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Research Handbook on Childhoodnature

Assemblages of Childhood and Nature Research

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Editors

Research Handbook on Childhoodnature

Assemblages of Childhood and Nature Research

With 298 Figures and 28 Tables

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Welcome to the Country

Yanbalehla Ngulung Karulbo on Bugeram Jagun – Walking Ahead Altogether on Sacred Land

I would first like to thank the Handbook Editors for this opportunity to create a Welcome to Country for this book on childhoodnature.

A Welcome to Country is generally conducted in the physical presence by traditional custodians of the land by which you are gathered. It is an honor reserved specifically to traditional custodians of that land due to the physical and emotional connection to place. To acknowledge country is an honor that anyone can deliver to pay respects to the traditional custodians.

As an Aboriginal person with connection to the Mununjali people of Beaudesert through Bilin Bilin and Nellie, I regard myself a representative of the Yugambeh language region of South East Queensland, Australia. My totem is Mibun, the eagle, which I consider sacred and connect through story and spirit. It provides guidance and strength to my journey. I acknowledge the country and land that you may be gathered upon as the reader and send my respects to the traditional custodians of that physical place.

Elders are important to me and are the ones that hold the knowledge, teach, and guide us through life's journeys. They were also the ones who had to fight to keep our cultural practices alive and ensure that our culture was not decimated. Often paying the ultimate price, they are our guiding lights. I humbly acknowledge the elders that have touched my life and continue to provide a lifetime of guidance.

As jarjums (children) we do not automatically get taught a lesson like at school. We must earn the right to receive that information and then ensure that we utilize that information or practice in the way that it was received. At no time does any one person hold all the knowledge. Each person is provided with the right information, at the right time, for the right reasons.

To receive these lessons requires trust and relationship. Our connection with others is like connection to country. It is assured but limited by the level of trust and relationship you have together. Our lore or law is taught through a number of ways and the responsibility of our lore men and women. This is passed down through stories, songlines, art, totems, and from the land. Our creation stories come from our country and link to neighboring countries through story and song lines.

All people should understand our connection and share the pride in our "mother," this country. To connect and understand the environment provides guidance and strength that is immeasurable and should come naturally to all people.

Silkwood School Jaelyn Biumaiwai
Year 12

Childhoodnature Preamble

"You did not act in time"

Greta Thunberg's speech to MPs at the Houses of Parliament, United Kingdom (UK), 23 April, 2019

My name is Greta Thunberg. I am 16 years old. I come from Sweden. And I speak on behalf of future generations.

I know many of you don't want to listen to us – you say we are just children. But we're only repeating the message of the united climate science.

Many of you appear concerned that we are wasting valuable lesson time, but I assure you we will go back to school the moment you start listening to science and give us a future. Is that really too much to ask?

In the year 2030 I will be 26 years old. My little sister Beata will be 23. Just like many of your own children or grandchildren. That is a great age, we have been told. When you have all of your life ahead of you. But I am not so sure it will be that great for us.

I was fortunate to be born in a time and place where everyone told us to dream big; I could become whatever I wanted to. I could live wherever I wanted to. People like me had everything we needed and more. Things our grandparents could not even dream of. We had everything we could ever wish for and yet now we may have nothing.

Now we probably don't even have a future any more.

Because that future was sold so that a small number of people could make unimaginable amounts of money. It was stolen from us every time you said that the sky was the limit, and that you only live once.

You lied to us. You gave us false hope. You told us that the future was something to look forward to. And the saddest thing is that most children are not even aware of the fate that awaits us. We will not understand it until it's too late. And yet we are the lucky ones. Those who will be affected the hardest are already suffering the consequences. But their voices are not heard.

Is my microphone on? Can you hear me?

Around the year 2030, 10 years 252 days and 10 hours away from now, we will be in a position where we set off an irreversible chain reaction beyond human control, that will most likely lead to the end of our civilisation as we know it. That is unless in

that time, permanent and unprecedented changes in all aspects of society have taken place, including a reduction of CO_2 emissions by at least 50%.

And please note that these calculations are depending on inventions that have not yet been invented at scale, inventions that are supposed to clear the atmosphere of astronomical amounts of carbon dioxide.

Furthermore, these calculations do not include unforeseen tipping points and feedback loops like the extremely powerful methane gas escaping from rapidly thawing arctic permafrost.

Nor do these scientific calculations include already locked-in warming hidden by toxic air pollution. Nor the aspect of equity – or climate justice – clearly stated throughout the Paris agreement, which is absolutely necessary to make it work on a global scale.

We must also bear in mind that these are just calculations. Estimations. That means that these "points of no return" may occur a bit sooner or later than 2030. No one can know for sure. We can, however, be certain that they will occur approximately in these timeframes, because these calculations are not opinions or wild guesses.

These projections are backed up by scientific facts, concluded by all nations through the IPCC. Nearly every single major national scientific body around the world unreservedly supports the work and findings of the IPCC.

Did you hear what I just said? Is my English OK? Is the microphone on? Because I'm beginning to wonder.

During the last six months I have travelled around Europe for hundreds of hours in trains, electric cars and buses, repeating these life-changing words over and over again. But no one seems to be talking about it, and nothing has changed. In fact, the emissions are still rising.

When I have been travelling around to speak in different countries, I am always offered help to write about the specific climate policies in specific countries. But that is not really necessary. Because the basic problem is the same everywhere. And the basic problem is that basically nothing is being done to halt – or even slow – climate and ecological breakdown, despite all the beautiful words and promises.

The UK is, however, very special. Not only for its mind-blowing historical carbon debt, but also for its current, very creative, carbon accounting.

Since 1990 the UK has achieved a 37% reduction of its territorial CO_2 emissions, according to the Global Carbon Project. And that does sound very impressive. But these numbers do not include emissions from aviation, shipping and those associated with imports and exports. If these numbers are included the reduction is around 10% since 1990 – or an average of 0.4% a year, according to Tyndall Manchester.

And the main reason for this reduction is not a consequence of climate policies, but rather a 2001 EU directive on air quality that essentially forced the UK to close down its very old and extremely dirty coal power plants and replace them with less dirty gas power stations. And switching from one disastrous energy source to a slightly less disastrous one will of course result in a lowering of emissions.

But perhaps the most dangerous misconception about the climate crisis is that we have to "lower" our emissions. Because that is far from enough. Our emissions have

to stop if we are to stay below 1.5–2°C of warming. The "lowering of emissions" is of course necessary but it is only the beginning of a fast process that must lead to a stop within a couple of decades, or less. And by "stop" I mean net zero – and then quickly on to negative figures. That rules out most of today's politics.

The fact that we are speaking of "lowering" instead of "stopping" emissions is perhaps the greatest force behind the continuing business as usual. The UK's active current support of new exploitation of fossil fuels – for example, the UK shale gas fracking industry, the expansion of its North Sea oil and gas fields, the expansion of airports as well as the planning permission for a brand new coal mine – is beyond absurd.

This ongoing irresponsible behaviour will no doubt be remembered in history as one of the greatest failures of humankind.

People always tell me and the other millions of school strikers that we should be proud of ourselves for what we have accomplished. But the only thing that we need to look at is the emission curve. And I'm sorry, but it's still rising. That curve is the only thing we should look at.

Every time we make a decision we should ask ourselves; how will this decision affect that curve? We should no longer measure our wealth and success in the graph that shows economic growth, but in the curve that shows the emissions of greenhouse gases. We should no longer only ask: "Have we got enough money to go through with this?" but also: "Have we got enough of the carbon budget to spare to go through with this?" That should and must become the centre of our new currency.

Many people say that we don't have any solutions to the climate crisis. And they are right. Because how could we? How do you "solve" the greatest crisis that humanity has ever faced? How do you "solve" a war? How do you "solve" going to the moon for the first time? How do you "solve" inventing new inventions?

The climate crisis is both the easiest and the hardest issue we have ever faced. The easiest because we know what we must do. We must stop the emissions of greenhouse gases. The hardest because our current economics are still totally dependent on burning fossil fuels, and thereby destroying ecosystems in order to create everlasting economic growth.

"So, exactly how do we solve that?" you ask us – the schoolchildren striking for the climate.

And we say: "No one knows for sure. But we have to stop burning fossil fuels and restore nature and many other things that we may not have quite figured out yet."

Then you say: "That's not an answer!"

So we say: "We have to start treating the crisis like a crisis – and act even if we don't have all the solutions."

"That's still not an answer," you say.

Then we start talking about circular economy and rewilding nature and the need for a just transition. Then you don't understand what we are talking about.

We say that all those solutions needed are not known to anyone and therefore we must unite behind the science and find them together along the way. But you do not listen to that. Because those answers are for solving a crisis that most of you don't even fully understand. Or don't want to understand.

You don't listen to the science because you are only interested in solutions that will enable you to carry on like before. Like now. And those answers don't exist any more. Because you did not act in time.

Avoiding climate breakdown will require cathedral thinking. We must lay the foundation while we may not know exactly how to build the ceiling.

Sometimes we just simply have to find a way. The moment we decide to fulfil something, we can do anything. And I'm sure that the moment we start behaving as if we were in an emergency, we can avoid climate and ecological catastrophe. Humans are very adaptable: we can still fix this. But the opportunity to do so will not last for long. We must start today. We have no more excuses.

We children are not sacrificing our education and our childhood for you to tell us what you consider is politically possible in the society that you have created. We have not taken to the streets for you to take selfies with us, and tell us that you really admire what we do.

We children are doing this to wake the adults up. We children are doing this for you to put your differences aside and start acting as you would in a crisis. We children are doing this because we want our hopes and dreams back.

I hope my microphone was on. I hope you could all hear me.

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Prologue

Childhoodnature: *nabi*[1] [begin]

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Childhood and Nature: *A Natural Meeting Place*

Every book comes to be through the flourishing of an initial spark or idea released into the universe and let to follow its own line of thought while being guided by a host of many. Assembled in a forest in the hinterlands of the Gold Coast, Australia, in 2015, 20 scholars gathered for an international colloquium on childhoodnature. The intent of the colloquium was to act as a meeting place for researchers working in the fields of childhood and nature, to consider a cartography of the field as an ever-evolving movement, and to contemplate the central tenets of the field in order to support imaginaries for potential. The concept of childhoodnature and the *Research Handbook on Childhoodnature* was imagined and began to be realized.

Figure 1 represents places as circles, the coming together of entities and bodies, and lines as the journey of these bodies and entities through and within places. The Gold Coast campus of Southern Cross University, the site of the handbook's emergence, is a

[1]Nabi means to "begin" in Bundjalung-Yugambeh. See http://bundjalung.dalang.com.au/language/dictionary.

Fig. 1 Childhoodnature meeting place symbol. (Image adapted and drawn by Amy Cutter-Mackenzie-Knowles Marianne Logan, and Maia Osborn)

Fig. 2 Childhoodnature Collective, 2015. The concept of the collective is symbolic of Latour's (2004) concept of common worlds recognizing that all objects and subjects are in perpetual relation

historical Aboriginal meeting place. We were attuned to the sensitivity of the land, nature, humans, and non-humans as entangled in places through past, present, and future tracings. In this sense, the intent of the colloquium was to act as a "moving" meeting place for researchers working in the field (see Fig. 2, Childhoodnature Collective) through a program that followed a unique and untraditional structure, a dialogic journey through time and space from the rainforest, a school, to the coast where a public dialogue on childhood and nature was then performed.[2]

The colloquium opened with a keynote address by Professor Karen Malone at Binna Burra National Park entitled "Reconsidering children's encounters with nature and place using posthuman theoretical approaches." Malone's keynote troubled the

[2]The moving and dialogic format of the program was inspired by Professor Sean Blenkinsop of Simon Fraser University and the colloquium that he convened in Vancouver, Canada (September 2014).

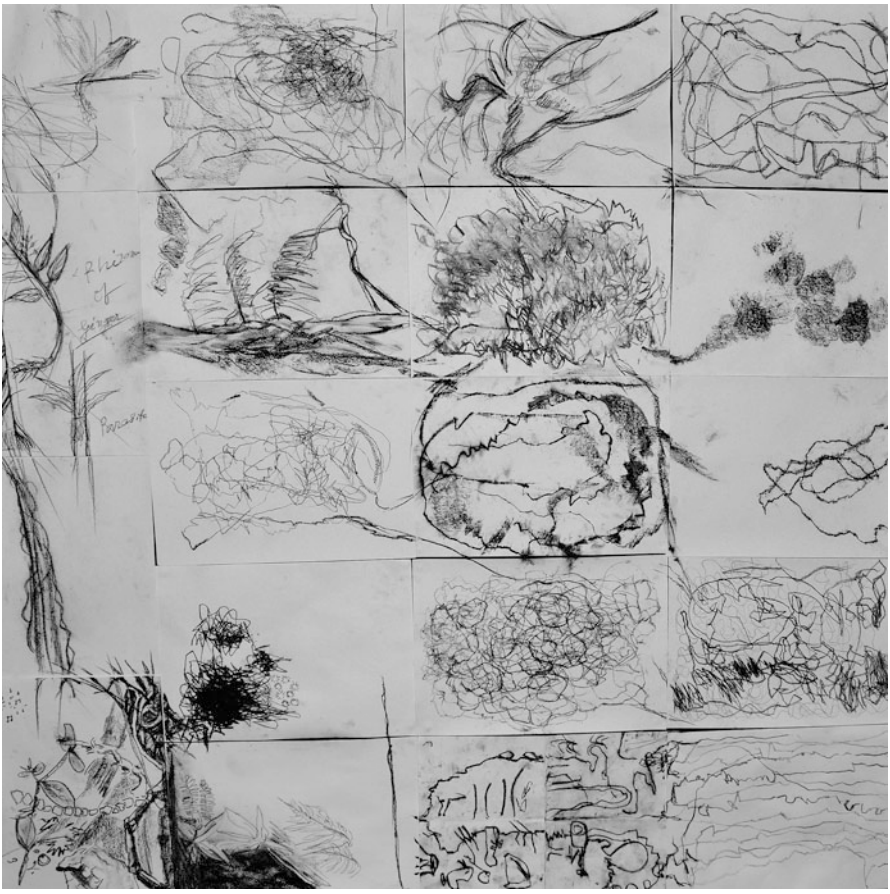

Fig. 3 Psychogeographic methods of walking and mapping (Photographer Dr David Rousell, Childhoodnature Collective Researcher)

"centrality of the human and to reconsider the way we relate, set ourselves outside of and seek to dominate the more than human world." From that vantage point, the collective represented their research on childhood and nature. In particular, Cutter-Mackenzie and Barratt Hacking reflected on their personal and research journeys toward childhoodnature; they discussed the way in which the development of child-framed research methodologies had supported child and adult researchers in understanding and representing children and young people's ontologies on childhood and nature (Barratt Hacking, Cutter-Mackenzie, & Barrratt, 2013). Such thinking led the group to consider the proposition of "Childhood after Nature: Walking and mapping new pathways for the posthuman child in the Anthropocene" facilitated by David Rousell. Rousell provoked "If the earth has become something other than 'nature', and humanity has become something other than 'human', what are the implications for our understanding of 'childhood'?" The session responded to two recent turns that have

Fig. 4 The *Handbook of Childhoodnature* editors – Amy Cutter-Mackenzie-Knowles, Karen Malone, and Elisabeth Barratt Hacking

far-reaching implications for understandings of childhood: firstly, the turn toward the Anthropocene as an era in which natural and cultural phenomena have become fundamentally entangled (Crutzen & Brauch, 2016) and, secondly, the turn toward posthuman theory that rejects anthropocentrism, humanism, and individualism to make way for new forms of collective subjectivity and expression (Braidotti, 2013). These turns have brought the romantic concepts of "childhood" and "nature" under productive scrutiny, and paved the way for new imaginings of childhood.

Applying psychogeographic methods of walking and mapping (O'Rourke, 2013), the participants explored Binna Burra national park as and with "ecology without nature" (Morton, 2008). Approaching the national park as *always already inhabited by multiple others*, and *always already mediated by multiple technologies*, walking, dialogue, reflection, writing and drawing, were sought to uncover new and alternative pathways for considering possibilities for a childhood in the posthuman age of the Anthropocene (see Fig. 3). Our walking and mapping led to intensive dialogue about the concepts of childhood and nature.

Evolving from our being together, the concept of "childhoodnature" was cocreated by Cutter-Mackenzie-Knowles, Malone, and Barratt Hacking during an intensive conversation on the intent of the Handbook (see Fig. 4). The concept reflects Cutter-Mackenzie, Malone, and Barratt Hacking's underpinning belief, and the latest innovative concepts in the field, that as children *are* nature, this should be redefined in this integrating concept. It was envisaged that the Handbook would critique and decenter

Fig. 5 Contemplating Childhoodnature at Silkwood School through 8 Ways of Aboriginal Learning

dominant anthropocentric views of nature. These disruptions would interrupt existing ways of considering children and nature by making visible the limits of a view of human exceptional, that humans are positioned as superior to nature. These ideas have been nurtured and flourish in the handbook as it now comes into being.

In considering the porousness of childhoodnature, the dialogue continued at Silkwood School with educators, children, and young people (Fig. 5). Educators conceptualized childhoodnature as a kindred concept with traditional ways of knowing. At Silkwood Independent School, traditional ways of knowing are central to the School's philosophy, curriculum, teaching, and learning. Silkwood School is part of Kombumerri country and the wider Yugambeh language region. Jaelyn Biumaiwai, an indigenous student at Silkwood, welcomed our collective to the School. Fittingly, Jaelyn has commenced the Handbook by giving a Welcome to Country – *opening this Handbook*.

Dialogue was further continued at Southern Cross University, the final meeting place, for a public dialogue on childhoodnature. As we ended our journey, the childhoodnature collective opened its doors to welcome children, young people, educators, parents, academics, and interested community members into a public dialogue on childhoodnature. We now welcome you to the childhoodnature collective in search of common ground, a common world where children and nature are enmeshed as they *are*.

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Dr. Amy Cutter-Mackenzie-Knowles (formerly Cutter-Mackenzie) is a Professor at Southern Cross University, School of Education, in Sustainability, Environment and Education. She is the Dean and Head of School for the School of Education, as well as the Research Leader of the "Sustainability, Environment, the Arts in Education" (SEAE) Research Cluster.

Amy commenced her career as a school teacher in Queensland, Australia, and later moved into academia after completing her Ph.D. Amy's research is deeply engaged with children's ontologies with/as nature through socioecological and posthumanist theoretical framings. Amy's most current book is *Touchstones for Deterritorializing Socioecological Learning: The Anthropocene, Posthumanism and Common Worlds as Creative Milieux* (with Lasczik, Wilks, Logan, Turner, and Boyd). Amy is the Editor-in-Chief of the *Australian Journal of Environmental Education* with Professor Karen Malone (Cambridge, Q2) and a Consulting Editor for the *Journal of Environmental Education* (Q1) and the *International Journal of Early Childhood Environmental Education* (NAAEE).

In the past 5 years Amy has generated substantial external research income (including two Australian Research Council Discovery grants), having completed over 40 research projects in the areas of environmental education, climate change education, and nature play.

She is the research leader of an international research program in climate change education called Climate Change + Me (http://climatechangeandme.com.au).

In 2014 Amy was awarded the Australian Association for Environmental Education Fellowship (Life Achievement Award) for her outstanding contribution to environmental education research. Further, in 2010 Amy was awarded a prestigious Australian Learning and Teaching Council (OLT) National Teaching Excellence Award. In 2009 she was awarded Monash University's Vice-Chancellor's Teaching Excellence Award (September 2009) and a prestigious OLT Citation for Outstanding Contributions to Student Learning (August 2008). These respective teaching awards were specifically for "leading school-community teaching and learning practices and partnerships to influence, motivate and inspire pre-service education students and schools to engage in environmental education and sustainability."

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Professor Malone researches in science and environmental education, urban and animal ecologies, and childhood studies with a specific focus on children's environmental encounters with the more than human world of damaged urban landscapes. Her current research program is located under the overarching theme of **Children in the Anthropocene**. Within this program she has five enmeshed research themes that entwine a series of research interests and activities: **children sensing ecologically**, **children's bodies on damaged landscapes**, **children's multispecies companions**, **children's watery lives,** and **children's natural play**. The research program is the culmination of over 20 years of research working in urban environments with children and families in a variety of community, school, and public spaces in cities and towns around the world. She has successfully attracted over two million dollars in grants on this research work with the majority of her grants having been funded by the United Nations (UNESCO and UNICEF) and other

government, industry, and community partners. In all these funded projects she has documented the everyday lives of children aged 2–15 years while growing up in challenging environments. Her research activities are conducted using participatory place-based research workshops, using visual, mobile, and verbal methods. Thousands of children have participated in research workshops in Australia, Albania, Bolivia, Cook Islands, Indonesia, Japan, Kazakhstan, Papua New Guinea, and South Africa, with this data set now providing a solid foundation for ongoing longitudinal comparisons. Her most recently funded research project "Children sensing ecologically" explores for the first time very young children's (1–3 year olds) walking encounters of urban landscapes in public, home, and childcare settings. Sensing ecologically is a conceptual tool that she is using in order to imagine how children can engage/communicate with the more than human world prior to language acquisition. In early 2018 she published a sole-authored book *Children in the Anthropocene* that provided her most current thinking theoretically, methodologically, and conceptually and setting the foundation for future research activities. During her career Professor Malone has authored 7 books and over 100 other publications. She is coauthor of the *International Research Handbook on Childhoodnature* and first named editor of the Springer education book series Children: Global Posthumanist Perspectives and Materialist Theories. She is also first named author of an edited collection titled *Reimaginging Sustainability in Precarious Times*.

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Elisabeth is the Deputy Head of the Department of Education at the University of Bath and Director of Studies for the MA Education. Elisabeth is a founding member of the University's Childhood, Wellbeing and Education Special Interest Group.

Elisabeth's research is in the overlapping areas of environmental education, childhood and the natural environment, and global citizenship. For more than 20 years Elisabeth has led numerous educational

research, evaluation, and development projects with children, educators, educational and environmental organizations, and national and international policymakers. Much of this research has been undertaken in partnership with children and young people using participatory, child-framed research methodologies. Initially commenced through an Economic and Social Research Council (UK) research grant, "Listening to children: Environmental perspectives and the school curriculum" (with Scott and Barratt), Elisabeth has made an important contribution to the advancement of theory, policy, and practice in the area of childhood and the natural environment. In 2007 Elisabeth guest edited a special issue of the journal *Environmental Education Research,* "Childhood and Environment" (with Barratt); this was the first special issue to focus on childhood and was ground-breaking in the environmental education field. In 2010 Elisabeth authored a government report synthesizing latest research evidence on the impact of attending schools in England that focus on education for sustainability (with Scott and Lee). This has since contributed to the policy and practice debate about Education for Sustainability in England and further afield. Most recently Elisabeth's global citizenship research has been advanced by a funded research study exploring how "International Mindedness" is conceptualized and practiced in International Baccalaureate (IB) World Schools (2017). These research findings are being used to inform IB policy and practice and, more widely, contribute to research and policy debates in global education.

Elisabeth serves as a Consulting Editor and International Editorial Board Member across multiple journals, including the *Australian Journal of Environmental Education*.

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Childhoodnature: An Assemblage Adventure

1

Amy Cutter-Mackenzie-Knowles, Karen Malone, and Elisabeth Barratt Hacking

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Abstract

What follows in this International handbook are nine distinct sections, together with a companion authored by children and young people. It is the first handbook on childhoodnature research, theory, and practice – a new field of research and inquiry. In the handbook introduction, we initially invite readers to join us for a grandtour of the handbook and companion, followed by a rich discussion on the new concept "childhoodnature" co-created by the handbook editors.

Keywords

Childhoodnature · Assemblage · Posthuman · Anthropocene · Childhood

Embarking on a New Childhoodnature Adventure

"The adventures first" as Lewis Caroll would say. This handbook is an adventure. A new adventure of thought; indeed a thought experiment. It experiments through the compilation of new and old ideas enmeshed into one collection.

We are sitting together at a set of table and chairs constructed for small children. I feel uncomfortable, unstable, my knees are bent. I am slightly hunched over so I can attentively watch at the actions of the small child next to me, without getting too close. Sara has the packet of developed photographs from the disposable camera she handed to me a week ago. She had run up to me with an air of excitement when I had arrived in the Kindergarten room. She wouldn't be disappointed. I had the photographs. She opens the packet and starts to methodically pull each one out. She pauses at each, looks at it for a while, then places it on the table in front of her.

She stops at one photograph and holds it in her hands. Putting aside the packet with the unviewed photographs still contained inside, she holds the photograph in both hands. For where I am sitting I can see the photograph she is holding has the trunk of two trees and the perspective is as if it was taken looking up into the tree from the ground. I pause and allow her to guide the process.

'I took this in the park' she says quietly, almost like she is speaking to herself. I nod my head. 'I am a leaf fallen from the tree'. She turns her head to see my reaction. I nod again. She pauses, still looking at me, 'from that tree', she says and points to the tree on the right of the photograph. She then gets off the chair on the floor beside me and lays down on her back.

She is once again becoming a leaf. I sit still, quietly watching. She is still, quietly being a leaf. (Extract from Malone (2018), *Children in the Anthropocene* (used with permission of the author))

Grandtour of Childhoodnature Handbook

Through its 81 chapters, including the companion, the Research Handbook on Childhood is an assemblage of research in the field of childhoodnature. Likened to an assemblage as espoused by Deleuze and Guattari (1987) in their book "a thousand plateaus" the handbook can be entered and exited at any point. It has content and form, ways of being and becoming with many ideas and concepts, some new, many in between old and new and other speculative around how the field could be and the contribution it could make in future thinking. At present no such handbook or major work of this breadth and depth of theoretical and applied thinking and research in the field exists, but beyond this is for the first time it invites children and young people to walk alongside adult researchers and provide their own perspectives through a range of multimodal philosophies and methodologies.

With the advent of a re-turning of the "children in nature" movement, the "new nature movement" has seen an increase in producing the practice and nature of outdoor and nature education that has led to a resurgence in public visibility of the field (see Fletcher, 2017; Gill, 2011; Kahn, 1999; Kahn & Kellert, 2002; Kellert, 2002; Louv, 2011, 2016; Malone, 2016; Malone, Birrell, Boyle, & Gray, 2015; Sobel, 1996, 2008; Taylor, 2013). At the public interface, this resurgence has primarily been orchestrated on a small collection of well-known books (for example Louv, 2005, 2011, 2016). These books, although focused on the ways and means of educating children in nature and effective in engaging the (minority Western) public in such matters (Alam, 2008), have tended not to problematize the implications for this field or be instrumental in supporting new theoretical perspectives and associated research methodologies. Further, we argue that this work maintains the Cartesian nature-culture binary, which

we find problematic, by suggesting a separation between children and nature. As a response the new concept of childhoodnature aligns with a posthuman turn in educational and childhoodnature research and, associated with this, the recognition that humans are having an unprecedented planetary impact on Earth in this time of the Anthropocene. To this extent, posthumanist ontologies reject "that humans are the only species capable of producing knowledge and instead creates openings for other forms/things/objects/beings/phenomenon to know" (Ulmer, 2017, p. 834). Such ontological thinking troubles traditional and scientific ways of knowing between species, opening up "a wealth of research possibilities. . . when humans are decentered as the only possible knowers" (Ulmer, 2017, p. 834).

The intent of this handbook was therefore to bring together children and researchers interested in the new concept of childhoodnature, whose research work reflected our commitment to problematizing views around childhood and nature and progressing "childhoodnature" work. Here, we offered an opportunity for researchers to gather into a new research collective and, as such, build the momentum. To these ends, this handbook's endeavor is to consolidate the field of childhoodnature research, providing an avenue for considering the terrain that lies ahead to continue to build the influence and impact of the field.

Uniquely, this handbook assembles existing research themes and seminal authors in the childhoodnature field alongside new cutting-edge research and researchers drawing on cross-cultural and international research data. From the onset, the underlying objectives of the handbook were twofold:

- Opening up spaces for childhoodnature researchers in what we have termed a childhoodnature collective; and
- Assembling Childhoodnature Research into one Collection that informs education and the social sciences

The handbook's nine sections were edited by 22 Section Editors who took oversight of those particular sections. The sections and editors include:

1. Childhoodnature Theoretical Perspectives (*Section Editors: Professor Karen Malone, A/Professor Iris Duhn and A/Professor Mark Tesar*)
2. Childhoodnature Research Methodologies (*Section Editor: Professor Paul Hart*)
3. Cultural, Political and Wild Perspectives of Childhoodnature (*Section Editors: Professor Sean Blenkinsop and Professor Peter Kahn*)
4. Childhoodnature and the Anthropocene: An Epoch of "Cenes" (*Section Editors: Professor Amy Cutter-Mackenzie-Knowles, Professor Karen Malone, A/Professor Hilary Whitehouse and Professor Marianne Krasny*)
5. Childhoodnature Significant Life Experience (*Section Editors: Elisabeth Barratt Hacking, Dr Debra Cushing and Professor Robert Barratt*)
6. Childhoodnature Ecological Systems (*Section Editors: Dr Marianne Logan and Dr Helen Widdop Quinton*)

7. Childhoodnature Animal Relations (*Section Editors: Professor Pauliina Rautio and Dr Tracy Young*)
8. Childhoodnature Pedagogies and Place (*Section Editors: Professor Bob Stevenson, Dr Greg Mannion and Dr Snowy Evans*)
9. Childhoodnature Ecological Aesthetics and the Learning Environment (*Section Editors: Dr David Rousell and Professor Dilafruz Williams*)

The handbook also includes a **childhoodnature Companion** authored by children and young people, edited/curated by distinguished early career researchers (Dr Helen Widdop Quinton, Dr. Laura Piersol, Dr. David Rousell and Dr. Joshua Russell) supported by a panel of youth reviewers. The companion is located in the middle of the handbook signifying its centrality. It operates as a milieu akin to Deleuze and Guattari's (1987) conception of milieu that is vibratory, chaotic yet relational. The companion vibrates through/in/as the handbook where children are nature.

Section 1: Childhoodnature Theoretical Perspectives (*Section Editors: Professor Karen Malone, A/Professor Iris Duhn and A/Professor Mark Tesar*)

In setting out on an uncertain and tenuous adventure into the future, theories are needed which can help humans effectively respond to the rapidly changing conditions of everyday life on earth. This is particularly the case in the emerging field of childhoodnature studies, as children themselves will be forced to grapple with existential threats associated with the onset of the Anthropocene era, including climate change, social instability, and water crises, among many others. This section assembles a theoretical toolkit which can enable childhoodnature encounters to flourish into the Anthropocene and indeed post-Anthropocene. In this undertaking, this section does not put diverse theoretical perspectives into competition but rather assembles theories as tools which can produce sparks when knocked together. These are theories that you can pack up and take for a walk, theories that can help get you out of sticky situations, and theories which children themselves can use to address the crises which they will inevitably inherit. As such, this section puts multiple philosophical perspectives into consequential relation such that they can become productive in their differences. This endeavor asks us to take stock of theories which have been productive in the field to this point and also to seek new theories which are emerging in direct response to the contemporary moment.

Section 2: Childhoodnature Research Methodologies (*Section Editor: Professor Paul Hart*)

This section focuses on the framing of childhoodnature research and its interpretations and applications, as well as trends and issues. Methodological inquiry in the social sciences normally rests upon certain epistemological interests, ontological

assumptions, and axiological commitments. This basic frame of research is complicated further in environmental education research when the formative context of childhoodnature is included. Additional demands are placed on the conceptualization, contextualization, representation, and legitimation of the research problem, purposes, processes, values, and inevitably, usefulness. Methodological deliberations and debates in environmental education research have a four decade long history (strictly in a Western minority sense) but are now subject to "new" theoretical perspectives introduced in Section 1 while also drawing inspiration from the rise of the environmental arts, humanities, sciences, and related genres of emergent inquiry. Paradigmatic change for childhoodnature is a potential – exacerbated practically by the local-global consequences of the Anthropocene now being felt intergenerationally and lived cross culturally. Children and childhood are particularly vulnerable. How, and in what ways, does methodological inquiry about the researcher-researched (childhoodnatures) relationship *access* children's lived experiences; historicized selves/subjectivities and identity formations including family and schooling ecologies; actions and interactions with (and against) nature; and "worldviews"? Methodological inquiries into the framings, interpretations/applications, and trends/issues supported by, where possible, distinctive empirical insights are invited. Exemplary contributions to this section demonstrate how the methodological reflexivity of childhoodnature studies advances the qualities, values, status, and efficacy of environmental education research and the social sciences more broadly.

Section 3: Cultural, Political, and Wild Perspectives of Childhoodnature (*Section Editors: Professor Sean Blenkinsop and Professor Peter Kahn*)

This small yet significant section speaks to the transformative power of children interacting with nature, and more wild nature, in diverse settings, including schools. It considers investigations of nature and wildness, nature as teacher, and educational, political, social, and cultural transformation. Consideration is given to ways in which current and near future (often digital) technologies are impacting children's learning and experience of nature and authenticity of relation. Chapters also include innovative educational work that is currently happening that imagines beyond the boundaries of conventional affluent minority educational norms. Linkages are established between theory, practice, ethics, diversity, and contested ideas of childhoodnature.

Section 4: Childhoodnature and the Anthropocene: An Epoch of "Cenes" (*Section Editors: Professor Amy Cutter-Mackenzie-Knowles, Professor Karen Malone, A/Professor Hilary Whitehouse and Professor Marianne Krasny*)

Section Four troubles childhoodnature and the Anthropocene, a scientific and popular term used to described the present human-nature conditions on planet Earth. The section does this through eight contributions which broadly speak to four 'cenes',

namely: children in the Anthropocene – child-cene; woman in the Anthropocene – gyno-cene; Cities as sites of the Anthropocene – city-cene; and relations with the morethanhuman – kin-cene. The lines though between/within/ through these identified cenes are porous and enmeshed as the nonliving, the human, and nonhuman transition between two epochs – the Anthropocene and the Postanthropocene.

Childhoodnature Companion (*Companion Editors/Curators: Dr Helen Widdop Quinton, Dr Laura Piersol, Dr David Rousell and Dr Joshua Russell*)

This "Companion" to the Childhoodnature Handbook is a co-creation between children, young people, and adults, curated by four academics and five graduate students to bring children and young people's voices to the foreground. What does it mean to create a Companion? How might the voices of children and young people become "companions" with the other chapters that make up this Handbook? The Companion editors began the process of compiling and curating the Companion with these open questions in mind. They wanted to explore how a notion of companionship could grow and develop organically and perhaps become something more than what we had expected. In early 2017, the Companion Editors extended an international call for contributions from children and young people all over the world. The call asked for children and young people (from early childhood to 25) to submit essays, photographs, poetry, drawings, creative writing, or personal narratives that expressed their experiences and understandings of childhoodnature. They asked for *"anything and everything that you, as children, teenagers, and young people (ages 0–25), might contribute that draws on your ideas about nature, your experiences with animals, or your thoughts about environmental issues."*

The companion editors' editorial approach to constructing the Companion has attempted to preserve the quality and diversity of the submissions that they received. They also worked with youth reviewers who helped to shape their approach and understanding of the material.

The Companion is something new in academic publishing – there were no models or templates to guide either the Handbook Editors or Companion Editors. Rather than attempting to represent, interpret, or categorize the experiences of children and young people, the Companion Editors created four distinct *compositions* of interwoven feelings, places, sensations, and ideas:

Composition 1: stories of human and nonhuman relation
Composition 2: practices of sense and sensation
Composition 3: eco-poetics of childhoodnature encounter
Composition 4: the childhoodnature imaginary

In putting these compositions together, the Companion Editors endeavored to give each submission space to breathe, inhabit, and saturate the page, while also weaving together different voices and geographical locations to produce a range of feelings and sensations for the reader.

Section 5: Childhoodnature Significant Life Experience (*Section Editors: Elisabeth Barratt Hacking, Dr Debra Cushing and Professor Robert Barratt*)

Being in nature as a child has long been reported as an important contributor to being an advocate for the environment later in life. This section investigates the multiple-complexities about what people attribute their significant lived experiences to and how it has shaped their environmental choices. Significant Life Experiences (SLE) was coined in 1980 by Tom Tanner (Chawla, 1998) who inspired an avid interest in this area of research. Tanner's ground-breaking study identified affective experiences in nature that had an impact upon people's respect and appreciation for the environment. Following on from Tanner's work, further research has also endorsed and confirmed the power of SLE in nature. But what is it about these SLEs that have such an impact upon people's lives? The quality of SLE has been shown to influence learning, not just in early childhood but throughout life. Chawla has noted that natural areas, family influences, organization, negative experiences, and/or education have been attributed to creating these SLE. While children are often not able to recall these experiences, they do shape lifelong learning, which clearly develops into personal adult characteristics, as is demonstrated by adults' reflections upon their experiences. This section provides a snapshot of current research and associated understandings of SLE in childhoodnature. Authors draw on SLE reported from around the world contextualizing the influence of society, people, and culture on childhoodnature relationships and theorize on the meaning of both social disadvantages and negative environmental experiences. By developing deeper understanding of these experiences, authentic achievements in environmental education are afforded.

Section 6: Childhoodnature Ecological Systems (*Section Editors: Dr Marianne Logan and Dr Helen Widdop Quinton*)

Section 6 focuses on childhoodnature within the complexity of the entanglement of the biological environment with the physical environment. It incorporates childhoodnature in the light of the magnitude of environmental change as a result of human activity, indeed the Anthropocence. Ecological literacy, ecological thinking, ecological identity, and whole systems thinking are central to the eight chapters which comprise this Section. The section (re)explores systems thinking, ecological systems and the interaction of humans within those systems. The chapters reveal a posthuman turn for reconceptualizing ecological systems thinking in childhoodnature.

Section 7: Childhoodnature Animal Relations (*Section Editors: Professor Pauliina Rautio and Dr Tracy Young*)

Until recent times human-animal relationships have received minimal attention from educational and social science research or have rarely focused on children's inter-species relations. We know that animals matter in the lives of children and the

Handbook and Section Editors have chosen to privilege these human-animal relationships through this section. The complex relationships with children, animals, and environment provide a space for ethical considerations that critique the social positioning of animals in education and society. The ten chapters provoke a diversity of (re)thinking of child/animal relationships in communities, families, and education with a range of suggested ways that animals can be elevated as crucial components of pedagogical theory and practice. The authors grapple with taken-for-granted interspecies relationships in their messy, complex, and multiple forms, looking beyond the hidden, the marginalized, the unexplained, and the ill-considered. This questioning of multiple relatings has the potential to (re)imagine new models, theories, and ways of crossing boundaries that blur the illusion of separation between children and animals.

Section 8: Childhoodnature Pedagogies and Place (*Section Editors: Professor Bob Stevenson, Dr Greg Mannion and Dr Snowy Evans*)

This section explores a range of pedagogies enacted in diverse contexts with a childhoodnature focus. Place is an integral element of childhoodnature experience and education; this section represents writing that engages with a depth of pedagogical understandings and a breadth of pedagogical repertoires. The way that childhoodnature centric approaches promote critical thinking, problem solving, resilience, adaptability, and preparedness in the current and future global uncertainties is considered and discussed in this section. The seven chapters in this section document current research and thinking about place and pedagogy supported with illustrative vignettes and case studies from a range of educational contexts.

Section 9: Childhoodnature Ecological Aesthetics and the Learning Environment (*Section Editors: Dr David Rousell and Professor Dilafruz Williams*)

This section explores the ecological and aesthetic dimensions of learning environments in which childhoodnature encounters take place. While environmental education has traditionally placed children in contact with a relational and interconnected world, too often the aesthetic dimensions of these encounters have been overlooked. As revealed across the ten chapters in this section, eco-aesthetics provides fertile grounds for interdisciplinary research and practice which attends to richly textured compositions of childhoodnature through a diverse range of material, social, and conceptual practices. Such approaches have become increasingly relevant following the onset of the Anthropocene epoch, which has provoked new modes of thinking and practice transgressing established barriers between the arts, humanities, sciences, and technology. In attending to the sensuous and affective qualities of childhoodnature encounters, multiple sites are opened up as vital spaces for children to respond to the changing material conditions of everyday life. These

spaces are not limited to national parks, remote wilderness areas, nature schools, or community gardens but also include art galleries, online environments, museums, urban landscapes, everyday domestic spaces, among many other settings. Each of these sites of engagement can be considered inherently ecological *and* aesthetic spaces which afford and constrain the very possibilities for movement, learning, and thought. This perspective supports methodological turns towards arts-based, creative, and sensory practices in educational research with children.

A Childhoodnature Emergence

In recent years, there has been a significant return to the enduring sentiment that providing opportunities for children to be immersed in "nature" particularly in the places close to where they live is an essential way to support children's opportunities to reconnect with the planet. Premised on the argument that a nature-child connection is essential for their health, well-being, and their potentiality to be environmental stewards and that unless children are re-natured then all these attributes would be compromised. This is a significant challenge, engaging children to be the potential "masters" (using this term is to signify how humans, particularly male Eurocentric humans, have come to view themselves in relation to nature) of the Earth's destiny on behalf of the human/nonhuman species. Educators in sustainable development, environmental, and nature education as fields of educational study have sought to idealize and argue that the central challenge of education is to encourage and entice the human moral desire to "conserve nature," to "protect animals," and for children to grow up and be politically active agents for change (see Cutter-Mackenzie & Rousell, 2018; Cutter-Mackenzie, Edwards, Moore, & Boyd, 2014; Rousell, Cutter-Mackenzie, & Foster, 2017). Big-ticket environmental issues such as limits to production, climate change, and animal conservation are the backbone of sustainability, environmental, and nature education; to be able to "overcome" these significant global issues, a well-educated and natured child willing to have the moral certitude to take up the challenges has been viewed as essential. Cutter-Mackenzie et al. (2014, p. 26) caution such "child" positionings:

> An anthropocentric perspective emphasises the use of the environment *for human gain*, and so sustainability is associated for some scholars with responding to this use so that children become 'agents of change', working to protect the earth's resources from being depleted. Whilst this approach undoubtedly has value... critics argue that an ecocentric [relational] perspective is more appropriate.

Taylor (2017, p. 1462) further problematizes stewardship in environmental education and traces this belief in the potential environmental immersion to produce agents of change back to the writings of Wilson (1993), Chawla (2009) and the historical traditions of Rousseau: "... the close association of young children with nature can be traced back to Rousseau's figurative 'Nature's Child' legacy and the subsequent Romantic western cultural traditions that perpetuate the view that young

children have a special and close affinity with the natural world (see Taylor, 2013, pp. 3–57). From this legacy, the assumption is that, if nurtured, children's 'biophilia' (or innate love of nature) will predispose them to become environmental stewards" (p. 5). Taylor (2017) then goes on to argue that these beliefs are a divergence between good romantic nature and bad evil culture with children positioned as "bad culture" in need of a return/reconnect back to their pure natured bodies. She argues that these beliefs are supported by a set of two keenly held assumptions: "Firstly, they assume that nature exists 'out there' in a pure space that is somehow separate to the corrupting cultural/technological/urban domain in which most children grow up" (p. 1452); and "Secondly, and concomitantly, they assume that young children's 'natural' place is in nature, and that the increasing paucity of children's first hand nature experiences in their overly urban lives constitutes a threat to their wellbeing" (p. 1452).

These beliefs have been supported also through much of the recent studies by agencies such as the US-based child and nature network (https://www.childrenandnature.org) where the focus is on creating opportunities to enhance children's experiences and capacity to encounter "real" nature. In their fervor to improve what may have been viewed as degraded environments or deprived children, what they have not done is look closely at the relations of those entities and things that surround and embrace children in the urban places where they live. Questions about what the meanings of those child-nature encounters are or even to acknowledge that children, no matter where they are (in slums or in a conservation park), are engaging with a range of different types of "nature" relations have been missing from the literature, something explored and unpacked deeply in this childhoodnature handbook.

Dickinson, for instance, has argued in the past that (2013, p. 7) "Fall-recovery narratives can be problematic in how they reify the human-nature split, obscure environmental justice, influence irresponsible behavior, and normalize contemporary conditions and relationships." What she means by fall-recovery narratives is a form of reminiscing about the past that has been sanitized/romanticized in order to present a specific view of childhood and nature. That is, for example, the view that "the past was always 'good' and 'virtuousness' particularly in terms of the child-nature relationship and the focus should be on returning children to this desired natured state" (Malone, 2018). The past generation is sentimentalized as having grown up in an utopian dream in which all children had a childhood where they were safer, had more freedom to be "children," and were left to explore nature (particularly wild nature). This return to a "better" nature relation is contrived on an assumption that past generations had a closer and more intimate relation with the planet and "de-emphasizes" according to Dickinson (2013, p. 7) "a long history of environmental degradation and disconnectedness."

Past studies on children's perceptions of nature in a range of urban and peri-urban environments reveal that unlike the simplified and commodified definitions of "childhoodnature relations," child/nature relations are complex and these encounters of children with and through their natured selves, as nature, with nature, being entangled with natural entities can often be uncomfortable, difficult, and tricky. We do not need to go far back into the literature to find this work. Teenagers in

Wals's (1994) early study on perceptions of nature (one of the first ever in the field), for example, defined their view of "nature" as a threatening place and validated an anthropocentric desire by the young people to control, tame and manage the wilds. In his study, the students' perception of nature was based upon "..a combination of their own fantasies and the unspeakable acts that occur in local parks, which are often well documented by the media" (p. 132). In their home neighborhood, the students feared the forest and trees. One student remarked that they would prefer forests with "just enough trees to give you shade, but not enough for murderers and rapists to be able to hide behind them" (p. 135). Wals's (1994) results are consistent with other research studies where "nature" (including animals) can be viewed as both threatening and fascinating (Evans, 2013; Evans et al., 2007; Phenice & Griffore, 2003).

Participatory research with 10–12 year old children in a disadvantaged urban area of the UK (Barratt Hacking et al., 2007) found that children held a realist rather than romanticized view of childhoodnature relations. While this research predates the new concept of childhoodnature, looking back it is clear that childhoodnature experience was important to the children. Specifically, they demonstrated concern for the (local) environment for themselves, other children, and adults and more than human nature. The children conveyed a real sense of emotional attachment to, and physical engagement with, the local environment (Barratt & Barratt Hacking, 2008). Despite living in a disadvantaged environment, the children viewed more than human nature as integral and important to their lives and their locality. The research found that children had intricate local environment knowledge which "is generated through exploration and play, passed to the children from their peers and families through stories, and is renewed through contact with each other, with older children, with adults" (Barratt Hacking et al., 2007, p. 131). Green spaces in the form of parks and school grounds, though limited in this urban area, were significant in children's lives, not least as places beyond the adult gaze to play, socialize, and enjoy. Nevertheless, there were concerns about how older youths and adults posed a threat to the children's safety and enjoyment in the park and to the wildlife contained in it. The child researchers' analysis of data they gathered about their own and their peers' local environment perspectives led them to conclude that:

> Many of us move around without adults now. . . we have detailed knowledge that is different to adults and we use our knowledge differently to them. The environment is important to us, we want more wildlife, we want a cleaner and safer environment, we want to care for the environment. (Barratt Hacking & Barratt, 2009, p. 379)

While attaching great importance to local environment quality the children reported that they and their peers have "difficulty taking action to achieve what they want for their local environment; (and) do not know how to go about it" (Barratt Hacking et al., 2013, p. 447). The evidence from this research showed how the children viewed their natural worlds as intertwined with their socio-cultural worlds and that children have "a strong desire to be involved in local improvement; for example, they are concerned about environmental quality and would like to see more habitats" (Barratt Hacking et al., 2007, p. 132).

Then taking into account the diversity of children and childhoods now existing in multiple ways of knowing and being in the world, childhoodnature has the opportunity to open up a range of different possibilities. Hordyk, Dulde, and Shem (2014), for example, reporting on their study of immigrant and refugee children in Canada revealed that for children coming from majority world nations: "Nature was not a utopian ideal waiting to be experienced by children" and "human and animal predators made walks in a forest dangerous pass-times" (p. 6). Malone (2018, p. 124) also revealed this less than romantic view of childhoodnature relations from her studies in Bolivia which are further expanded in the handbook:

> The majority of children growing up in the slums of La Paz although in a built and very altered environment were deeply embedded in the potential of intra-acting with the natural environment. This was not an imagined pure nature, a wooded forest with birds and butterflies; it is the difficult dirty gritty world of living in poverty with nature through shared material matter.

The world outside of the Western minority gaze also reveals a view of the natural world as entangled in cosmological philosophies dating back for thousands of years in many indigenous nations. The diversity of possibilities and potential for childhoodnature as a means for relational ways of being as nature, child, and earth allows something new and old to happen differently:

> Children in La Paz are deeply entangled in a relation with their natural world. This is not just a worldly present relation but a deeply entrenched history of reverence and respect for nature and the earth that has evolved through their indigenous spiritual beliefs of the Pachamama. (Pachma meaning 'cosmos' and mama meaning 'mother'). In the indigenous philosophy of the Andean people, the Pachamama is a goddess. She is Mother Earth. She sustains life on earth. Water, Earth, Sun, and Moon are Mother Earth's four Quechuan cosmological entities. (Malone, 2018, p. 103)

Conclusion

By shifting away from the child in nature as the only agential body and focusing on the materiality of child bodies and the bodies of other nonhuman entities as relational assemblages allows this new ethical imagining for children and their encounters with place and nature. In this handbook, we are seeking to reframe the importance of childhoodnature relational encounters as central to children's collective agency with and through being with others. This allows us to realize the messy, entangled natures of living in a less than romantic world. In this time of the Anthropocene, children are living natured lives with a host of others. A focus on the human subject to the detriment of 'other' possible agentic subjects has narrowed the view of child-nature relations and supported the Cartesian divides human/nature, adult/child, and self/other. Taylor (2013, p. 66) describing the recent conversations in the field states:

> . . . such conversations have constellated around the challenge of thinking differently about nature, as well as what it means to be human. Those involved have undertaken to reconceptualize what counts as nature outside the bounds of the nature/culture divide, to build connections rather than rehearse separations.

The research conversations with the emergent compositions of the companion have sought to disrupt beliefs and assumptions around children and nature by engaging with the majority of the world's children's real (rather than imagined) childhoodnatures. Essentially, what this makes clear is that childhood encounters with the "environment" are not always as restorative, healthy, or spiritually uplifting as some nostalgic stories have seduced many to believe. A child-nature reconnect as purported by many in the fields of childhood and nature are in danger of reinforcing the human-nature divide by continuing to position humans as "exceptional" and outside of nature, a sentiment that some may say has set humanity on its current destructive path. This handbook holds the space for something new to happen outside these past histories, bringing emerging new relational potentials through childhoodnature.

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Part I

Childhoodnature Theoretical Perspectives

Greedy Bags of Childhoodnature Theories

2

Karen Malone, Iris Duhn, and Marek Tesar

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Abstract

The purpose of this chapter is to assemble a theoretical toolkit, a greedy bag of possibilities, that can enable childhoodnature encounters to flourish in the Anthropocene and beyond. In this undertaking, our aim is not to put diverse theoretical perspectives into competition with each other but rather to assemble theories as tools which can produce sparks when knocked together. These are theories that can be packed up and taken for a walk. Theories that can help us to get out of sticky situations. And theories which children themselves can use to

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address the crises which they will inevitably inherit (and already are). As such, this theory-infused section seeks to put multiple philosophical perspectives into consequential relations such that they can become productive in their directions and differences. In this chapter we take stock of theories that have been productive in the field childhood-nature up to this point, while at the same time seeking new theories, which are emerging in direct response to the contemporary planetary turn.

Keywords
Theoretical approaches · Diffractive theorizing · Speculative figurations · Posthumanism · New materialism · Learning theory · Spacetimematterings · Place theory · Object-oriented · Place attachment

> It matters what matters we use to think other matters with;
> It matters what stories we tell to tell other stories with;
> It matters what knots knot knots, what thoughts think thoughts, what ties tie ties.
> It matters what stories make worlds, what worlds make stories. (Donna Haraway, 2011, p. 4)

While setting out on an uncertain and tenuous adventure into the future, theories should be available to us and are very much needed to help us respond effectively to what is regarded as rapidly changing conditions of life on earth for all species and things. This is particularly the case in the emerging field of childhoodnature, as children themselves are being forced to grapple with existential threats associated with the onset of the Anthropocene era, including climate change, social instability and water crises, among many others. The purpose of this section is to assemble a theoretical toolkit a greedy bag of possibilities that can enable childhoodnature encounters to flourish in the Anthropocene and beyond. In this undertaking, our aim is not to put diverse theoretical perspectives into competition with each other but rather to assemble theories as tools which can produce sparks when knocked together. These are theories that can be packed up and taken for a walk, theories that can help us to get out of sticky situations, and theories which children themselves can use to address the crises which they will inevitably inherit (and already are). As such, this theory-infused section seeks to put multiple philosophical perspectives into consequential relations such that they can become productive in their directions and differences. This section, and pondering with theory, asks us to take stock of theories that have been productive in the field childhoodnature up to this point however at the same time to seek new theories which are emerging in direct response to the contemporary planetary turn.

The questions that authors are asking refer to the natures of the theories of childhoodnature and to the complexities of childhoods in the Anthropocene. We need theories to respond to and challenge the changing conditions of human and nonhuman subjects and of all, mundane, everyday, organic, and inorganic planetary life. Children in the Anthropocene – as Malone (2017) argues – are grappling with this era, as the crisis is real. Children are in the center of the greedy theoretical bag that is required for us to both problematize and establish the field of childhoodnature. The questions we have asked of the authors, and which the authors in return have

asked of themselves, are how childhoodnature theories are becoming the catalyst to move childhoodnature and how they can capitalize on difference.

Contemporary posthumanist and new relational materialist theories, which figure prominently throughout this section, critique the value of human/nature binaries and the limits they place on how we come to understand what it means to be human, not as outside of the world but deeply entangled with all that makes up the human and more than human world. In this world of new materialist/posthumanist theories, creativity and agency will still exist, but they will no longer be positioned as the property of humans alone (Chandler 2013). Rather agency, and in this case children's agency when responding to the ecological crisis, will be recognized as assemblages, associations, and relationships through which they are wordly with a host of other species and entities. By moving away from an explanation of children's environmental encounters from a humanist perspective where we "...understand and act in the world on the basis of our separation from it – articulated in the constraining, alienating and resentment-filled modernist divides of human/nature, subject/object, culture, environment," a posthumanist approach allows a consideration of how we "should develop our understandings around our attachment to the world" (Chandler 2013, p. 516). That means shifting away from the child in nature as the only agential body and focusing on the materiality of child bodies and the bodies of other nonhuman entities as relational assemblages to allow a new ethical and theoretical imagining for children and their encounters with place and nature.

This focus on shifting away from a romanticized or humanistic view of the human/nature relationship has been a feature of scholarship in a range of disciplines evolving over many years/centuries (Head 2016; Duhn, Malone, & Tesar, 2017). So even though they feel fresh, their ontology can be traced back to a range of theoretical approaches – philosophical thoughts – of philosophers such as Spinoza, Derrida (2005), Deleuze and Guattari (1987/2014), and many more (see Murris in this section for a mapping of this cartography of human/nature theorizing). Unfortunately, over this time, many of the disciplines – where these ideas have had the least currency and still remain in many ways uncontested – are disciplines that have been very influential in the children's environments, childhood studies, child/nature, and children/cities research fields. Disciplines, such as environmental education, childhood sociology, urban planning and urban studies, landscape architecture, and environmental psychology, have been slow on the uptake of working with contesting human/culture binaries and contest human exceptionalism in particular. Thus, the outcome has been a strong human-centric and deterministic paradigm that has been influential in the conception of the childhood – nature field. While there has been some leverage through theories such as biophilia (reference) and affordance theory (ref), the theoretical work has mostly been narrowly focused on sociocultural frameworks solely attentive to human-centric agendas. The main exception to this has been in geography, with many urban, human, and cultural geographers who have been interested in children and environments applying these theoretical approaches in their research. The journal *Children's Geographies*, for example, has encouraged and has, over a long period of time, been publishing articles in which authors have engaged in a range of theoretical approaches including posthumanist and new

relational materialist theories, and many other cutting-edge theoretical thinking, in their research. The theory section of this handbook therefore becomes a significant moment for attending to and noticing how and what theorizing in childhoodnature is influencing the field and, to paraphrase Haraway (2011), what stories are making worlds and what worlds are making stories.

This section tells some of these theories and philosophies of childhoodnature stories. However, theories are not captured or sealed in a tight container of science. There is always some spillage. So theories and philosophies of childhoodnature do spill over, and they are both a liberation and a shift; and they are perceived as a possibility to engage with others. Such philosophies of childhoodnature primordially attest to that notion and thus speak back to Haraway's statement above. Furthermore, in such a way, childhoodnature is the world of children's lived experience, a physical world not so much indifferent since they are personally bound to it with their love, hatred, relations, contempt, respect, narratives, tradition, nature, and culture. In this tradition, conceptions of "nature" and "culture" are conceived as theories with children. There are these realms of childhoodnature as inimitable, inalienable, and nontransferable notions of children's relations. At the basis of this planetary experience and childhoodnature relations are values which are simply there, perennially, before children ever speak of them and before they reflect upon them and inquire about them. Childhoodnature theories function in this section as if there is a rational understanding at our grasp but at the same time of the hidden source of all the rules, customs, commandments, prohibitions, and norms that hold within it. The natural world, by virtue of its very being, bears within it the presupposition of the absolute which grounds, delimits, animates, and directs it, without which it would be unthinkable, absurd, and superfluous and which we can only quietly respect. Any attempt to spurn it, master it, or replace it with something else appears, within the framework of the natural world, as an expression of hubris for which humans must pay a heavy price.

Based upon this thinking, by initiating this section, the editors invited authors to engage in a variety of theoretical responses which would open up the potential theoretical landscapes of childhoodnature as samenesses and differences. There was no sense of what those theories had to be other than that they should be disruptive of set ways of knowing and thinking that set up dichotomous relations between human subjects and nature. We advised that potential guiding theoretical papers could include but were not limited to sociocultural theory, poststructuralism, posthumanism, systems thinking, postcolonial theory, ecoexistentialism, and eco-psychology. From this call, we received a number of chapters that are part of this section. These have been grouped under the key conceptual headings (loose containers) of diffractive and speculative theorizing, posthuman and new materialist theories of learning, and theorizing through place.

Diffractive and Speculative Theorizing

Murris engages with diffractive theorizing to provide a cartography of western thought and engages with the key concepts of culture/nature. She acknowledges the role of feminist scholarship in order to understand that the dominant concept of

knowledge in education is grounded in both the nature/culture dichotomy and in patriarchy. The knowing subject, man, is assumed to be of a particular (adult) age. Modern schooling positions children as knowledge *consumers*, not *producers*, because it is assumed that they are (still) developing, (still) innocent, (still) fragile, (still) immature, (still) irrational, and so forth. In her chapter, she shows how six overlapping configurations of child presuppose the metaphysical nature/culture binary which have shaped schooling as a process of *becoming adult* (man): the "developing child," the "ignorant child," the "evil child," the "innocent child," the "egocentric child," and the "fragile child." The figuration of the "normal" knowing subject informs institutionalized discriminatory and colonizing child-adult relationships and has brought into existence specific roles of the educator: guide, instructor, trainer, discipliner, facilitator, socializer, protector, diagnozer, or medicator. Drawing on the philosophies of Barad, Braidotti, Haraway, and Deleuze, the chapter by Murris unhinges child and childhoods from their metaphysical frame of reference. For "justice to come" (Barad, 2012, p. 81), she argues schooling needs to contribute to a postcolonial future that disrupts human exceptionalism and age-discrimination. Moving beyond the anthropocentric focus on children's abilities or capacities as *individuals*, such posthuman schooling would regard knowledge production as part of an ontological *relationality* (including nature *and* culture) through which the human and more than human render each other able (Haraway, 2016). Drawing on posthuman notions of space and time, she offers tentative imaginaries of a diffractive posthuman educator.

Weaving her personal narrative and a cartography of the theoretical field of childhoodnature, Malone's chapter is a biographical account of being and becoming an environmental educator and researcher in the field of childhoodnature over and through 25 years. Also borrowing from Barad (2014), she uses the notion of a "diffractive turn": ". . .by re-turning – not by returning as in reflecting on or going back to a past that was, but re-turning as in turning it over and over again – iteratively intra-acting, re-diffracting, diffracting anew, in the making of new temporalities (spacetimematterings), new diffraction patterns" (Barad, 2014, p. 168). Barad (2014) attributes the notion of diffraction as evolving from feminist theorizing and the science discipline of physics, both seeking to deepen understandings about difference differently. Diffraction is a useful and troubling process, and unlike the idea of reflecting on stories, she views her research as entangled in many worlds. Over and over, spanning a series of theoretical returns from ecophilosophy, environmental activitism, feminist theory, critical theory, human geography, social cultural theory, and more recently posthumanist and new materialist approaches her accounts are embedded in the interdisciplinary fields of childhood studies, children's geographies, children's environments, and environmental/nature education. The stories by children in this chapter illustrate their everyday experiences of growing up in relation with the places they inhabit: the weather, the landscape, the earth, the mountains, the dogs, and the dirt. Childhoodnature is theorized as lively, messy everyday lives, a living well with a host of others. The chapter traces the past, present, and future of environmental education and childhood studies of nature as omnipresent in complex webs. It's littered with the intersection of stories of children growing up in a variety of "places" across the globe as the account seeks to

acknowledge and trouble the view that childhoodnature does not exist without a philosophical past by tracing its theoretical ghosts.

Taking a narrative approach that also follows Haraway's (2016) call for making kin with growing awareness of a looming sixth mass extinction of species, the chapter by ▶ Chap. 5, "Eye-to-Eye with Otherness: A Childhoodnature Figuration" focuses on multispecies encounters to consider what childhoodnature as a concept can do for research. The intention is neither to focus on what can be learned from multispecies child-animal encounters nor is it an attempt to document such encounters in "real life." Rather, the chapter experiments with the porosity and liveliness of materialized thought (the text) as it gives form to an event (the multispecies encounter) across time and in place. The intention is to speculatively imagine a childhoodnature figuration of a hen and a child as a lively encounter that ripples through time/place and that generates unexpected lines of inquiry. The chapter experiments with a speculative approach to explore new ways of thinking and doing multispecies relationships as "earthly encounters" that matter to politics and ethics of sharing worlds. This, they argue, is an essential task in the midst of loss of diversity as it opens spaces for new imaginings about sharing worlds through kin making in childhoodnature research.

Posthuman and New Materialist Theories of Learning

Provoked by curiosity about the rise of posthuman theorizing in early years learning research and practice, the chapter by ▶ Chap. 7, "Outlining an Education Without Nature and Object-Oriented Learning" is set in the context of the Anthropocene as the age of human entanglement in the fate of the planet; it takes the view that the primary task of this time is to develop new understandings of the human and new concepts of thought (Colebrook, 2010). Early childhood has led the field of education in the development and application of posthuman theorizing in response to this imperative, prompting the explorations of the chapter. A review of the literature in this field resulted in the identification of three distinct areas of posthuman theoretical activity: *new materialism*, *child-animal relations,* and *indigenous nonindigenous intersections*. The third category *indigenous nonindigenous intersections,* which draws primarily on indigenous theorizing, was so divergent from the others, and so complex, as to be considered outside the scope of this chapter. In gathering the various papers together to make sense of the literature in each of *new materialism* and *child-animal relations*, different modes of analysis were called for. *New materialism* in early childhood education and practice is considered using a genealogical generational analysis following the work of Van der Tuin (2014), while *child-animal relations* prompted an analytical approach involving Haraway's bag lady method following Taylor, Blaise, and Giugni (2013). A particularly interesting and curious finding was that "life" emerged as a major theme from *new materialism* and "death" from *child-animal relations* in keeping with the paradoxical nature of the Anthropocene.

The chapter by ▶ Chap. 6, "Posthuman Theory and Practice in Early Years Learning" aims to outline a theory of object-oriented learning. In this effort, it breaks with tracing nature in environmental education and education (cf. Morton 2007) in

order to approach learning as relating to radical, dark ecological thought (Morton 2010, 2016). It engages in the groundbreaking work of translating the emerging ontological outlook of object-oriented ontology (Harman, 2011, 2013; Morton, 2013) into a theory of learning. This theory of learning will transgress a number of core axioms, such as the anthropocentric notions of knowledge and learning. Instead, the chapter aims to offer an outlook on learning that includes humans but does not confine learning and engagement with other objects only to humans. Accordingly, the outlined theory develops radically new perspectives on education that break with the human-world centrism of post-Kantian philosophy and offers the opportunity to a conceptualization of a widened process of learning to include also objects and inter-object relations. Learning in this object-oriented perspective becomes limited or bounded with regard to the withdrawnness of objects (Harman 2002), where we as objects have a partial sense of other objects that form a mesh in their relation to us and to other objects (Morton 2016). In this object-object relation, some qualities of objects (the sensual object) are sensible, but some remain hidden (the real object). The outline of object-oriented learning will initially embed itself within a critical analysis of philosophical underpinnings of contemporary trends within environmental education and broader education research.

Theorizing Through Spaces and Place

Amidst a growing social movement to connect children to nature, little is understood about how children actually attach to place or the role of children as nature in the shaping and theorizing of spaces and places. While place attachment is often viewed as an undertheorized concept, human attachment is well understood in traditional contemporary theories. In the chapter by ▶ Chap. 8, "The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment", an exploration of human attachment provides clarity of the potential outcomes of place attachment. Human attachment and place attachment may be related concepts. Both focus on the strength of the attachment of an individual to an external entity, a caregiver, or a place in the physical environment. The secure base function of secure human attachment mirrors the home range function of place attachment. In both concepts, children venture away from the object of attachment only to return in times of stress. Yet while human attachment is well documented, the outcomes from place attachment are still being identified. Secure human attachments foster the development of an internal working model in which a child mentally organizes behavior to solicit a desired response. The strength of the model predicts the quality of future relationships. Currently no research links the development of an internal working model to place attachment. Secure human attachments also foster resilience in that children are better able to respond to and cope with stress. According to Little and Derr, secure place attachments are linked to the presence of nature, social bonding, and emotional and cognitive processes. This is consistent with emergent resilience research with children, which suggests that nature can play an important role in fostering resilience. Nature thus may be a defining feature of place attachments that help build resilience.

Waite and Quay continue in this line of thinking around children's place attachment and its relation to nature when in their chapter they present the question, (How) do places affect us? They explore how place is experienced by children with reference to empirical studies that reflect several forms of outdoor learning, both curricular and outside the classroom. Outdoor learning is undergoing a renaissance of interest and is widely seen as an effective means of connecting children to the natural world (Louv, 2005). This common conceptualization is challenged by recognizing the child within nature. In examining the question of the effect of places on young people (and vice versa), the paper employs theories of cultural density (Waite, 2013, 2015) and cultureplace (Quay, 2017) in relation to how culture informs place and pedagogies within them. It argues that the more-than-human world shapes possibilities for interaction but that these are mediated by structural and cultural influences, acknowledged and tacit, in the enactment of outdoor learning within and across countries (Malone & Waite, 2016). Interweaving sociological and psychological perspectives, the chapter considers the implications for practice and suggests that feelings and affect may act as intrapersonal organizers of this complex interplay of cultural and material influences. The authors argue that by rejecting human dominion over nature, place as "personal" is nonetheless a key contributor to the power of outdoor learning to transform lives.

With the introduction of the "co-research playspace" as a methodological figure for working with children as co-researchers and co-artists in the Anthropocene, the final chapter of this section assembles objects, place, and theoretical reconfigurations to present powerful multimedia engagements with climate change. Cutter-Mackenzie and Rousell focus on collaborative research and artistic co-production with 135 children who participated in the *Climate Change and Me* project (2014–2017) in Northern New South Wales, Australia. Drawing on Winnicott's concepts of "transitional space" and "transitional objects" in relation to children's art and environmental play, they focus on the ways that iPads functioned as transitional objects within the *Climate Change and Me* project. This leads to further analysis which highlighted that children used digital video as a "transitional medium" to experiment with new forms of co-production and creative resistance. Through analysis of films produced by children in the project, a series of three political esthetic modes of response to climate change is outlined to break with the predominant moralistic discourse surrounding the issue: I. critical interventions in public space; II. wild, absurd, and improvisational disruptions; and III. the creation of thought experiments and alternative worlds. The chapter concludes with the consideration of "children as para-academic researchers," a concept that emphasizes children's abilities to invent their own modes of co-creation and critical inquiry that disrupt normative research protocols and associated adult expectations.

Final Comments

Sections in this chapter significantly offer and contribute to ideas both of "naming" of the field and persistence with analyzing not only subjects and space/places but also "time." Recently, Koro-Ljungberg (2015) developed a concept of

"methodologies with no name," or methodologies without methodologies. The methodology of naming is equally important as the act of naming. In the methodology of naming, we utilize the same methods: There have been attempts to colonize both children and nature through the act of naming. Through the act of naming, there is a strong seductive calling for new recipes, new ideologies, new control systems, new institutions, and new instruments, to eliminate the dreadful consequences of our prior errors of children and nature/culture binaries. Failing to name a theory or methodology can be a productive exercise which could continue the grappling with existential threats associated with the childhoodnature challenge and with the objective way out of the crisis of objectivism and the arrogant belief that all issues can be solved with new technologies and with the push of a button. Indeed, the naming of new theories is filled with complexities and potential pitfalls.

The notion of urgency – and time – illustrates the paradox of the measure and the measured: time may be said to measure motion, or motion may be said to measure time, in our understanding of childhoodnature. This paradox is inherent in speculations, being and listening and deep hanging out with children, and fiction alike: the walking and the travels are measured by time, and time itself is measured by walking and being with the other. The concepts of mobility and time become pertinent in human subjects' memory-infused narratives – in the freedom to move and explore or the freedom to work with time. Time runs slowly in the mornings and in school and disappears quickly in the afternoons. Time runs quickly with the Anthropocene and slowly with us doing something about it. Time is a continuity divided paradoxically into three parts: the past, which is a continuity but no longer exists, the future, which is a continuity but does not yet exist, and the present, the now, then moment, which exists but is discrete. And theories of childhoodnature, named or unnamed, in this section allow children in the Anthropocene to be equipped with theories.

Haraway (2015) insists that if we are to imagine and nurture rich multi/species/material assemblages and new ways of being with the planet, then "we need stories (and theories) that are just big enough to gather up the complexities and keep the edges open and greedy for surprising new and old connections" (Haraway, 2015, p. 160). In this childhoodnature theoretical section, we were set the task of mapping out the possibilities for richer, more complex, yet open and greedy, theoretical frameworks for posthuman assemblages of childhoodnature. Readers are invited to consider this section as a loosely woven bag or basket, unfinished, with raw edges that invite additional weavings and threads. The function of the bag is not to carry loads from here to there as efficiently as possible. Rather, the bag poses a challenge to the ways in which we have come to think of functionality, normality, and efficiency. Many children know this: things are not what they seem to be. Theories as things, as thought objects, and as tools may benefit from a shake-up or closing or from being threaded to the raw edges of the bag in unexpected ways. This section invites readers to enter into a space where playing with theories makes childhoodnature come alive – a childhoodnature playspace.

Cross-References

- ▶ Embodied Childhoodnature Experiences Through Sensory Tours
- ▶ Eye-to-eye with Otherness: A Childhoodnature Figuration
- ▶ In Place(s): Dwelling on Culture, Materiality, and Affect
- ▶ Outlining an Education Without Nature and Object-Oriented Learning
- ▶ Posthuman Child and the Diffractive Teacher: Decolonizing the Nature/Culture Binary
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment
- ▶ The Mesh of Playing, Theorizing, and Researching in the Reality of Climate Change: Creating the Co-research Playspace

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Posthuman Child and the Diffractive Teacher: Decolonizing the Nature/Culture Binary

3

Karin Murris

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Abstract

This chapter gives an overview of how the *substance ontology* of Western philosophy thrives on the power producing Nature/Culture dichotomy, has caused asymmetrical violence, infiltrated everyday language, created academic divisions, produced hierarchical categories and classifications, and underpins colonialism and colonizing notions of relationships – not only between humans and sub-humans (e.g., child) but also between humans and more-than-humans (e.g., animals, matter). This chapter shows how critical posthumanism as a navigational tool offers a different *relational ontology* – more akin to African Indigenous scholarship and ways of living – that reconfigures subjectivity and brings into

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existence the notions of *posthuman child* and the sympoietic *diffractive teacher* (human or nonhuman) – critically urgent notions to consider for education in the Anthropocene.

Keywords
Posthuman child · Diffractive teacher · Decolonizing education · Ontoepistemic injustice · Developmentalism · Postdevelopmental child

Introduction

Drawing on posthuman notions of space and time, the chapter starts with a vignette: a tentative imaginary of a diffractive posthuman educator: a heron. In the writing that follows, I explain how the relational ontology of the diffractive teacher as *sympoietic* system disrupts the Nature/Culture binary and patriarchal notions of the self on which modern schooling has been built. The knowing subject, Man, is assumed to be of a particular (adult) age. Modern schooling positions children as knowledge *consumers*, not *producers*, because it is assumed that they are (still) developing, (still) innocent, (still) fragile, (still) immature, (still) irrational, and so forth. In this chapter, I show how six overlapping configurations of child presuppose the metaphysical Nature/Culture binary which has shaped schooling as a process of *becoming-adult* (Man), also in Africa: the "developing child," the "ignorant child," the "evil child," the "innocent child," the "egocentric child," the "fragile child." The figuration of the "normal" knowing subject informs institutionalized discriminatory and colonizing child/adult relationships, and has brought into existence specific roles of the educator: guide, instructor, trainer, discipliner, facilitator, socializer, protector, diagnoser, or medicator.

Drawing on the philosophies of Barad, Braidotti, Haraway, and Deleuze, this chapter unhinges child and childhood(s) from their metaphysical frame of reference. For "justice-to-come" (Barad, 2012, p. 81), schooling needs to contribute to a postcolonial future that disrupts in particular misogeny, racism, human exceptionalism, and age-discrimination (misopedy). Moving beyond the anthropocentric focus on children's abilities or capacities as *individuals*, such posthuman schooling would regard knowledge production as part of an ontological *relationality* (including Nature *and* Culture) through which the human and more-than-human render each other able (Haraway, 2016).

Vignette: A Diffractive Teacher

Posthuman education is a shift from "seeing, observing, and knowing from afar to entanglements and relationalities, focusing instead on making and marking differences from within as part of an entangled state" (Ivinson & Renold, 2016 p. 171).

Fig. 1 The diffractive teacher

What it means to teach is what the heron is doing – standing in the Rhine in Basel (Fig. 1) creating a diffraction pattern in the water.

This is not a metaphor, or an analogy, which would assume the Nature/Culture binary, but a *homology*. Teacher and heron are basically *doing the same thing*. In the case of an analogy or metaphor, we might for example propose that the heron is *like* a teacher, but of course not *really* believing that herons can be teachers, because they have little intelligence after all (a "bird brain") and no self-reflective consciousness which one needs for being a (reflexive) teacher. With metaphorical thinking, teacher (read: culture, therefore human) and heron (read: nature, therefore nonhuman) are assumed to be at an ontological distance from one another. The human who thinks this connection between teacher and heron *re-presents* the heron *as* the teacher through language or other symbolic sign systems, *without attributing teacher (human) qualities to the heron himself or herself*.

In the case of a homology, the comparison between the human teacher and the bird teacher means that both bodies make and mark "differences from within as part of an entangled state" (quote above). Both bodies – human and nonhuman (heron) – cause diffraction patterns. It literally *matters* that both bodies are "there," whether in the river or in the classroom. Moving away from *human*-centered (e.g., *child*-centered) education (Murris, 2017), the diffractive teacher is part of the process of producing new thoughts and ideas diffractively sedimented materially as part of the world. The notion of diffraction disrupts the Nature/Culture dichotomy that presupposes individualized existence of subjects and objects.

When I took the photo from a bench along the river, the heron moved gracefully through the river, all the time keeping a watchful eye on me. We were entangled when we were in each other's vicinity. However, Karen Barad's notions of diffraction and quantum entanglement go even further than that. Drawing on Quantum Field Theory (QFT), she argues that the "intra-action" *is always there* (and at the same time *not* there), even when bodies are not close physically. Moreover, according to QFT, bodies are waves or particles depending on the apparatus that

measures (also at macro-level). So, as a matter of *fact*, QFT queers the individual existence of human and nonhuman bodies as bounded by a skin, whether human skin, bird feathers, the surface of the water or the banks of the river. Boundaries are discursive and human-made after all. Space, time, and matter are not threaded like beads on a string, but threaded through one another sympoietically. Human and nonhuman bodies do not move between *points* in space and time but *are always "*on the move." Sympoiesis, Haraway (2016, p. 58) explains "is a simple word; it means 'making-with'." As I was observing the heron in the river, and now, diffracting "my" memories of the event of our encounter, I am also part of the phenomenon and an entangled "observer": a "being-with," a "making-with," a "thinking-with" as a "sympoietic system" (Haraway, 2016).

The work of feminist philosophers Karen Barad and Donna Haraway is about the implosion of nature and culture – a plea to rethink relationality together *without* the Nature/Culture binary. The posthuman ontology of a sympoietic system (e.g., that of a diffractive teacher) disrupts the Nature/Culture binary on which modern schooling has been built and has profound implications for (child) subjectivity (Murris, 2016). The figuration of the diffractive teacher provokes a tracing of the complex philosophical ideas entangled in posthumanism before re-turning to the diffractive teacher at the end of the chapter where learning is conceptualized as a relational material-discursive process between human and nonhuman bodies. Such a "body" can be human, an animal, a child, or even a stone in the river Rhine. Posthumanism reconfigures subjectivity and with it radically changes what it means to teach and what it means to learn and the Nature/Culture binary is central in what we have come to understand as real knowledge: asocial, apolitical, and rational (in a disembodied manner).

The Philosophical Origin of the Nature/Culture Dichotomy

The Nature/Culture dichotomy and its entanglement with modern schooling and figurations of child and childhood can be traced to – as Alfred North Whitehead famously characterizes the European philosophical tradition – as "a series of footnotes to Plato" (Whitehead, 1979, p. 39). To understand why embodied experiences and the body (Nature) have been rendered inferior to the mind (Culture) in schooling, we need to turn to the binary logic that was put in place by Western metaphysics (and reinforced by capitalism and Christian theology).

The dualism between mind and body has had an incredibly strong foothold on Western thought, with the writings of Ancient Greek philosopher Plato as a major influence. A deeply influential articulation of Platonic dualism can be found in the philosophies of René Descartes. He proposed the idea that the mind is a *substance* whose whole essence or nature consists in thinking and can exist without the body. Of the two substances, the mind is privileged over the body, or put differently, contemplative life is superior to active life. Also, not the body, but the mind guarantees existence, as expressed in his well-known dictum: "I think therefore I

am" (cogito ergo sum). In Descartes, we find the most extreme expression of the dichotomous mind/body split that characterizes modernity. Universal, timeless knowledge of the "outside" world is obtained from the "inside" of the knowing subject (as conscious, self-aware, self-contained, independent, rational, mature, universal). This *substance ontology* has infiltrated everyday language (e.g., what counts as "common sense") and has given rise to the sciences with strong disciplinary divisions, hierarchical categories, and classifications (Deleuze & Guattari, 1987/1994). It also in-forms academic discourses in the Global North as well as the Global South. Moreover, substance ontology underpins colonialism and colonizing notions of relationships between humans, and between humans and more-than-humans. A radically different ontological framework for relationality is possible using posthumanism as a "navigational tool" (Braidotti, 2013). It is important to stress that this is "radical" only for the Western tradition of thought that was globalized through colonial practices, including education. Juanita Sundberg (2014, pp. 36–37) argues that posthumanists are unaware of their own location when making universalizing claims about "the" human and are silent about past and present non-Western or Indigenous scholarship and ways of living. She points out that "other" knowledge systems based in non-dualist thinking tend to be "forgotten" in the posthuman literature, thereby perpetuating a colonial stance when advancing posthuman scholarship that only engages with "Anglo-European scholarship" (Sundberg, 2014, p. 38). Bearing this critique in mind, I turn to some key ideas in posthumanism and assess her claim that posthumanists are not aware that "knowledge comes from somewhere and is, therefore, bound up in power relations" (Sundberg, 2014, p. 36). I pick it up again at the end of this chapter when re-turning to the figuration of a diffractive teacher.

Man and Asymmetrical Violence

Fields as diverse as, for example, environmental humanities, the performative arts, cultural theory, education, organizational studies, critical geography, architecture, anthropology, political theory, childhood studies, and literary and literacy studies are now questioning human-centered figurations of the subject and see it as the main reason for all present struggles with respect to race, gender, class, and the environmental problems in the controversially termed geological period of the Anthropocene. For example, Donna Haraway (2016, pp. 49–57) offers eight reasons why she prefers to distance herself from the word "Anthropocene" and explains why she prefers "Chthulucene" – a tentacular thinking that disrupts the human exceptionalism of the Anthropocene discourse in which we now live. Donna Haraway (2016, p. 35) explains our predicament passionately:

> These times called the Anthropocene are times of multispecies, including human, urgency: of great mass death and extinction; of onrushing disasters, whose unpredictable specificities are foolishly taken as unknowability itself; of refusing to know and to cultivate the capacity

> of response-ability; of refusing to be present in and to onrushing catastrophe in time; of unprecedented looking away.

A plethory of terms have emerged that describe this "new" philosophical orientation with implications for ethics: "posthumanism," "new materialism," "vital materialism," "relational materialism," "socio-materialism," "object-orientated ontology" and so forth. There are more or less subtle differences between these philosophies, and my own inspiration for doing education differently is inspired mainly by the complex critical posthumanism developed by Karen Barad and Rosi Braidotti (who in turns draws heavily on Gilles Deleuze and Felix Guattari, who in turn have developed their ideas in dialogue with the writings of Plato, Leibniz, Kant, Nietzsche, and especially Spinoza).

Reinforced by Cartesian dualisms and underpinning capitalism, ontoepistemologies that assume that knowledge and intelligence are located only in the human, and *one* human bounded by a skin for that matter, have become so naturalized as "common sense" and engrained in everyday language (Deleuze & Guattari, 1987/2014) globally that it is not easy to identify the "I" as the root cause of structural exploitation, dehumanization (of women, sexualized, racialized, and naturalized "others") and asymmetrical violence (Snaza & Weaver, 2015). For poststructuralists and critical posthumanists, the "human" is clearly a political category – white, male, heterosexual, able-bodied (Braidotti, 2013), although interestingly and of concern, age is not included (yet) (Murris, 2016). Sylvia Wynter's powerful writing makes the receptive reader feel and think differently about the "I" that has made modernity and colonialism possible. She writes that the Western bourgeois "conception of the human, Man, which over-represents itself as if it were the human itself, and that of securing the well-being, and therefore the full cognitive and behavioral autonomy of the human species itself/ourselves" (Wynter, 2003, p. 260). The Western "I" – Man – as universal, essentializing signifier has created identity through difference, that is, the human/subhuman dichotomy. This metaphysics, reinforced by religious humanist mythology, has spawned an ontology and epistemology that move on binary logic, power relations of inequality, and "otherizing" notions of identity. Not a posthumanist as such, Wynter's decolonizing project is that of "practicing epistemic disobedience," that is, "a delinking of oneself from the knowledge systems we take for granted (and can profit from)" (Mignolo, 2015, p. 107). But Man is not just a product of a particular *epistemology*, a matter of how and what we know – epistemology and ontology are always entangled as what it means to know and depends on assumptions about what exists ("onto"). Shifts in ontology have implications for what it means to have agency, a voice, or an identity, and particularly relevant for this chapter, what it means to be a teacher. I agree with Sundberg (2014, p. 34) that "decolonization" means "exposing the ontological violence authorized by Eurocentric epistemologies both in scholarship and everyday life." I am interested in how decolonizing education involves an examination of the various philosophical ways in which coloniality manifests itself in the production and communication of knowledge and meaning-making (Patel, 2016), and how humanist ontology has produced certain constructions of childhood with the

Nature/Culture dichotomy as its structuring mechanism (Murris, 2016, Chap. 5). Colonialism has instilled a non-relational ontology and competitive individualized subjectivity in education that continues to regard people, land, and knowledge as property, and this *also* includes colonizing relationships between adult and child (the subhuman).

Critical posthumanists not only raise awareness of the Western Man/human dichotomy, but they also queer how we see the more-than-human as not merely inert, passive things *in* space and time (Barad, 2007). The queering of the binaries such as the social/physical, nature/culture, individual/society is especially relevant here. To queer is not a fixed, determinate term with a stable meaning and referential context (Barad, 2012, p. 81), but it is the ethico-political practice of radically questioning identity and binaries (Barad, 2012, p. 81). Such a shift to a relational ontology, akin to some Indigenous knowledge systems, requires an un/learning of agency "outside the acting, human body" (Rotas, 2015, p. 94). This unsettling of agency, voice, and identity as not something subjects "have," invites us to reconfigure who and what the "I" is, as well as its relationship to "the" world.

Earthlings are Never Alone: Queering the Nature/Culture Dichotomy

The Nature/Culture dichotomy presupposes individualized existence of subjects and objects. The kind of individualism and deep dualism this dichotomy has created has become the trademark of Western thought, a philosophical substratum that has made colonialism and capitalism possible, and an imperialism that has permeated the globe (Cannella & Viruru, 2004; Castaneda, 2002). By understanding the Subject (Culture, self, "I," me, adult) at an *ontological* distance from the Object (Nature, you, animal, matter, child) particular kinds of power relationships have been made possible: imperial and colonial exploitation of land, resources, animals, certain categories of humans (e.g., young, black, labourer, peasant, nomad, rural dweller, ghetto dweller, township inhabitant, infant, child, homosexual, homeless, female, elderly, disabled, disturbed, addict) – complex global networks of political and economic domination. Nature is otherized, and placed at a distance. The Western humanist ideal notion of the human has been restricted to very few human animals, ironically thereby *dehumanizing* the sexualized "other" (women), racialized "other" and naturalized "other" (e.g., child, matter).

The Nature/Culture dichotomy has inserted itself into Western knowledge systems and beliefs and, through colonization and global capitalism, extends its reach to push aside and override different knowledge systems (Kayira, 2015), including those of young children (e.g., animism; Kennedy, 2006).

"Immaturity" has become synonymous with childhood and maturity with adult masculinity (Jones, 2009, p. 40). Immaturity has become an umbrella term for a period in a human's life that is *lacking*: lacking cognitive ability, moral responsibility, emotional independency and rationality. Child is seen as vulnerable, fragile and in need of adult surveillance and controlled opportunities and experiences,

"given" by teachers whose teacher-directed pedagogies rob children of opportunities to show what they know and can do. Interestingly, there is the same ontoepistemic distancing move from child by adult when childhood is conflated with idealized "pure" Nature (Taylor, 2013), for example child as "little angel." Influenced by Rousseau, positioning child as innocent, means that she/he needs to be protected from the corrupting influence of adult society, and is therefore separated off from the rest of humanity (Taylor, 2013, p. 62). Critically, the way the concept childhood is used in teaching, research, policy-making and curriculum design presupposes the Nature/Culture dichotomy, with child associated with Nature and adult with Culture. Anthropologist Maria Kromidas, (2014, p. 429; my italics) argues that children have been neglected, "taken for granted as appendages to adult society, or cocooned from the world and thrown out of society, children can only be of *nature*, which is to say, *outside the human*. . .." She points at the lone position child takes up, the "last savage," since people of color and women have found their legitimate place in society (by law, although not necessarily in practice). She puts it beautifully:

> Humanism, with its discourse of progress and perfectibility theorized as a movement out of nature, no longer holds the racial Other or prehistoric man as the representative of ground zero – that position is now solely the child's. (Kromidas, 2014, p. 429)

So child is either positioned as good or as bad (e.g., immature) by Nature, and therefore, adults needs to protect child, or adults need to be protected *from* child. In both cases, it prevents children to be seen as *part* of the world they share with other earth dwellers, and prevents them from building "real common world relationships" (Taylor, 2013). This, Affrica Taylor (2013, p. 62) points out, is the "biggest cost of all." Diffracting with Haraway's ideas, she argues that the real world gets lost. "Common worlds" (a term from Bruno Latour), she explains, are "down-to-earth". . . "worlds full of entangled and uneven historical and geographical relations, political tensions, ethical dilemmas and unending possibilities" where crucially nature and culture come back together again (Taylor, 2013, p. 62). So, as a result of the ontoepistemological nature/culture divide, our complex, "messy" real worlds have been kept away from our sanitized classrooms.

The figuration of the "normal" knowing subject as the mature (Western) adult has informed institutionalized discriminatory child/adult relationships and materializes specific roles of the educator: guide, instructor, trainer, discipliner, facilitator, socializer, protector, diagnoser and medicator. These are the result of at least six overlapping configurations of child that are still dominant globally in educational theories and practices (Murris, 2016, pp. 104–122) (Table 1): the "developing child" who lacks maturity by nature and needs culture's guidance; the "ignorant child" who lacks rationality and experience from birth and needs instruction and training; the "evil child" who lacks natural goodness and requires cultural intervention of control and discipline; the "innocent child" who lacks responsibility, therefore needs culture to provide protection and to facilitate learning; the "egocentric child" who lacks social norms and cultural

Table 1 A map of figurations of child that presuppose the Nature/Culture dichotomy, and position child that is deficit

Figurations of child	Theoretical influences	What child lacks by Nature	What Culture needs to provide child
Developing child	Aristotle, Darwin, Piaget, Vygotsky	Maturity	Maturation; guidance
Ignorant child	Plato, Aristotle, Locke	Rationality; experience	Instruction; training
Evil child	Christianity esp. Protestantism	Trustworthiness; natural goodness	Control, discipline inculcation; Drawing in
Innocent child	Romantics (Rousseau)	Responsibility	Protection facilitation
Egocentric child	Piaget	Empathy; social norms and values	Socialization by elders inculcation
Fragile child	Psycho-medical scientific model	Resilience	Protection medication diagnoses; remediation

values and requires socialization by elders; the "fragile child" who is assumed to lack resilience by nature and needs culture to diagnose, protect and possibly medicate.

All these deficit figurations of child assume childhood as an inferior stage in human development with the mature, developed, rational, autonomous adult self as the normative ideal. Moreover, this self is also gendered (male). Nature, traditionally coded as passive and feminine, awaits the active, male imprint of Culture (Barad, 2011, pp. 435, 439). Knowing how the gendered, ageist, ableist and racist Nature/Culture binary works and for whom is salient in this chapter. Some posthumanists offer powerful imageries and experimentally play with new concepts in their academic writing to provoke readers to think differently about relationships. One such powerful notion is Haraway's *sympoiesis.*

Sympoiesis and Intra-action

Haraway (2016, p. 176, fn 13) writes about the difference between seeing human animals as *autopoietic* systems and *sympoietic* systems. In the former, humans have "self-produced binaries," they are "organizationally closed," "autonomous units," centrally controlled (e.g., through a human will or intellect), orientated around growth and development with "evolution between systems," and are "predictable." In contrast, *sympoietic* systems lack boundaries, are "complex amorphous entities," have "distributed control" with an "evolution within systems" and are "unpredictable." Haraway (2016, p. 58) explains:

> Sympoiesis is a simple word; it means "making-with." Nothing makes itself; nothing is really autopoietic or self-organizing. In the words of the Inupiat computer "world game," earthlings are *never alone*. That is the radical implication of sympoiesis. *Sympoiesis* is a

> word proper to complex, dynamic, responsive, situated, historical systems. It is a word for worlding-with, in company.

Earthlings are never alone. In other words, the human is not an individual with distinct boundaries, but is "spread out," like "a flow of energies, constituted in a total inter-dependence with other humans and the matter and physical intensities and forces around us" (Palmer, 2011, p. 7). The subject comes into existence through the encounter with other material-discursive agencies (Petersen, 2014, p. 41). Subjectivity as an existential event is a paradigmatic shift from the discursive to the material-discursive and describes a relational posthuman ontology. The ontological fact that earthlings are never alone means that teachers are always part of, and situated in (as Haraway points out), complex, dynamic, historical, and responsive systems that are both material and discursive at the very same time. Teaching and learning are "worlding-with" practices that disrupt the Nature/Culture binary – explored further below.

The significance of critical posthumanism for decolonizing education, is this key idea that categories that involve binaries, such as "subjects, objects, kinds, races, species, genres, and genders" are all products of *relationships "between" significant others* (Haraway, 2003, pp. 6–7). An ethics of respect for these "significant others," as Donna Haraway calls them, means "to hold in regard, to respond, to look back reciprocally, to notice, to pay attention, to have courteous regard for, to esteem" (Haraway cited in Lund, 2014, p. 103). Despite not regarding herself as a post-humanist (Haraway, 2016), Haraway's influence on posthuman scholars has been, and still is, significant. Her inspiration is also notable in the work of her friend Karen Barad, whose notion of *intra-action* at the heart of her *agential realism* also emphasizes an ontological shift in how humans and more-than-humans relate and influence each other (Barad, 2007, 2013) as we have seen in the notion of the diffractive teacher.

Barad's neologism *intra-action* ruptures the familiar concept of "interaction." Intra-action is different from "interaction" in that "nature" and "culture" are never "pure," are never unaffected by each other, but are always in relation – a sympoietic system, Haraway would say ("entanglement" for Barad). It is a radical shift from substance ontology to an *intra-active relational ontology*. It moves discussions about relationality from the *sociological* to the *ontological* – sometimes referred to as "the ontological turn" in the history of ideas. This "ontological turn" sits uncomfortably with pedagogies informed by scientific realism, social constructivism or post-structuralism that all assume the necessity for linguistic or other semiotic systems to mediate between Nature and Culture (Murris, 2016). The power of these systems has not only been substantial, but also "substantializing," allowing linguistic structure to determine our understanding of the world (Barad, 2007, p. 133). Take, for example, the standardized educational practice of giving definitions of concepts to capture the essence or meaning of concepts, including attempts to define what child is by nature.

Posthumanism breaks with the assumption that there is no direct "access" to child in reality, that child is not *present*, and can only be *re-presented* through human

semiotic constructions or scientific language. Key to this rupture is the notion of intra-action.

Intra-action is ontologically different from "interaction." Intra-action should not be confused with notions such as "inter-subjectivity" or "inter-activity" (as in child-centered pedagogies), which assume pre-social, independently existing *human* subjects (in relation with one another). This ontological shift is so difficult to make because it requires thinking differently about space and time – not as containers filled with bodies (as in Newtonian space), or as a succession of atomic moments. Movement does not depend on time; it is the other way around ontologically: time measures or re-presents motion (Deleuze, 1968/1994). Or, as Barad (2007) puts it: past, present, and future are always intra-actively threaded through one another (Barad, 2007) – the reason why at the same time, posthumanism is not *post*, as it would assume that humanism can be left *behind*.

The neologism "intra-action" creates fresh decolonizing opportunities for a *doing* of subjectivity differently. Ethics is not only a human affair – human actions are just one element of the apparatus of entangled intra-actions with the more-than-human. The quantum entanglement of all human and nonhuman phenomena intra-acting with one another means as we have seen in the case of the diffractive teacher, that it is impossible to say where the boundaries *are* of each entity, including people. This "lack" of bodily boundaries is not just *epistemological*, but *ontological*. Put differently, it is the way the world *is*, not just a matter of how we get to *know* this world. Ontological relationality is not a matter of how we *experience* the world, or a matter of (psychological) *awareness*. Neither is it a doing away with, or a denial, that there are individual humans who exist, but what is at stake here is a rethinking and revaluation of human's anthropocentric philosophical claims to *exceptionalism*: the normative idea that what sets human animals apart from other earth dwellers (including matter) is reason and rationality, the source of all knowledge and located in a mind that is contained by a body which exists alongside other bodies moving through space and time (as autopeiotic systems). For critical posthumanists, words or concepts do not capture or mirror things "out there" in the world, but are part of a constantly changing reality.

This means pushing aside colonizing knowledge systems that assume an inner/outer (or mind/body) and nature/social binaries. Meaning making is not purely a *social* process involving *human* agency only. Barad (2007, p. 152) writes: "Neither discursive practices nor material phenomena are ontologically prior or epistemologically prior. . .matter and meaning are mutually articulated." For a posthumanist (and many other knowledge systems other than Western, including young children's), human and nonhuman matter always exist in entangled intra-active relations.

African Indigenous Ontoepistemology

As new materialists Jackson and Mazzei (2012, p. 114) explain: the artificial divisions between the biological and the cultural, the material and the semiotic, the natural and the human, genes and the environment blind us from the knowledge "at

the intersection between things and people, between feats of engineering and social structures, between experiences and bodies." Such "blindness" is particularly devastating for Africa. According to the Geo-2000 report, some 500 million hectares of land have been affected by soil degradation since 1950, it has lost 39 million hectares of tropical forest and water is scarce in 14 countries and the number is only growing, not getting less (Le Grange, 2012, p. 60). Apartheid capitalism is partly to blame, not only for the "material suffering," but also the "mental suffering" as apartheid legacy continues to impact on the everyday in terms of race, gender and class inequalities (Le Grange, 2012, p. 61). Conservation and the environment are often seen as a luxury and of concern only of the white elite who are not struggling for basic survival.

With "Indigenous" I mean the groups of people in sub-Saharan Africa who have ancestral ties and claims to the land prior to colonization by European nations, and who have a particular ontoepistemic relationship to that land (as well as to each other and ancestors). African scholars claim that unlike Western humanism, African humanism does not reduce nature to a mere object of human knowledge and thereby also disrupts the Nature/Culture dichotomy. Nature is not seen as something that exists "out there," passively, to be discovered by humans' thinking about or experimenting on "it."

Le Grange (2012, p. 61) urges for a decolonization of the mind through a re-appropriation of *Ubuntu* (humanness) and in particular *ukama*, which means "relatedness to the entire cosmos." What these terms mean exactly and their current relevance for educational theory and practice are the topic of heated academic debate especially in the context of decolonization (see, for example, Enslin & Horsthemke, 2004; Le Roux, 2000; Murove, 2009; Ramose, 2002). One of the main difficulties is the use of Western languages to explain African philosophies. How to interpret, for example, the following quote?

> We belong in a bundle of life. We say, "a person is a person through other people" (in Xhosa *Ubuntu ungamntu nganabye abantu* and in Zulu *Umuntu ngumuntu ngabanye*). I am human because I belong, I participate, and I share. A person with *Ubuntu* is open and available to others, affirming of others, does not feel threathened that others are able and good; for he or she has a proper self-assurance that comes from knowing that he or she belongs in a greater whole and is diminished when others are humiliated or diminished, when others are tortured or oppressed, or treated as if they were less than who they are. (Tutu, 1999, cited in Kahiri, 2015, p. 110)

At first glance the ontology described seems very anthropocentric, but Kayira (2015, p. 111) claims that *Ubuntu*'s interdependence and community involves the natural world as well as human networks: "Nature and persons are one, woven by creation into one texture or fabric of life" (Sindima, 1995 cited by Kayira, 2015, p. 111). South African scholar, Le Grange (2012, p. 58) draws on Guattari's "ecosophy," which recognizes the entanglement of the social, the environment, and human subjectivity – nature and culture cannot be separated. He suggests that there is a close similarity between ecosophy, *ubuntu,* and the broader concept of *ukama* (Le Grange, 2012, p. 61), hence his proposal to use African philosophies as an

ethical response to the environmental degradation and "erosion of human solidarities" characteristic of contemporary Africa (Le Grange, 2012, p. 61).

Now to what extend does *Ukama* put the *human* in the center of the ontoepistemic universe and to what extent does that presuppose the possibility of a justification for the human (Culture) to be at a distance from Nature, with the latter to be used as a resource and commodity for exploitation? Zimbabwean philosopher of education Amasa Ndofirepi explains that "*Ukama*, in its etymological roots, is a Shona adjective from the stem *hama,* meaning "relative." While *U* is the adjectival prefix, *kama* is the adjectival stem and *kama* on its own means "to milk' an animal." The idea of milking an animal suggests "closeness and affection" and Ndofirepi (2015) adds that *ukama* points at a relational ethic – relationships that come first and form us. Quoting De Quincey, Ndoferipi argues that "we emerge as subjects from intricate networks of interrelatedness, from webs of inter-subjectivity."

The implications for education are that moral education with *ukama* as guiding principle starts with the family and then outwards. The core of the ethic is non-individualistic and focuses on shared interdependence. *Ukama* expresses a relationality between people that also extends beyond death. The relations with ancestors are critical for the passing on of the values that are immortal and need to be treasured and preserved. What it means to be ethical for an individual in this context is to re-establish the presence of one's ancestors (Le Grange, 2012, p. 61). Le Grange (2012, p. 63) insists that *ukuma* is not speciecist, and constitutes the right ethical response to the environmental crisis – a crisis that includes the erosion of human solidarities (Le Grange, 2012, p. 61). He also claims that his proposal is in line with Guattari's ecosophy. However, there seems to be a profound tension between the Natureculture relationality claimed by African philosophers and the scholarship on child and childhood in Africa.

Child in Africa, Childhood, and Ontoepistemic Injustice

In all societies, the figurations in Table 1 are entangled phenomena and are materialized differently in teaching, educational research, curriculum construction and educational policies. In African societies, the extended family is a microcosm of the wider society, characterized by communal interdependence (Letseka, 2013). Hierarchies are written into the nature of the universe, with child low in the hierarchy – subservient (obedient and respectful) to adults and ancestors. Child's place is to serve this extended family, with obedience as a prerequisite and reinforced through physical punishment (Penn, 2005, p. 110). Girls have even less status and authority than boys, and are expected to be more domesticated and more compliant, also sexually (Penn, 2005, p. 110). There is an important difference though from (deficit) Western notions of childhood. Children are capable of important responsibilities, and like adults, need to contribute to the subsistence of their extended families and wider communities. Depending on gender, even young children are supposed to, for example, look after infants or herd cattle. Childhood is not seen as *a phase* in a human life, but is instead associated with certain *capabilities*, that is, *the*

physical activity to perform adult tasks, economic independence and getting married (Twum-Danso, 2005). The hierarchy is less related to age, and more to children's obligations to support the family in times of need and old age, so in that sense, children always remain children (of their parents). It is not something they grow out of. The basic assumption in the (dominantly Western) literature is that (Western) children – "indoor children" – grow up in a benign environment where the family will look after their development, whereas child-headed households are not uncommon in Africa (Penn, 2005, p. 111). Especially in a continent plagued with HIV/AIDS, there is a distorted picture of what childhood is like for many children, obscuring their capacities and the contributions they make in caring for siblings and other family members (Kesby, Gwanzura-Ottemoller and Chizororo, 2006, p. 186). As Penn (2005, p. 111) puts it "[c]hildren's resilience, solidarity, capacity for sharing, their stamina, their sense of time, place and the future, are rarely conceptualized or investigated." In a significant sense, child in Africa is only visible in Table 1, because child has been normalized into a Western metaphysics that assumes the Nature/Culture dichotomy. The latter has infiltrated and colonized Indigenous peoples, also through a Western normative education system that regarded African culture and their ways of being and knowing as inferior and worthless – something to be ashamed of (Kayira, 2015, p. 108). The queering of the Nature/Culture dichotomy in Table 1 is therefore both a decolonizing *and* a posthuman move towards regarding young earthlings on a more egalitarian footing: a "being-with," "making-with," and "thinking-with" as part of the world as sympoiesis. This should be included in the larger creative ethico-political project of transforming how humans relate to each other and to nonhuman "others" and the material environment. Although the decolonization of speciest discourses is on the agenda of an increasing number of scholars, child is still rarely mentioned as a category of exclusion, even in the feminist, postcolonial and posthuman literature (Burman & Stacey, 2010). And this despite the fact that it could even be argued that the logic of childhood is the internal structure of the logic of colonialism (see below). Crucially, a reconfiguration of child and childhood is not just a matter of *including* another category of humans previously excluded epistemologically and ontologically. What is involved is a radical reconfiguration of identity and the human subject.

Salient for education is that the Nature/Culture dichotomy separates the *thinking* subject with agency from a sensing body (object) that is temporal, spatial, without agency and not involved in knowledge production. Affect and other transcorporeal knowledges are thereby excluded from the domain of "real" knowledge. But as Barad (2014, p. 168) argues "the quantum understanding of diffraction troubles the very notion of *dicho-tomy* – cutting into two – as a singular act of absolute differentiation, fracturing this from that, now from then."

The Western dichotomy has also cut child (Nature) apart from adult (Culture) thereby essentializing and discriminating the young "other." But surprisingly, child as subhuman tends to be forgotten and childhood remains unproblematizied in much posthumanist, postcolonial writing, as well as African philosophy of education. For example, Kayira (2015, p. 109) states that "traditionally most Africans believe that that one gains wisdom and knowledge with age in relation to traditional and

community-based practices." Many Western philosophers and educationalists still assume that child is associated with Nature and that his or her development to mature adult will either unfold (Rousseau), or needs to be developed (Locke), or interacted with (Kant) through Culture in order to become "fully-human" (Murris, 2016).

The Nature/Culture binary works in contradictory ways in Western education – an education that has now become the universal norm. Since the Enlightenment, human intentionality and agency and the capacity to reason have positioned school-based education as the conduit through which to bring the pre-rational child into the world of the rational (white, male) adult through cognitive development, thereby rendering Nature as passive and inert (Taylor, 2017, p. 62). On the other hand, the Romantics (e.g., Rousseau) have inspired educational approaches that regard Nature as innocent, good, pure and true. Nature is aligned with "children, animals, 'native' people, and pristine wilderness areas," whilst Culture is aligned with "greed, immorality, political exploitation, technological perversions, and urban and industrial pollution" (Taylor, 2017, p. 63). In short, Western education assumes that either Culture is "the teacher," or Nature, and has led to two very different approaches to (environmental) education: play-based back-to-nature approaches (e.g., Forest schools) or cognitive-orientated classroom activities that involve representations of and knowledge *about* Nature. The problem of both Western approaches is that they assume the Nature/Culture dichotomy, but there is no "pure" nature, only environmentally damaged places (Taylor, 2017, p. 65). Since the unenlightened Enlightenment, educators have been unhealthily (for the planet) preoccupied with the holistic development of the individual child in social-cultural contexts at the expense of the nonhuman and more-than-human "others," such as plants, animals, things, planet, water. For example, the production of economic profit relies on the exploitation of animal bodies, their labor and their reproductive capacities (Pedersen, 2015, p. 59). Although postcolonial, poststructuralist and postmodernist theorizing has brought many gains in terms of foregrounding categories of discrimination and exploitation, these scholars tend to focus on the human (race, gender, class), rather than the young human, or as Helena Pedersen (2016, p. 6) argues, on animal/human relationships (speciesism) and are therefore also anthropocentric.

The Nature/Culture Dichotomy and Ontoepistemic Injustice

Thanks to twentieth century feminist scholarship, we have come to understand that the hegemonic conception of knowledge is grounded in *patriarchy*. The normal Subject, the standard by which other earth dwellers (including more-than-humans) are measured, is of a particular gender (male), race (white), able-bodied, and with a particular sexual orientation (heterosexual); the humanist ideal of Leonardo da Vinci's Vitruvian Man as the yardstick by which the worth of the "other" is measured (Braidotti, 2013). But we have to turn to scholarship in childhood studies and early childhood education to find that this normal Subject is also assumed to be of a particular (adult) age (Burman, 1994; Cannella & Viruru, 2004; Dahlberg, Moss, & Pence, 1999/2013; Fendler, 1998; Jenks, 1996; Walkerdine, 1984). This injustice is

not just social, but also *ontoepistemic* (Murris, 2016). Children are not listened to because of their very *being* (onto) a child and are therefore unable to make claims to knowledge, because it is assumed that they are (still) developing, (still) innocent, (still) fragile, (still) immature, (still) irrational, and so forth. As a result, child is denied ethically, epistemically and ontologically.

Ontoepistemic injustice is a kind of injustice that is woven into the fabric of social injustice. The Nature/Culture binary affirms the child (Nature)/adult (Culture) binary. For decolonization this is important, because much injustice is inflicted on children on the basis of adult claims of what counts as reason, rationality or true knowledge, and therefore what is, for example, educationally worthwhile. For Miranda Fricker (2007), who coined the term, epistemic injustice is done when people are wronged specifically in their capacity as a *knower*. Knowledge is offered by the child, but not heard by the adult, because of identity prejudice (ageism) (Miranda Fricker does not refer to children as a marginalized social group. She only refers to class, gender, and race.). This kind of prejudice is in turn related to conceptions of child and childhood and the stereotyping involved (Murris, 2013). Stereotyping involves empirical generalizations about a given social group (here, children), sometimes even resulting in universal claims, such as, "All children are immature." Fricker points out two necessary conditions for the identity prejudice in such a claim to be prejudicial. First, the attribute (intellectual disability) needs to be a reliable generalization, and secondly, it should not be a "*pre-judgment,*" that is, a judgment made without proper evidence (Fricker, 2007, pp. 32–33). Importantly, the misjudgment of the speaker's credibility should be non-intentional, that is, clouded by prejudice and not a case of deliberate manipulation (Fricker, 2017, p. 54). She continues that many attributes assigned to historically powerless groups are often associated with a lack of "competence or sincerity or both" (Fricker, 2007, p. 32), and the attributes she mentions also apply to child historically: "over-emotionality, illogicality, inferior intelligence, evolutionary inferiority, incontinence, lack of "breeding," lack of moral fiber, being on the make, etc." (Fricker, 2007, p. 32). These prejudices of deficit are often held "unchecked" in the collective social imagination, and do their damage, especially, when child is not only young, but *also* female, black and lives in poverty (Murris, 2016). Prejudice runs deep. It operates "beneath the radar of our ordinary doxastic self-scrutiny" (Fricker, 2007, p. 40) and is particularly damaging, but hard to detect, when power relations and structural prejudice undermine child's faith in its own ability to make sense of the world (a case of "hermeneutic injustice" – see Fricker, 2007, 2017). Ageist prejudices are directly related to the Nature/Culture binary, which separates child from adult epistemically and positions child as an ontological, colonized "other."

Misopedy and Colonialism

Deficit figurations of child (child as not fully-human-yet) and colonialism are entangled phenomena. Toby Rollo (2016, p. 2) argues that the ancient conception of the degraded, "not fully-human," child "misopedy" is the *internal logic* that has

made colonial superiority (the colonial denial of full humanity) and the notion of the ontological "other" possible (Rollo, 2016, p. 2). Rollo (2016, p. 2) explains:

> The idea of a *telos* of progress from animal child to human adult is both a historical and conceptual antecedent of the idea of European civilization, prefiguring its stories about maturation and progress from cultural ignorance to enlightenment.

Developmental theories prepare children for a capitalist economic workforce (Burman, 1994), have an evolutionary bias, and are colonial (Burman, 2008, 2016). It has been pointed out that the assumption in developmental theories is that the goal of the process is maturity – each stage is followed by one that is "better," more "mature." This is what philosopher of childhood Gareth Matthews (1994, p. 17) calls "evolutionary bias." Developmentalism is a *recapitulation theory*: child's intellectual development is compared with ("recapitulates") the development of the species (with the child as nature, as the origin of the species) from "savage" to "civilized." This process of "racial differentation" underlies our modern understanding of the child and is influenced by the natural sciences, and in particular physiology and medicine (Oswell, 2013, p. 24). It is significant that colonialism and cognitive theories of child development emerged at the same time in Europe (Nieuwenhuys, 2013, p. 5). There is an intricate connection between imperialism and the institutionalization of childhood (Burman, 2008; Cannella & Viruru, 2004; Nandy, 1987).

One view is that enlightenment notions of progress and reason have colonized children as positioning them in need of recapitulating the development of the species. Like Indigenous peoples, children are seen as simple, non-abstract, immature thinkers who need age-appropriated interventions in order to mature into autonomous fully-human rational beings, and therefore cannot be granted political agency. Child as not fully-formed-human and developing is evident in biomedical and bio-psychosocial approaches to early childhood education (e.g., their focus on age, weight charts, language, gross and fine motor skills) (Cregan & Cuthbert, 2014, p. 10). Children's development is seen as dependent on adult Man – the standard by which their development is measured, evaluated and found wanting.

Rollo takes this a step further and argues that the concept of childhood has made it possible to conceptualize *all* subhumans as ignorant, immature, uncivilized animals by Nature and therefore they need faith (premodernity) and reason (modernity) in order to progress and develop into fully-human beings (Rollo, 2016, p. 4). This means that age is not just another category of exclusion, like race, gender or class, but "*the degraded figure of the child provides the internal structure and logic of the colonial conception*" (Rollo, 2016: 4; my italics) of the deficient "other." The comparison between the colonizing of ("developing") nations, women, people of color, and people living in poverty is, therefore, not just a paternalistic *analogy* (as e.g., with Burman, 2008), but a *homology* – a sharing of essential structures: these subhumans *are* children (Rollo, 2016, p. 4). Misopedy is not only about children, that is, young people of a particular age, but includes "*all* feral children of civilization, including white European ancestors" (Rollo, 2016, p. 2). Key to this internal structure of the childhood of society as inferior is a linear notion of time.

The logic of linear progression has positioned school at the heart of a civilization process (Culture) in aid of developing the wild and ignorant (Nature) to become "fully-human," whether as individuals or as species.

Since the Enlightenment, so-called inferiority in reasoned speech (*logos*), through which the intellect is evaluated and assessed, is not seen as innate and inherent in the subhuman, but understood as *temporary* and *should* be "fixed" through schooling (Rollo, 2016, p. 11). The associated *moral* superiority of the adult colonizer explains the resilience of misopedy and its intricately related use of time (*linear* progress) in school. Whether inspired by religion (progress through faith), or non-secular ethics (progress through reason), the adult as savior is seen as in a hierarchical and authoritative position to cultivate the inferior non-civilized "other" – even as a means to justify the use of violence (Rollo, 2016, p. 4). It is this moral superiority that is disturbing as misopedy is sedimented in school as chronological institution. Elsewhere (Murris & Haynes, 2018), a decolonizing way forward is proposed through the verb "to child" – something *all of us* can do.

Posthuman Child and Justice-to-Come

We have seen how dominant discourses and material practices, especially since modernity, position child as a lesser human being, marginalized and excluded, despite sustained academic critique from many disciplinary quarters in higher education. If these dominant discourses are not contested, the professional preparation of, for example, teachers, architects, lawyers, anthropologists, medical practitioners, art educators and social workers, will continue to be ageist. African children experience the most fundamental intersecting forms of discrimination on the basis of race, gender, living in poverty and lack of representation in political decision-making fora. As Achille Mbembe (2015, p. 2) comments: Western philosophical traditions regard "the body and the flesh" of the non-Western, and especially the African as the "stranger." Like many others in the postcolonial literature (see, e.g., Mignolo, 2011; Maldonado-Torres, 2007), Mbembe argues that an African self has been negated as a result of the Western "I" as universal, essentializing signifier, creating identity through difference.

In the case of black African child, an even lesser degree of humanity has been attributed by virtue of not only being black, but also being child – a double blow. As elsewhere, conversations about decolonization in South Africa as well as the literature tend to focus on the individual adult human. In contrast, we have seen that for posthumanists all earth dwellers are mutually entangled and always becoming, always intra-acting with everything else (sympoiesis). The notion of intra-action implies that there is no prior existence of individuals with properties, competencies, a voice, agency, etc. Hence, the reconfiguration of the posthuman child is not *a* child at all, in the sense of a fleshy unit bounded in space and time (Murris, 2016). Individuals human and nonhuman bodies (of whatever age) materialize and come into being *through* relationships; and so does meaning. "Age" as a human made apparatus can cause ontoepistemic injustice when it excludes young human bodies

through unjustified stereotyping on the basis of the deficit figurations of child (Table 1). The figuration of the "normal" knowing subject informs institutionalized discriminatory child/adult relationships and materializes specific roles of the educator (Table 1). The Western dichotomy cuts child (Nature) apart from adult (Culture) thereby essentializing and discriminating the younger "other." Drawing in particular on the philosophies of Barad and Haraway, this chapter has unhinged child and childhood(s) from their metaphysical frame of reference. For "justice-to-come" (Barad, 2012, p. 81), schooling needs to contribute to a postcolonial future that disrupts not only human exceptionalism, but also misopedy. Justice, for Barad, is about "proceeding responsibly," which involves the impossible task of allowing the response of the "between" she says she is trying to gesture toward. Barad (2012, p. 81) explains:

> (Doing justice is a profound yearning, a crucially important if inevitably unachievable activity, an always already inadequate attempt to respond to the ethical cry of the world.) Or, rather, perhaps I can put it this way: It is the very question of justice-to-come, not the search for a final answer or final solution to that question, that motivates me. The point is to live the questions and to help them flourish.

This decolonizing move is therefore not about *truths about a just future* as perceived by the educator to be taught (transmitted, facilitated, mediated etc.) to the learner, but to continue to ask the awkward questions (including what it means to decolonize). Importantly, it also means to allow children to ask the questions that *matter* in class (including what it means for *them* to decolonize education). This decolonizing pedagogical move reconfigures children as knowledge co-creators and as such includes them in the becoming of their own futures (both immediate and long term). We can now pick up some of these and other threads and re-turn to the figuration of a posthuman teacher. If the teacher is neither a guide, nor an instructor, nor a trainer, nor a discipliner, nor a facilitator, nor a socializer, nor a protector, nor a diagnoser, nor a medicator, then what kind of teacher is s/he/it? How will learning be assessed? Which pedagogies will be used? What kind of teaching resources will s/he/it use and how? What is becoming evident is that they are simply the wrong questions to ask as they already assume the existence of bounded (by their skin) individuals who exist prior to their interactions with the human and more-than-human. A posthuman reconfiguration of both child and teacher assumes that there is ontological, as well as epistemological equality between species and between different members of each species.

Re-turning: The Diffractive Teacher

Posthuman education moves beyond the anthropocentric focus on children's abilities or capabilities as *individuals* and regards knowledge production as part of an ontological *intra-active relationality* (including nature *and* culture) through which

the human and more-than-human render each other able as part of a sympoietic system (Haraway, 2016).

Several teacher educators have interrogated the logic and ethics of anthropocentrism in education and have given examples of decentering the human by resisting "following the child" only (Blaise, Hamm & Iorio, 2017; Lenz Taguchi, 2010; Murris, 2016; Nxumalo, 2016; Olsson, 2009; Taylor, 2013). Drawing on the philosophies of Deleuze and Guattari, Haraway and Barad, they have given concrete examples of how pedagogies and research methodologies, such as multispecies ethnography, rhizomatics, modest witnessing, or diffraction can work in the university classroom, outdoor outings and on field trips. This is important work, as they show how a posthuman inclusion of the more-than-human can work in the context of schooling – rendering children "capable by and with both things and living beings" (Haraway, 2016, p. 16). The details of these material-discursive entanglements matter, and tracing them "link actual beings to actual response-abilities" (Haraway, 2016, p. 29). When child is reconfigured as part of a sympoietic system, more equitable relationships between humans (of, e.g., different ages) and between the human and more-than-human are brought into existence. Sometimes these pedagogical examples focus explicitly on more-than-human entanglements in everyday encounters with colonized and environmentally damaged places (Nxumalo, 2016, p. 2). Like many Indigenous ontologies, posthumanism posits the inseparability of humans from their material environment and more-than-human relations and response-abilities (Nxumalo, 2016, p. 2). There is an important ethico-political point about building a different relational ontology in the Anthropocene, a geological period of permanent change to the planet's biosphere caused by large-scale industry, natural-resource exploitation and intensive agriculture. Unlike ecologists who assume that natural systems are universal and "outside, or separate, from human communities," posthumanism offers a transdisciplinary approach that disrupts the Nature/Culture binary and attends to land, the temporality of place and offers a way of "experiencing ecology as an intensive quality of experience," for example, attending "to the smell and texture of grass, soil and plants (Rotas, 2015, pp. 91, 97). A different kind of education is required for "an affirmative ethico-political economy" that addresses the "problematic of a dying species such as ours who is on the trajectory to extinction" through a shift that includes "trans-subjective and transhuman forces" (jagodzinski, 2015, p. 128).

It is only when we separate the human "I" from other human and nonhuman bodies that teaching and learning become activities that (human) individuals *do* (to each other or themselves as in "reflection"). This happens when we use language and other semiotic sign systems and *mediate* knowledge *about* the world through these conceptual systems and thereby bring into existence the Nature/Culture binary. Knowledge, so construed, is about the languages we use *about* the world and not regarding ourselves as *part of* the world.

It should become clear now that Sundberg's critique discussed earlier that posthumanists are not aware that "knowledge comes from somewhere and is, therefore, bound up in power relations" (Sundberg, 2014, p. 36) is unfounded. Ontology and epistemology are always entangled with the ethical because the knowing subject is

not at a distance from the world. S/he is always located, but not in a "fixed position," that is, "with the specification of one's social location along a set of axes referencing one's *identity*" (Barad, 2007, p. 470, Fn 45; my italics). Therefore, "location" does not mean the same as "local" or "perspective." For example, my email address is specific *in* the internet, but this net itself is always fluid and becoming, and so are identities (Barad, 2007, p. 470, Fn 45), but never politically neutral.

In contrast to the transcendal signifier "I" of humanism, the posthuman subject (including child subjectivity) is an entanglement that is constituted by concepts *and* material forces, where the social, political, the biological, and its observing, measuring, and controlling machines are interwoven and entwined. All elements of the entanglement intra-act without clear bodily boundaries, including between what is natural or cultural. For a justice-to-come this is salient, because binary thinking misses important knowledges – it cuts nature away from culture, child from adult, mind from body, boy from girl. So what could or should the role of the teacher be in posthuman schooling? What does it mean to teach and to work and think together in a posthuman classroom? Let us re-turn to the vignette at the start of this chapter.

Diffraction helps materialize important new insights for posthuman schooling. It disrupts the idea of humanist schooling that knowledge acquisition is *mediated* by the more expert and knowledgeable other; schooling as a linear journey from child to the more "fully-human" adult. Importantly, *the diffractive teacher can be human, nonhuman or more-than-human*, contributing to a reconfiguration of the world in all its materiality – a process of "worlding." Importantly, this process is always *relational,* not *individual*. The heron's standing in the water is made possible by the water, the river, the people who maintain it, the mountains, the people who pay taxes, the heron's mother who gave birth to him/her, environmental laws and rules of the city, animal protection agencies, other species, global politics of climate change and sustainability and so forth. All are intra-acting with one another and with me who took the photo. Like the diffraction pattern caused by the heron's body, the relationship between the human and more-than-human is dynamic and has agency. The point is not so much that knowledge practices have material consequences, but that "practices we enact *matter* – in both senses of the word," and that these practices of knowing are "part of the world's differential becoming" (Barad, 2007, p. 91; my emphasis). And this includes when as educators we re-turn to experiences diffractively: experiencing the experience (again). Making knowledge is not about the production of facts, but about "making worlds" ("worlding"), "in the sense of materially engaging as part of the world in giving it specific material form" (Barad, 2007, p. 91). Knowledge is constructed through "direct material engagement with" and not by "standing at a distance and representing" the world (Barad, 2007, p. 49). In that sense, teaching and learning are a "performance." (Barad has been influenced by Judith Butler's theory of performativity, but she is also critical of her reinscribing matter "as a passive product of discursive practices rather than as an active agent participating in the very process of materialization" (Barad, 2007, p.151).)

When learning is not positioned "within" a subject, but is conceptualized and enacted as a dynamic, relational process of intra-action, what it means to "think-with" in education is a material-discursive intra-action between human and

nonhuman bodies (a "flattened," non-hierarchical ontology). A body is to be understood as in physics, as any kind of body, whether a human body, an organ, a heron or a stone. Jane Bennett (2010, p. 2) describes how, for Spinoza, human *and* nonhuman bodies have "a peculiar vitality" or "conatus" – "a power present in every body [*conatur*] in order to persevere in its own being" (Bennett, 2010, p. 2). In that sense, all things (including the human body) are equal, and therefore form an ontological *continuum*, not a difference of *kind*. Although for Spinoza (like Descartes a rationalist), human beings strive to live by the guidance of reason, *all* things have vitality and are able to persist in existing "with the same force whereby it began to exist." For Spinoza, even a falling stone strives to continue its motion (Bennett, 2010, p. 2). Spinoza's monism and the relational ontologies of Barad, Deleuze and Guattari make us think differently about teaching and what it means to think together. Not only human bodies, but also their minds are *part* of nature, not in control of it, or in command of it. It has been wrongly assumed that education is only for, and about, humans. Decentering the human is one step (in the river) towards decolonizing education and the figuration of posthuman child is part of our response-ability for a justice-to-come.

Cross-References

- ▶ Eye-to-eye with Otherness: A Childhoodnature Figuration
- ▶ In Place(s): Dwelling on Culture, Materiality, and Affect
- ▶ Mundane Habits, Ordinary Affects, and Methodological Creations
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Situating Indigenous and Black Childhoods in the Anthropocene

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Re-turning Childhoodnature: A Diffractive Account of the Past Tracings of Childhoodnature as a Series of Theoretical Turns

4

Karen Malone

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Abstract

Weaving my personal narrative with a cartography of the theoretical field of childhoodnature, this chapter is the account of being a scholar working in the field of environmental education and more recently childhoodnature for close to two decades. To do this disruptive work, I am exploring the use of Barad's (Parallax 20(3): 168–187, 2014), this notion of a "re-turn" in her diffractive theorizing. Spanning a series of theoretical turns from critical theory, ecophilosophy, human geography, social cultural theory, feminist theory, and more recently

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posthumanist and new materialist theory, this account is embedded in the interdisciplinary fields of childhood studies, children's geographies, children's environments, and environmental/nature education. Littered with the intersection of stories of children growing up in a variety of "places" across the globe, the account seeks to acknowledge and trouble the view that childhoodnature does not exist without a philosophical past by tracing its theoretical ghosts.

Keywords
New materialism · Socially critical theory · Posthumanism · Diffractive theorizing · Anthropocene · Posthumanist ecological community · Intra-acting · Enmeshment · Assemblages · Disrupting · Re-turning

Introduction

> . . .by re-turning – not by returning as in reflecting on or going back to a past that was, but re-turning as in turning it over and over again – iteratively intra-acting, re-diffracting, diffracting anew, in the making of new temporalities (spacetimematterings), new diffraction patterns. (Barad, 2014, p. 168)

Re-turning through the theoretical field of childhoodnature, this chapter is a diffractive account of a researcher who has been wondering in the field of childhoodnature for a quarter of a century. I am borrowing from Barad (2014) this notion of a "re-turn." Spanning a series of theoretical turns from critical theory, human geography, social cultural theory, feminist theory, and more recently posthumanist, new materialist theoretical approaches, this engagement is enmeshed in the interdisciplinary fields of children's geographies, children's environments, childhood studies, and environmental, outdoor, and nature education. These stories of children growing up in a variety of "places" across the globe come from slum communities in Bolivia, inner city towns and prefectures in Japan, communities in polluting industry zones in the western suburbs of major cities in Australia, palm industries in rural villages and urban fringes of Papua New Guinea, small island communities in the Pacific, and a number of cities and regional towns in Kazakhstan. Life, according to Deleuze and Guattari (2004), is developed along thread lines (Ingold, 2010). A "line of becoming," Deleuze and Guattari write:

> . . . is not defined by the points it connects, or by the points that compose it; on the contrary, it passes between points, it comes up through the middle . . . A becoming is neither one nor two, nor the relation of the two; it is the in-between, the . . . line of flight . . . running perpendicular to both. (2004, p. 323)

Ingold (2010) building on a similar view of becoming explains his concept of "lines of light and flow" as linked to his notions of network and meshwork. The network of lines, the flow of materiality of child-city-nature-bodies in the stories of my own past tracings of environmental education research, provide the possibilities for real and imagined journeys where the human and nonhuman have always been

connected and always been implicated but often been mere adornment or context for the lives of those that were seen to matter the most, the humans. The defining attribute of a network of flow lines is their potential for connectivity. Using diffractive tools with Ingold's (2010) lines of light and flow with notions of enmeshment and creative entanglement, movement and freedom are embodied, performed, and inscribed in becoming simultaneously both as conforming and transgressive. It is through walking with children in past tracings of research that I have come to know the complicated negotiation of performing research with posthumanist approaches. The chapter explores three re-turning moments in my theoretical meanderings.

Diffractive Stance 1: Socially Critical Environmental Activist Re-turn

I start with my re-turning by exploring a "critical" environmental activist turn. It was 20 years ago during my doctorate research that I came to be first collaborating with a disenfranchised community in the western suburbs of Melbourne. It is here that I first came to understand the vulnerability of children in cities where pollution, toxic contamination, and disconnect of being with and through the environment were having significant impacts on children's lives. The UNICEF Convention on the rights of the child had just been endorsed by a number of countries around the world, and there was a sense that a "rights agenda" was becoming a dominant theoretical approach for understanding oppressed childhoods. The term Anthropocene hadn't been introduced into the nomenclature of the environmental crisis, but the sense of foreboding and its implications for the planet were already being revealed to me.

Diffractive Stance 2: Critical Cultural, Sociological, Geographical Re-turn

The second theoretical re-turn follows a critical "cultural, sociological, geographical turn." This began with the start of a postdoctoral fellowship with the United Nations on a project *Growing Up In Cities* where I was once again studying a community in the western suburbs of Melbourne, Australia. As part of an eight-country study replicating the work of eminent urban planner Kevin Lynch from the 1970s and directed by Louise Chawla, this project was my first entry into exploring a multidisciplinary, multi-theoretical approach to research that focused on working directly with children as co-collaborators and co-researchers while studying their relationship with a place. All sites in the study were communities where children were living in the most disadvantaged neighborhoods of the cities. The international team of academic researchers were urban planners, environmental psychologists, architects, anthropologists, geographers, and myself, the only education/social science researcher (and the youngest academic) on the team. One aim of the study was to develop results representing the diversity of children's experiences, including possible longitudinal comparisons. The project developed into a book of case studies on children's lives where the first ever set of qualitative indicators of environmental

quality devised by children was produced. The new sociology of childhood was impacting on the field of childhood studies; children as social/cultural beings with agentic properties adopted a central role in the stories of child rights.

Diffractive Stance 3: Critical Posthumanist and New Materialist Re-turn

I then re-turn to my emerging, lively "posthumanist and new materialist turn." Enmeshed in a human and more-than-human world, an onto-epistemological shift finds my researcher body implicated in a "messy entanglement" as an assemblage of and with all beings and entities acting on each other. Being in ecological community, I have employed the potential of posthumanist approaches while seeking to critique classic humanism, an approach that emphasizes only the value and agency of humans to the detriment of the agentic potential of the more-than-human world. Through the import of de-centering the human by using new materialist approaches, I am being enticed to question the centrality of the human and to reconsider the way humans relate to, set ourselves outside of, and seek to dominate the more-than-human world (Malone, 2018). Beyond the global crisis, these new ways of considering material relations with the planet have become important through lines for exposing children's encounters and relations with a nonhuman world, by their enticing of a shared agency among others. By reimagining this materialist manner, I was seeking to acknowledge the intricate web of interrelations that marked the contemporary child subjects' relationship to their multiple ecologies, the natural, the social, the physic, and the material possibilities of being child-kin-other on a damaged planet with a host of others. A posthuman child disrupts Cartesian divides: subject/object; human/nature; a new way of considering family, community, rights, ethics and injustices. To speak of ecological communities, beings in common, is to shift away from sentimentality, a distinct disruption of romantic views of child with/in nature; it is to know that all things are mutually implicated; the child is nature. Theorizing as childhoodnature the child as nature comes into being; reconfigured, co-present, enmeshed in diffractive becomings (Malone, 2018).

Diffractive Theorizing

Only the green twinkle of streetlights below me, endlessly floating in the open space, is there to greet me. The white light impacted by the altitude, higher levels of nitrogen, and less oxygen, diffracts and shines green. In years passed this prompted many to name La Paz the emerald city. Ironically, drawing on descriptions by the author Baum of the emerald city in book The Wizard of Oz*, it is claimed that he thinly disguised Oz as a socialist utopian. There were no poor people in the fantasyland of Oz, because there was no such thing as money; everyone worked halftime and played half the time. In 2005 Evo Morales became the current indigenous President of Bolivia on a platform of people living in community, with values*

such as solidarity and reciprocity. His party the "Movement to Socialism" *(MAS) established Bolivia as a plurinational state based on the autonomies of the indigenous peoples to liberate Bolivia from its colonial past. MAS represents a new indigenous nationalism combining elements of indigenismo, nationalism, and* "miners" *Marxism. As I descend I can hear the familiar sounds of gunshots or fireworks; likely it is protesters on the streets in the valley below. I remember a local telling me once* "you have not experienced Bolivia unless you have smelt tear gas in your nostrils or rubber bullets in your bum." *Socialism came at a great cost in Bolivia. The streets still echo the sounds of civil war, and the buildings in Central Square bear the scars of the bullets shot. From the taxi I can see posters in the streets* "Evo hasta 2020" (Evo until 2020) *alerting me to a coming election; people are always anxious during these times*; *it is probably neighboring factions fighting in the streets. I may have only dropped 500 m, but by the time I reach my hotel, I can feel my body calming. My heart is returning to a familiar regular beat; my breathing has slowed down. Now to climb the stairs and find the room that will be my home and office for the next 4 weeks. I silently creep quietly into bed and fall into a deep sleep.*

Barad (2014) attributes the notion of diffraction as evolving from feminist theorizing and the science discipline of physics, both seeking to deepen understandings about difference differently. Diffraction is a useful and troubling process, and unlike the idea of reflecting on my stories (as I would have done in the past), I am seeing who I am as entangled in my world of research, seeking to be with my data in different ways and using these new theoretical tools as the means for doing that. "Diffraction is not a set pattern, but rather an iterative (re)configuring of patterns of differentiating-entangling. As such, there is no moving beyond, no leaving the 'old' behind. There is no absolute boundary between here-now and there-then" (Barad, 2014, p. 168).

By attending to Haraway's (2016) notion of relational natures of difference, I use a diffractive lens to be responsive to patterns that map not where differences appear but rather to map where the *effects of differences appear*. Barad (2007) states that while diffraction apparatuses help us:

> . . . measure the effects of difference, even more profoundly they highlight, exhibit and make evident the entangled structure of the changing and contingent ontology of the world, including the ontology of knowing. In fact diffraction not only brings the reality of entanglements to light, it is itself an entangled phenomenon. (Barad, 2007, p. 73)

By not elevating all things or matter to the status of exceptional human or de-elevating human to the status of object or things but by exploring the biopolitical, bioethical, and ontological in order to pay attention to the subtleties of an ecological community that takes into account new relational materialist ontologies. Ontologies where "vital" and "lively" materialism is relational and emergent, it is an enduring structure of assemblages that is the product of their internal inertia. Vital new materiality acknowledges the aliveness of matter; it is always more than mere matter it is "active, self-creative, productive, unpredictable" (Coole & Frost, 2010, p. 9). I am using this diffractive approach to explore the many theoretical approaches I have adopted over

time. I am acknowledging that these approaches don't operate in isolation – the traces of past ways of thinking frame and reframe my analysis and the choices I make when encountering data is never in isolation, matter and meaning intra-act, and differences are exposed, and as I follow the path of these differences as they are becoming and are mattering, I am marking and noticing what matters falls away.

Therefore, to grapple with, in order to retheorize the research studies in this chapter, I have employed mechanisms that will help the reader to disrupt idealized ways of understanding children's relations with the more-than-human world. To do this I have sometimes employed the theoretical device of "intra-action" as used in new relational materialism approaches to support documenting messy, heterogeneous relations between children and their environment (in this case the cities) (Barad, 2007; Rautio, 2013a, b). The world, as used with this approach, is viewed as dynamic and in a constant process of "being" and "becoming" material matter. Intra-action constitutes a reconfiguring of "things" and "objects" that are not structured with a specific space or time but are enacted as agential entities flowing in a space-time continuum (Barad, 2007). The focus of reality in this approach is not on the phenomena of the things (their specific properties) but how the things are "in phenomena" – being produced through a series of entangled relational possibilities with other objects and things. Barad (2007, p. 185) uses the term "onto-epistemology" to describe "the study of practices of knowing in being" – an understanding that is central to intra-action. Onto-epistemology assumes that epistemology and ontology are mutually implicated "because we are of the world," not standing outside of it. The separation of epistemology from ontology, according to Barad (2008, p. 829), "is a reverberation of a metaphysics that assumes an inherent difference between human and nonhuman, subject and object, mind and body, matter and discourse." Therefore, when adopting a posthumanism approach, diffraction through intra-action can fulfil the aim of disrupting the Cartesian divide between humans and objects or things in our environment by challenging the simplistic dichotomies of animal/human, nature/culture, and object/subject (Barad, 2007).

As I fall asleep, I conjure up images of the children I met the last time I was in La Paz. I smile when I think of Luis, who was 14 years old when I was here on the mountain, before. I am coming back with the hope of speaking to him again. Now at 16 I want to ask him if his life has changed since we last spoke. Two years ago I had given Luis a camera so he could take photographs of his life up in the valley. A week later I had visited him and his friends at the local sports field to give him his photographs back. I also interviewed him. After he had a chance to look at his photographs, Luis had summoned me to come over, and then he showed me this photograph (Fig. 1).

> "I want you to have this one." he had said. ".. it is my favourite. The Illimani mountain is in this photo and a view over the city of La Paz from the El Alto. I can see Illimani from my house when sunshine hits the snow it fills me with joy." He then paused for a moment and closed his eyes, "My dream though is to live far, far, away from the city and my mountain, to be in the country where there are trees and fresh air where it is clean and safe."

Fig. 1 Illimani mountain. (Source: Photograph taken by Luis age 14, Cotahuma La Paz)

Fig. 2 My imagined dream place. (Source: Drawing by Luis aged 14, Cotahuma, La Paz)

He then drew a picture of his dream place for me and explained:

My favourite place is the country because it is peaceful and open, the places are beautiful there. This is the house where I can live in the country. The view from the hills, you can see everything. I like it because there are many rivers and fish (Fig. 2).

When Luis dreams of moving back to the countryside of Bolivia where many of his family still live, his life is representative of a rural-to-urban movement that is well established in our rapidly urbanizing world. Sixty million people in the developing world are leaving the countryside every year. For the first time in human history, more people live in urban than rural areas, and city populations are growing by more than 200,000 new inhabitants each day. As people continue to migrate the numbers of people living in slums, shantytowns and informal settlements rises steeply. Over one billion people currently live in slums that amount to one in seven people on the planet. Most come to the city holding onto a dream of a better life – more schools for their children, healthcare, jobs – to move out of their poverty. City life in cities like La Paz comes as a mixed blessing for children like Luis. The sense of deprivation and disappointment can be multiplied as children like Luis are so close to the opulence of modern society yet so far from enjoying it. Luis and his friends are exposed to a range of risks in their precarious environment: polluted air, dirty water, traffic accidents, flooding, potential landslides, forest degradation, the lack of sanitation, and the stench of garbage surrounding their homes. For these children, surviving to 5 years old is a major milestone, and the dream of a better life is often a privilege. The research activities conducted with the children by my team of newly graduated students from the social worker department of the University of San Andres in La Paz have been documenting the lives of children growing up in La Paz. Through their everyday encounters of being with others, our intention was to be influential with city council officials so they could create, for the first time, a children's plan for the city (Malone, 2018).

There has also been something more personal than the research study that connected me to Luis and other children who I have worked with in these challenging places. Like Luis as a child, I also had dreams for a different world. There was a place in my neighborhood, a place where I sought refuge. This was a place where I could quietly be *with* the world. The birds, lizards, and plants were my kin. My "humanness" was invisible; I existed merely as a "being," an entity among others who shared these spaces with me. These times exist as past tracings that I carry around within me. These moments captured in my body as a small child have influenced my thinking and drove me to understand the importance of children "sensing ecologically" through bodies, with bodies' affective relations with the leaves, the sky, the breeze, and the birds. I wrote this poem at a diffractive moment, leaving place, leaving kin, and leaving childhoodnature. The poem adorned the first page of my doctoral thesis 18 years later.

> Sitting on the rock
> I can hear the breeze
> playing on the leaves in the trees
> The sound of water trickles through my thoughts and dreams
> Is that a blue Wren in the distance I can hear?
> Wren will you be singing here again tomorrow?
> or is your life so filled with sorrow
> since they choked the sky with smoke and took away your home?
> The silence is so easy

Hiding in the shadows of history
time stands still when I am here
It is my special place
Nobody knows I am here
Nobody knows where I go
But special place will you always be here?
Do you quietly fear .....
as I do?
That in years to come the shadows will be gone
and only memories will stand in this place.
Karen Malone, March 1978, age 15

Luis calls her Pachamama *Earth mother*; as a child I called her Mother Nature. Mother Nature held me tight in those times when I felt that all humans had abandoned me. So how did I, a girl growing up in public housing in the outer suburbs of Melbourne, Australia, come to be here in this place with Luis and his friends discussing dreams and aspirations and learning to live with difference differently? Being connected, enmeshed, and entangled with their life and with my ghostly tracings remind me that we live in a time of rupture, a world haunted by the *Anthropos*.

Diffractive Stance 1: Socially Critical Environmental Activist Re-turn

When I first considered working with posthumanist approaches, I imagined that I was embarking on a new theoretical journey, a new way of seeing the world. But the more I have become entangled in my posthumanist new materialist thinking, the more the traces of its past iterations are being revealed to me. As a child in that poem who knew how it felt to be in an ecological community and to know plants and animals as kin, and professionally it and as a researcher in early 1993 when I arrived at the housing estate in Laverton Park to do my doctoral research, I came to realize seeking ecological kin was not a desire of mine alone.

It is now over 20 years ago since I first came to be collaborating with children who were experiencing the impacts of a mounting environmental crisis. The implication of an advancing anthropocentric world where nature was viewed as vast and bountiful as an unlimited resource for humans is that economic and technological progress was left to advance unchecked because technology could provide a solution for any ecological problem. I remember feeling at a loss as to how I could support the children as I looked across the highly degraded urban environment. The social and ecological degradation going hand in hand seemed to sap the energy, the desires, and the dreams from its inhabitants. I had young children at the time who played in well-manicured "natured" playgrounds, in safe suburban streets some distance away, and it seemed such an injustice that children in the same city were exposed to unsafe, polluted, toxic play spaces. The term Anthropocene hadn't been introduced into the nomenclature of the environmental crisis, but the sense of foreboding and its

Fig. 3 Offensive industries creeping up to the housing estate buffer zones, Laverton Park Housing Estate, Melbourne Australia. (Source: Photograph taken by author)

implications for the planet were already being revealed to me through the everyday lives of those most vulnerable to it, the children and the environment.

Although there were large expanses of vacant land owned by the government or industry, in Laverton they had lain idle for years and had, through neglect and lack of regulation, become dumping grounds for toxic waste and household rubbish. There were few parks or playgrounds with the only substantial area of public open space being McCormack Park. Local residents and educators describe the issues like this:

> "It is a bit late; we are surrounded by industry polluting all the area so bad that children occasionally come home from school with hands on their mouths to try to breathe", "Living close to industry can become very depressing, especially on windless nights when the stench of industrial fumes permeate the air." "The EPA say the industry doesn't put out emissions but when I wake up in the morning and my washing on the line is covered with smelly thick soot – I question that" "Children at this school suffer at a much higher rate than normal asthma, learning problems and constant general sickness" (Fig. 3).

A teacher in the local public school describing it to me stated:

> The general impression is that Laverton Park is the slums. People have deep sympathy for you if you say you work at Laverton Park. It's very hard, it's just an attitude people have. I just wonder if the kids don't take on that identity too, certainly the parents feel guilty that the children get so sick from the industry but many of them have no choice they cant afford to live anywhere else.

After my first days of visiting the school, I went home and wrote in my researcher's journal the following reflection. It revealed the very personal impact of being in the community:

> When I was a child I spent my first years living in a housing commission estate built at around the same time as Laverton Park. The school I attended was built from the same grey mortar bricks and the houses built in the same prosaic design. When I wandered around the school grounds today at Laverton Park I was constantly reminded of my past. I tried to recall how being in the school and living on a housing estate felt as a child.

The focus of the community environmental program being supported through the local primary school was to alter the power relationship that existed between the community and city authorities – to provide the space for the communities silenced voices to be heard. It meant supporting the community to perceive themselves not as mere objects of their social conditions but as active creators and narrators of their own lives. This had just started when I entered the community. I could tell from my first community meeting that the community, the children, and the adults felt powerless and silenced. This they told me was a consequence of them being "poor," having no political clout, no social status, and easy to ignore. They had come to accept that this was the way life was. It was their destiny, their lot in life, and their cross to bear. When I saw the principal of the school during my first visits, I asked him to describe the community program. This is what he had said:

> It was about developing a system of values for life – that you have the right and ability to change your world, change your society, that you can influence it. A lot of children and adults from this community don't believe they have the ability or right to do that. We're trying to set up something where the community would in every real sense own it and make it, would drive it and lead it to wherever it goes – empowering people to change society.

In my thesis I wrote the following to support how I was defining my own ideologies around the environmental movement and the theories informing my activist research position with an open invite to environmental education researchers to consider themselves as research activists. Oppositional or counter-hegemonic ideologies challenge dominant ideologies by disrupting the dominant discourse and providing alternative ways of viewing the world. Ideology becomes the tangible outcome of our consciousness; it helps to determine how we will "act" in our world. The environmental movement was committed to an abandonment of the commonly accepted and reigning paradigm of modern society or, as Goldsmith (1992, p. 337) aptly stated:

> So long as we argue within the accepted 'conceptual framework' of the reigning paradigm, or the canonical knowledge of the day, we can never persuade people either to accept a new idea or to abandon an old one ... it is the paradigm of science itself that must be abandoned, and hence the world-view of modernism which it faithfully reflects; and they must be replaced by the world-view of ecology.

The *cosmological dimension*, according to Eyerman and Jamison (1991), was the world view from which a social movement constructs its historical meaning and its utopia. It is the ideology or common belief held by its members. In environmentalism this was evident in the establishment of a new environmental worldview, an alternative way of viewing nature and society relationships. Cosmology served as a translation process and popularized systems ecology to the extent that the process of studying ecology became a discourse in the public arena and was used as a process for social and political action (Eyerman & Jamison, 1991). It was from the work of Carson (1962), Commoner (1972), Bookchin (1971), and Goldsmith (1972) that ecology was transformed into a kind of social philosophy (Eyerman & Jamison 1991, p. 71):

> As a break from the old conservationism which separated nature from society and acted on a continued separation – that is what wilderness preservation is all about- the environmental movement presupposed an ecological society, and by presupposing it, by conceptualising it, acted to achieve it.

It was the environmental movement that provided the space for the science "ecology" to move beyond the realm of scientific theory and become a way of life: "the movement provided the social context for a new kind of knowledge to be practiced" (Eyerman & Jamison, 1991, p. 73). The new ecological world view, the utopia, became the glue which bound the members of the movement together; it was an identity to which all who participated in the movement subscribed, of which I also subscribed as a member of the local conservation society and wilderness group.

Environmentalism and the environmental movement at this time gave rise to my early research by evolving as a philosophic discipline devoted to the interrelations between people and nature (Fairweather, 1993). This new philosophy "ecophilosophy" was concerned with thinking about nature and our relationship to it. The Norwegian philosopher Arne Naess began in 1973 to promote ecosophy or deep ecology as a comprehensive, integrative academic inquiry. Naess (1973, p. 99) stated:

> ... in so far as ecology movements deserve our attention, they are *ecophilosophical* rather than ecological. Ecology is a *limited* science which makes use of scientific methods. Philosophy is the most general forum of debate on fundamentals, descriptive as well as prescriptive, and political philosophy is one of its subsections. By an ecosophy I mean a philosophy of ecological harmony or equilibrium.

When I first started researching at Laverton Park, the children and the community seemed extremely apathetic to me about the degraded environment. Rubbish lay on the streets, there were no trees in the park, and the creek lay dead and dormant winding through the housing estate like a snake ready at any time to reveal some torrid poison. When I left 3 years later, the children with teachers and the community had planted over 10,000 trees in the park, cleaned up the rubbish, placed oxygenation ponds in the river, and had devised enough water quality data to convince the Environmental Protection Authority (EPA) to fine a number of the offensive

Fig. 4 Thousands of trees later. . . Laverton Park Housing Estate, Melbourne, Australia, 1996, Laverton Park Housing Estate, Melbourne, Australia, 2016. (Source: Photograph taken by author)

industries who then placed filters on their discharge pipes. With the community I had watched the world around the neighborhood change. They had made changes, through new imaginings, where they reconstructed themselves as a scientist, arborist, activist, anthropologist, and mostly as educators; they began to see themselves as connected, part of, and embedded in the liveness of the ecology of their urban landscape. The two photographs below are taken at the same location 20 years apart. The impact of the planting trees, cleaning up and diversifying the degraded ecosystem, and bringing attention to the "polluters" had been significant, and 20 years on the small seedlings have grown to become a eucalypt forest, a home for an array of others (Fig. 4).

I remember telling the children that by putting in oxygenation ponds, we were bringing life back to the river allowing animals to breathe to exist in the toxic water. In particular we had discussed how frogs were sensitive to the contamination because of

their porous skin. Frogs, as I remembered from my own biology classes in year 7, were an indicator species. On the final day of leaving the school, a child came running into the classroom, out of breath, agitated, and seemingly distressed. This normally would have set off alarm bells that something terrible may have happened at home during the night. But when I calmed her down enough so she could speak, she said: "I found a frog, I found a frog in my pond I found a frog, our river is alive ...."

In my doctoral thesis, I wrote that the dominant world view has entrenched a structure of hegemonic values and processes based on "human exceptionalism." Drawing on Merchant (1992, p. 63), I wrote, "Environmental ethics are a link between theory and practice. They translate thought into action, world views into movements." I supported this position using the work of Catton and Dunlap (1980, pp. 17–18) who had identified four assumptions held by contemporary industrial societies that reinforced the separation between ethics and morality and natural law in science: (1) People are fundamentally different from all other creatures and have dominion over them; (2) people have control of their own destiny. They can choose their own goals and learn to do whatever is necessary to achieve them; (3) nature is vast and bountiful and provides unlimited resources for people to satisfy their needs, wants, and aspirations; and (4) human history is the story of economic and technological progress. Progress need never cease because technology can provide a solution for every problem.

In Australia at that time, a number of environmental educators were contesting these assumptions (Fien, 1993; Gough, 1992), and by drawing again from the writings of Catton and Dunlap (1980) and Merchant (1992) in my research, I proposed four new or alternative assumptions to underpin a new environmental (ecological) paradigm and oppose the natural law of science: (1) humans may be exceptional species in some respects; however, they still depend upon other life forms for their survival; (2) human affairs are influenced by social processes; however, they are also influenced by the biophysical environment which often reacts to human activities; (3) the biophysical environment imposes constraints upon human affairs (e.g., human health and survival are possible only under certain environmental conditions); and (4) no matter how inventive humans may be, their science and technology cannot repeal ecological principles; there are limits to the economic growth of human societies Malone (1996).

In my writing I identified the basic tenet of this emerging shift as the expansion of human sympathies to include the nonhuman. Environmental ethics at this time as expressed by deep ecologists was viewed as a shift to a valuing of, and compassion for, all forms of nature – nature had valid rights that needed to be considered alongside human rights. Devall and Sessions (1985) at the time had summarized these two positions as an ecological consciousness that was in sharp contrast with the dominant world view. I had included the following tables as a summary of where my ecological theoretical approach was located. I argued that my theoretical framing was in opposition to the dominant world view and cohesive with ecocentric ideologies (Table 1).

The central thread weaving through the program at Laverton Park was the notion of collective action – providing opportunities for all members of the Laverton Park

Table 1 Contrasting world views and informing ecological ideologies from my 1996 doctoral thesis. (Source: Malone (1996) adapted from Devall and Sessions (1985) and Merchant (1992))

Devall and Sessions (1985) **Dominant world view**	**New environmental (ecological)** **World view**
Dominance over nature	Harmony with nature
Natural environment as resource for humans	All nature has intrinsic worth/biospecies equality
Material/economic growth growing human population	Elegantly simple material needs
Belief in ample resource reserves	Earth "supplies" are limited
High technological progress and solutions	Appropriate technology; non-dominating science
Consumerism	Doing with enough/recycling
National/centralized community	Minority tradition/bioregion

Merchant (1992) **Egocentric**	**Homocentric (anthropocentric)**	**Ecocentric**
Based on mechanistic science	Based on dialectic science	Based on holistic science
Matter is composed of atomic parts	The whole is a relation among parts, rather than a sum of elements	Everything is connected to everything else
Whole is equal to the sum of the parts (law of identity)	Emphasizes change, historicity, and social construction	Whole is greater than sum of parts
Knowledge is context-independent	Knowledge in any given period changes over time; it is socially constructed	Knowledge is context-dependent
Change occurs by the rearrangement of parts	Greatest good for the greatest number of people	Primacy of process over parts
Dualism mind and body, matter and spirit	The environment and society are the living contexts of life	Unity humans and nonhuman nature
Maximization of individual self-interest: what is good for each individual will benefit society as a whole	Look beyond the individual to the social and environmental whole for values by which to restructure the world	Faith all living and nonliving things have value
Mutual coercion mutually agreed		Duty to whole environment
		Human and cosmic survival

community to be involved in actions that would benefit the environment. As a researcher and co-participant in the community, my role as an environmental activist meant that I used the knowledge and practical skills I had to support these environmental actions. In practical terms this meant I not only observed and documented the actions of others but also became involved in community consultations to develop the plan of action, in helping to negotiate for funds to support the revegetation programs, and by planting trees with the community. It was a process of sharing and learning the importance of dialogue and the dialogic processes as a means of

providing a context for a shared activist stance. Even though I did not notice or give attention to the nonhuman entities travelling in that research journey with us, I look back now and realize that they were there at the level of ideology; the theoretical frame informing the research was always one of husbandry or "caring" for the environment. And just like in my childhood special place, and Luis with his Mt. Illimani, these children at Laverton sensed and knew it was "right" to care and to be with others and to be in a common world with other nonhuman entities.

In this study at Laverton, I used socially critical theory, drawing on theories of false consciousness, hegemony, governmentality, and false illusions. I explored the impact of social stratification and the relationship between structure, power, and agency. My intention was to support the community to reclaim their identity and voice and to identify how and where the power of their oppression was specifically located and to look for ways to live in a more harmonious relationship with their environment. While I was adopting an ethnographic stance, I also shared a role with the community in their activist processes, where they took up the role of "organic intellectuals." I was also introduced to participatory research as a way to work collaboratively with community and to help support them to be active in transforming their situation through research. Participatory research acted both as a methodological and a theoretical framework with oppressed others taking on the role as researchers in pursuit of answers to the questions of their daily struggles and to give a voice to the silenced, including the environment. Theoretically the research sought to find the means for exposing the myth of neutrality and objectivity and emphasized the principles of subjectivity. It brought into light the human/nature and subject/object binaries, but other than developing an awareness of the need for a paradigm shift where these binaries no longer had supremacy, they were exposed and yet under-theorized. The everyday lived experience of "forgotten classes" being in the world negotiating power with the most dominant while all the time seeking to construct counter-hegemonic discourses that reveal the false illusions that sought to maintain oppression, silence, and ecological degradation was exposed. The theoretical framing was based on the belief that ordinary people, including children, were capable of understanding unpacking, noticing the imbalance of power between themselves and nature and the dominant class.

The desire to rewrite the masters' story of human was evident in the work of Val Plumwood who at the time was a very influential in my thinking. Plumwood as a forewarning of time ahead wrote over two decades ago:

> The reason/nature story has been the master story of western culture. It is a story which has spoken mainly of conquest and control, of capture and use, of destruction and incorporation. This story is now a disabling story. Unless we can change it, some of those now young may know what it is to live amid the ruins of a civilisation on a ruined planet. (Plumwood, 1993, p. 196)

The work of ecofeminists such as Plumwood supported the final thesis of my study, a call to environmental educator researchers to take up the role as environmental activist in the same way feminist research scholars had taken up the role as

feminist activists. These theoretical outcomes of the research were explored in a paper *Environmental Education Researchers as Activists* published in 1999 in EER. I wrote in the article:

> The view of researcher as environmental activist I put forward is not restricted to an argument for a specific social research methodology but because I believe as intellectuals we carry a responsibility to engage in struggles of democracy and justice. As an environmental education researcher and an environmental activist I have a personal and professional commitment and responsibility to support and empower community members to be active in social and environmental change. I am engaging in a highly politicised act. How these multiple roles were constructed and synthesised is the essence of my research story." (Malone, 1999, p. 166)

The paper was one of the most cited papers at the time and was selected for the 10-year anniversary of the journal to be part of a special issue and book. The reprinted article included a commentary by Kim Walker. Walker summarizing the focus of the published paper wrote:

> Malone argues for an activist approach to environmental education research drawing on parallels that exist between feminist educational research and environmental education research. She argues that as a researcher in environmental education the researcher is engaged in a political act and that researchers are generating knowledge to advance a social movement. Malone calls for researchers to move out of the 'academy', develop partnerships with communities and become involved in political activism. (Walker, 2006, p. 394)

She then went on to explore the relationship between the particular theory, socially critical theory, that I had selected and the predictability of a set of conclusions from the research. In particular she questioned whether the theory has been central in the selection of a community (one suffering environmental problems, unemployment, and ethnic issues) that would meet the conditions of matching my theory:

> Malone's preferred theory in fact gave her the opportunity to understand that the participants of her study had adopted an activist approach to solving community problems in a manner that she did not expect. More importantly, she was able to develop a theory of the researcher as environmental activist based on her own experiences in the research process. (Walker, 2006, p. 399)

Diffractive Stance 2: Critical Cultural, Sociological, and Geographical Re-turn

Next came the "cultural, geographical and sociological turn." It was now 1996, and my thesis was submitted. In the role as a postdoctoral fellow with the UNESCO, I took on the role as the Australia director of a large international project *Growing Up In Cities*. As an eight-country study replicating the work of urban planner Kevin Lynch from the 1970s and coordinated by Professor Louise Chawla, this project

allowed for a transdisciplinary, trans-theoretical approach to research with a focus on positioning children as co-researchers. Children who participated were living in some of the most disadvantaged city neighborhoods in South Africa, Argentina, Poland, India, Australia, the USA, the UK, and Norway. The international team included urban planners, environmental psychologists, architects, anthropologists, geographers, and myself, the only education/social science researcher. One aim of the study was to represent the diversity of childhoods and, where possible, longitudinal comparisons. The project was published as a book of cases with the first ever set of qualitative indicators of environmental quality devised by children and was produced (Chawla, 2002). The methodological aim of the project was to devise a model of children's participatory research that would be generative and culturally sensitive. The audience of the research was UNESCO and UNICEF, in particular, but also other UN agencies, could use it to collect qualitative data with children in order to represent the fine-grained differences and experiences of children's everyday lives across a variety of neighborhoods in cities (Driskell, 2002).

After the *Growing up in Cities* project was completed, I continued to work with UNICEF on their *Child-Friendly Cities* international project. Building on my previous child-focused studies, I continued to refine with others the development of a place-based participatory research approach for researching with children. At the time I was also conceptualizing new ways of exploring the data with emerging theories from human and cultural geography, globalization, postcolonial theory, and the new sociology of childhood. These research studies were located with disadvantaged communities in city and rural villages in Papua New Guinea, a number of Pacific Islander communities, HIV-AIDS orphaned children in South Africa, and city, suburban, and small-town sites in Japan, Australia, and most recently Kazakhstan, Albania, and Bolivia. I called this my cultural, geographical, and sociological turn because it was during this time that sociocultural theory and geographical theories (inclusion/exclusion, affordance theory) meet with critical place-based studies to take on a central role in my reading of children's lives. Like another participant in the children's stories, it (place, geography, culture) wrote itself into my storylines with such vengeance that it was often hard to see outside of the thickness of the rich descriptions by children of childhoods as cultural, social, and geographical beings. I was very influenced by the compelling call by Qvortrup to childhood researchers:

> . . .children have been present all the time and they have influenced both their significant and insignificant others as well as the environment they were a part of. As other minority groups in history they cannot help having had an influence by means of their mere presence either as workers, helpers or as a nuisance. The research which is now being done in order to reveal their actual role in history and society is very important and must be continued with vigour and hard work. (1999, p. 5)

During this period I was employed by UNESCO to do conduct research on childhoods in the Cook Islands; the following is text taken from my writings around this time (Malone, 2011).

The image of childhoods on the Pacific Islands is often one of utopian paradise – clear blue oceans, palm trees, white sand, and other tourist brochure clichés. But for island communities behind this holiday facade, they face serious and unique challenges comparable often to the world's poorest nations. There have been long-term impacts of capitalism and free market on these fragile island ecologies: climate change, resource exploitation, pollution, and loss of culture to name a few. Islands are often strong metaphors in anthropology and other disciplines (such as biology) as isolated, unique, and bounded frequently portrayed as the archetypical metaphor of a closed, self-sustaining social, and spatial system. But it is important to debunk this view, even that somehow only modernist versions of globalization and a greedy capitalism have changed this isolation. That is, globalization is not a postmodern phenomenon; island cultures have always been involved in extensive networks and flows across hilltops, across islands, and across oceans. They are not exempt from the ecologies and degraded environmental conditions of a twenty-first century world consumed with consumption, including the consumption of child bodies, island resources, and cultural capital as they sip cocktails by swimming pools in gated hotels. My role was to bring the child-nature-island perspective to the world stage; small island states were being identified as central to debates on climate change and global warming. The research was to be an art of global call by children at the UN meetings on the sustainability and future of small island states (Malone, 2011). The following is a typical sociocultural storyline from children we researched with.

My drawing is of the beach because it is my favorite place. I love to look under the water at all the sea creatures and make sure they are OK. We have to take care of the beach because the animals will die if we don't. In my picture you can see a coconut palm, beach, and the sea, and in the sea are rocks, fish, coral, seaweed and jellyfish. And at the front, that's me. I am dancing at the beach. There are not many places I don't like to go, but I don't like the graves. They scare me. And the jail is bad especially when someone has to stay there I get scared for them. I think it is good that people come to our island. They need to learn our culture. But it is bad if they don't be nice or steal and stuff. We need to tell them not to pollute or leave rubbish. I think we should teach them about our beautiful island. The good thing about tourists is that they bring money and make jobs. The bad thing is that they leave rubbish and fight and get drunk. They should respect our culture and our language. When I grow up I would like to go to New Zealand, but I would come back (Fig. 5).

Children on the island were strongly committed to being active agents of change in their community, especially through the use of technology. We heard stories from both children and elders of villages, explaining how the children had become keepers of much of the traditional knowledge as they recorded songs, language, and other cultural artifacts from island elders on computers and uploaded them for others to see on the Internet. There was also a strong conservation movement fuelled by a number of active NGOs in the Pacific which have been working to develop environmental and sustainable practices for small island nations. Children have often been identified as the key actors in these environmental projects (Malone, 2011). From large-scale cleanup days, to campaigns to create *Raui* (marine protected areas) on fragile island reefs, children have been central. Teokotai aged 13, from Mitiaro,

Fig. 5 Drawing of my special place. (Source: Elizabeth, age 10 years, Rarotonga, Cook islands)

tells me: "We don't know enough of what is going on outside in the world, we need to be connected in order to be active in the future so we can protect and contribute to the global environmental issues." In a published article, some years later I described my encounters of Cook Island childhoods this way:

> Their experience of childhood, while personally unique, can be understood as a collective as well as an individualised journey in the process of being a child and growing up. Their stories weave threads of a collective concern about the need to have a voice, to move out from the periphery and into the centre of their island life. And while I have attempted to provide a construction of island childhood one which demonstrates the cultural autonomy of childhood and children's distinct identity from adult island society. I am also aware that to universalise their life would be to overlook that their culture of childhood is situated within and alongside, rather than outside, the world of adults Identities are neither fixed nor given; they are not ascribed or belonging to a particular culture or dependent on living in a particular space, but are the outcome of the negotiation of multiple spaces and multiple cultures. (Malone, 2011, p. 475)

This research, as with others projects I was working on during this time, was very political; children's rights in newly formed democratic countries like the Cook Islands are often tenuous and superficial. A human rights submission to save the Motu Koitaba city village in Port Moresby, for instance, put me in opposition to the government, who decided they could not ensure my safety when moving around the city. In response my research colleague and I elected to sleep in the village on the wooden floor of an elder's hut. The toilet was a hole in the pier, mosquitos buzzed inside netting, and the young rascals who were in opposition to the government took over as our security patrol. More recently, I have been again challenged with my own middle-class white privileged life when in the eastern cities of Kazakhstan my throat stung so much

from acrid toxins in the air I could hardly breathe. And again while in the western city of Aktau, Kazakhstan, I was reminded by the children that the nuclear reactor on the outskirts of town was so old it had been condemned. "Did you know?" they asked me. Did others know? Did the rest of the world understand what was hidden in these cities off the grid, far from prying eyes? I was sitting on a mountain pouring over 2000 photographs from children in La Paz feeling inadequate that I could only include brief descriptive data in the city report. Mostly in the report I wrote only of the role of children as social agents but all the time knowing there was so more being revealed. So many other actors were invisible.

Throughout this "cultural, geographical and sociological turn," I continued to explore the lived experience of my own subjectivity, always disrupting the subject-object binary. I was guided by the sentiments of writers like Michael Jackson at the time when he wrote: "Lived experience accommodates our shifting sense of ourselves as subjects and as objects, as acting upon and being acted upon by the world, of living with and without certainty of belonging and being estranged" (1989, p. 2). When reconfiguring my researcher role, I found myself seeking to find a close, empathetic position as an insider yet constantly aware of my power as an outsider. I questioned the impact of these multiple roles in countries where I did not speak the language and was positioned as an "expert" whose roles were to bring attention to "children's rights" through their participation, to have a voice. I had a great sense of responsibility to the children and their families to make sure their views were listened to, taken seriously, and acted on. I was drawing on an "epistemology of insiderness" that saw life and work entangled, where my life and the life of the communities, especially the children, became entwined in complex relations. The audience of government and especially policy-makers put pressure on me to "represent" data as discreet and clean, with which would be digestible to their needs, rather than providing me with opportunities to delve into and explore the complexities, to know these lives more deeply. It was from this yearning, a sense that these stories weren't allowing the deeply entangled lives of children to be present, that I embraced the theoretical musings first of Rosi Braidotti and then Karen Barad and considered if I could revisit this data through these new lenses.

Diffractive Stance 3: Critical Posthumanist and New Materialist Re-turn

The most recent theoretical and methodological "re-turn" is an emerging "posthumanism and new materialist turn." This turn supported a shift in focus, from culture as outside of nature, to a reorienting of relations where the human and more-than-human world were recognized as existing in an ecologically collective of "messy entanglements." By employing the potential of posthumanist approaches, my theorizing was seeking to critique classic humanism, an approach that emphasizes only the value and agency of humans to the detriment of the agentic potential of the more-than-human world. Through the import of de-centering the human by using new materialist approaches, I am being enticed to question the centrality of the

human and to reconsider the way humans relate to, set ourselves outside of, and seek to dominate the more-than-human world. Beyond the global crisis, these new ways of considering relations with the planet had important consequences for understanding current debates around children's encounters and relations with the more-than-human world. By reimagining in a vital new materialist manner, I was acknowledging "the intricate web of interrelations that mark the contemporary subjects' relationship to their multiple ecologies, the natural, the social, the physic" (Braidotti, 2013, p. 98). I was noticing and attending to the subtle ways "other objects" (animals, plants, buildings, earth, air) were often disregarded as nothing but aesthetics, the background context of children lives. A feature of this new ontological perspective was that "it shifts from conceptions of objects and bodies as occupying distinct and delimited spaces, and instead sees human bodies and all other material, social and abstract entities as relational" and that these "...assemblages of relations develop in un-predicable ways" (Fox & Alldred, 2014, p. 401). I explored these new theories by returning to research data from my studies with children in a 4-year period between 2012 and 2016. During that time I was researching again for UNICEF and had worked with four regional and inner city communities of Kazakhstan and the three communities in the higher reaches of the valley of La Paz, Bolivia.

The posthumanist/materialist reading of nonhuman encounters in urban environments helped me to unpack the political, ethical, and ontological questions about human-nonhuman relations through a deepening sense of intraspecies interdependence. The materialist reading, in particular, exposed the physicality of the relationships, an embodied reality of knowing others and what it meant to live in oneness with the nonhuman. While reflective or critical analysis had provided opportunities for me in the past to see similarities and cohesion in my data across place and time (reflecting sameness), working with diffractive lenses allowed for an opening up of data, "to diffract it, and to imagine what newness might be incited from it" (Hultman & Lenz Taguchi, 2010, p. 6). Rather than a fine-tuned analysis of the theoretical field of childhoodnature, I sought to share with the reader my grappling when applying these approaches. I moved away from generalizations and assumptions that have often universalized children's environmental experiences, and I sought to find a glimpse of the complexity of urban environments. I was using a diffractive analysis technique.

Diffractive theorizing encouraged me to view differently a shared ecosystem of bodies. Hultman and Lenz Taguchi (2010) term a "diffractive way of seeing" (p. 535) as involving reading with, not against data, allowing the data to work through you. Often I will insert scientific information juxtaposed with personal stories and children's images. These threads weave a complex and deep understanding of the different ways for representing what knowing and being in the Anthropocene could mean.

By adopting a posthumanistic approach and considering the value of theoretical tools like diffraction, I have sought to deconstruct children's relations with other "entities" or objects by expressing their encounters with all objects and entities as being shaped through noticing and being attentive to ". . .. space in between children

and their environments" (Rautio, 2013a, p. 4). I analyze data that does not fit into neat categories of certainty with closure; rather I research where the "complexity and open-endedness of phenomena" are not sacrificed. Drawing from Bruno Latour's concept of "learning to be affected" – which requires the researcher to develop more than cognitive modes of attention – I want to become attuned to the multifarious ways human and nonhuman bodies and entities move and affect each other.

Intra-action therefore supports the capacity for human-nonhuman encounters to co-merge (to take up an intersubjective position) where all things are "agentic" – that is, agency is not something a body (human or nonhuman) or an entity has but that it is a relationship brought about by intra-action. Rautio, for example, explains the distinction between more common ways of thinking about interaction and her use of Barad's offering of intra-action in the following way: "In interaction independent entities are viewed as taking turns in affecting each other, which implies that these entities are taken to each have an a priori independent existence. In intra-action, on the contrary, interdependent entities are taken to co-emerge through simultaneous activity to come into being as a certain kind because of their encounter."

My "posthumanism and new materialist turn" is evolving. Throughout my recent writing, I have endeavored to reveal my own struggles to reconcile my desire be to honest and respectful in the reporting of the children's lives and, in particular, incorporating child rights with rights for the more than human world while engaging in analysis that disrupts anthropocentrism and continue to expose the implications for a long history where humans have considered themselves as exempt from nature and as exceptional beings. In revisiting my earlier research in the early nineties, I felt rather than letting go and starting anew that this re-turning was enmeshed with past tracings of theoretical engagement with deep ecology, in particular, the work of ecofeminists such as Val Plumwood and Carolyn Merchant. When posthumanism contests the human/nature dualism, a dualism that installs this mastery and strips humans of their own "natural" dimensions, it challenges the myth that we are no longer animal nor part of nature and that nonhuman entities are not comparable to humans because they don't have emotions and attachments, comparable to humans.

Smith argues that the posthumanist perspective takes seriously this urgency for critique to stop "the anthropological machine, the constant production of absolute dividing lines between humans and the rest of the natural world" (2013, p. 24). And Wolfe argues that to question "humanism" in the posthuman is to be attentive to its limitations:

> . . .posthumanism isn't posthuman at all – in the sense of being 'after' our embodiment has been transcended – but is only posthumanist, in the sense that it opposes the fantasies of disembodiment and autonomy, inherited from humanism itself. (Wolfe, 2009, p. xv)

Children are closely affected by dogs. It is an ancient alliance of dogs supporting human survival by their capacity to be alerted to, and have sensitivity for, the precarious landscape. The child-dog intra-action and cohabitation provide a space for this mutual reciprocity, care, and protection to be thrown together and to be living well together. The child-dog accounts of intraspecies companionship and survival in

urban spaces in La Paz challenge the sanitized boundaries and binaries maintained by Western middle-class sensibilities. The "unromantic" child-dog relations experienced by impoverished urban dwelling child-dog bodies of La Paz contradicts Western centric views of humanized, romantic urban environments where nonhuman "animals" are wild, unwelcome, savage, and marginalized and children are "adult becomings," safe, secure, and contained by adult lives.

Diego takes photographs of stray street dogs, the ones who often accompany him as he walks the streets. He hands me one where I can see a dog high up on a roof alone, looking down. He explains, "this photograph is of a dog that I take care of because it doesn't eat. The dogs are badly treated and the people beat them for no reason [pause] a bit like the children [he giggles as he looks at his photograph] sometimes we hide on the rooftops to be off the streets with the dogs." The other photograph? "That is the dog that sometimes gets beaten, the streets are dangerous" (Figs. 6 and 7).

Many children feed street animals; they told me they felt distressed when animals were treated badly by others, normally the adults or strangers in the neighborhood. Dog-child entities are "co-present" in the streets, the children and the dogs yielding a shared "worldly collective" of the street-home-being present, dwelling in this shared place. Street dogs are urban scavengers, not Western-style, house-dwelling, middle-class "family pets." Child-dog assemblages are expressed through their intra-action in the streets.

Coco is his companion. Juan co-inhabits this environment with Coco. On the way up the valley Juan photographs a large dumping area for household rubbish; Coco is rummaging around amongst the rubbish looking to find food. It is a harsh life they share. Survival is dependent on the possibilities of what can found at this degraded

Fig. 6 Dogs hiding on rooftops. (Source: Photographs taken by Diego, La Paz)

Fig. 7 Dangers of being on the streets. (Source: Photographs taken by Diego, La Paz)

sites. In the final photograph we come to where Juan-Coco (child-dog) play freely in wild nature. Together they have evaded the confines of the built environment and found refuge. Both photographs Juan show me illustrate something other than an 'idealized' and 'romantic' play place where child-dog encounters of diverse majority world child-nature reconnections are possibly located. 'Coco was my best friend', says Juan, 'He was near me, always he was near me. He heared me, he was always with me. He understands the things I want. He always comed with me into the forest to play. He was my play mate. He was the same as a human friend, it was no difference between us as friends. He is gone now and I miss him. He was part of me and my life. My heart aches now. Death is all around me now' (Fig. 8).

The land is steep and due to the regularity of landslides and floods, it is dangerous. Rubbish is often dumped here, and dogs scavenge, while children climb trees and build huts. Juan's photographs portray child-dog as they journey and move through the in-between from streets to "wild degraded nature" on the upper reaches of the valley. We sense the intimacy and companionship of child-dog as they explore and roam together from prying adult eyes. This is not a human contrived nature forest play activity or a family dog on a lead being taken into nature with a child, such as we might find in one of Richard Louv's (2005) accounts of his or his children's childhood in middle-class suburbia (see Malone 2016 for further explication of this argument).

Unlike a Western centric theorizing of human-dog relations which often sees the dog presented as a substitute-dependent child – humans findings solace in the seemingly unconditional love from their dogs, the child-dog relations as expressed

Fig. 8 Dog and dumped rubbish. (Source: Photographs taken by Juan age 13, Cotahuma)

by Diego as "beings together" in La Paz are more likened to Donna Haraway's (2015) notion of "making kin." The purpose of or to make "kin" according to Haraway (2008) is to recognize the coming together of different entities who may not be tied purely by ancestry or genealogy. She argues the stretch and recomposition of kin and represents the understanding that earthlings are all kin in the deepest sense – kin becomes the purest of entities in assemblages of the human, more-than-human, other-than-human, and inhuman: "all earthlings are kin in the deepest sense, and it is past time to practice better care of kin-as-assemblages" (2015, p. 162). Kin relationships emerge in this study as a deep sensitivity by the children when describing the similarities of the child-dog experiences (Malone 2016, 2017).

Rather than understanding data as articulated from the modernist divides of human-culture, subject-object, and child-nature, I have in these instances sought to disrupt these familiar patterns and distance my analysis from the dominance of the human subject in order to notice new imaginings for a child-nature assemblage of intraspecies relations. Children's accounts of moving with dogs through dangerous public spaces and exercising mutual care, companionship, and protection in these spaces speak to the way where "dog and child bodies are shared bodies," together they are "learning how to be with" a damaged landscape. They are something outside of the image of the "adult human" in the landscape – the exceptional human and the unified, adult master human who is concerned with dominating and controlling the nonhuman other who is lesser animal, lesser being. Child-dog-bodies of La Paz illuminate children's encounters of dogs in La Paz that as an "ecological collective encounter," it could be possible to further extend Taylor's (2013) adaption of

Latour's "common worlds" notion and advance an indivisible human and nonhuman real-world posthuman ecological collective (Malone, 2017). That is, rather than a child engaging with nature (out there), it could be helpful to adopt the view childhoodnature collectives are integral to and deeply enmeshed in children's lives (Taylor, 2013).

Conclusion: Re-turning as Reconfiguring of Past Tracings

Through the introduction of new theories, namely, posthumanist and new materialist approaches, I have been grappling with the complexities of considering what happened when I viewed my research data differently. Did I even *do* data differently? Part of this was to consider what happened when humans as the "subject" did not occupy central stage in the stories and narratives of my data. What happened when that which was designated as peripheral, those phenomena (nonhuman entities, earthlings, others) that had existed in the background, moved to the center?

By using Barad's work, I am supporting the idea of a "flatter ontology," a flatter ontology that emerges from an understanding that all entities (humans, dogs, rocks, mountains, trees) have ontological significance and are always in relation to one another in nonhierarchical ways. Barad, for instances, writes:

> Neither discursive practices nor material phenomena are ontologically or epistemologically prior. Neither can be explained in terms of the other. Neither is reducible to the other. Neither has privileged status in determining the other. Neither is articulated or articulable in the absence of the other; matter and meaning are mutually articulated'. (Barad, 2007, p. 152)

Diffractive analysis therefore makes us aware of our embodied involvement in the materiality of the event of analyzing data.

As a researcher, in my re-turning to a posthumanist and new materialist perspective, I am implicated in the ethical choices I am making and how that positions me politically. In these current stories where I have retrospectively retraced past theories with current imaginings, I am acknowledging that I was and still am entangled in relations with the nonhuman world in a way that a mere unpacking of an ecological, cultural, or social self didn't fully reveal. I am moving and revealing my shifting as an ontological being, from identifying bodies (human and nonhuman) as separate entities with distinct borders, to think instead of assemblages and interdependences, my onto-epistemological self; I am knowing and being with my past, present, and future. I am inspired by the possibility of an embodied engagement with the materiality of my research: a *becoming with the data* as new and past researcher. I am considering new ways of making meaning from my research that will invite uneasiness, messiness, and complexity rather than reassurance and comfort. I am not separating the past from the present, I am iteratively intra-acting, re-diffracting, and diffracting anew in the making of new temporalities and new ways of knowing and being with the world through my data that includes the tracings of past theoretical landscapes.

Engaging with posthumanist and diffractive theorizing has allowed me to introduce the concept of "posthumanist ecological communities" into my environmental education research. This is different than the "environmental collective action" I supported in earlier theorizing, yet in my re-turn, I can see tracings of an activist stance embedded in desires to unhitch the primacy of the exceptional human in mine and others' writings. Environmental education drawing on environmental collective action assumed a deep ecological perspective that humans should be acting on behalf of the environment; this was essentially motivated by a central anthropocentric ethic; destroying the planet was jeopardizing the longevity of human life on earth. This diffractive theorizing through posthumanist ecological community contests human exceptionalism as I had done before but in turn acknowledges also that we are connected to the more-than-human in more diverse and complex means than I had envisaged before. Taylor (2017, p. 4) responding to one of my current research articles stated:

> She is one of the few environmental education scholars who is calling for 'a new imagining of a 'collective ecology' of human and nonhuman for future sustainability and environmental education'. (Malone, 2015, p. 50) in the Anthropocene

> Motivated by an engagement with posthumanist theory, Malone's notion of 'collective ecology' is not the same as calls for 'environmental collective action' emanating from political ecology and some of the more activist branches of sustainability education. While the former moves from an understanding of the 'collective' as already constituted by humans and nonhumans alike, the latter assumes that humans need to band together to take collective action on behalf of the environment. (Taylor, 2017, p. 4)

In the era of Anthropocene where the human has been positioned outside of the nonhuman, I desire to disrupt dominant master discourses. Discourses that have in the past embedded me deeply in my human dreaming of a Cartesian modernist divide, where children as the decolonized other stood with the nonhuman, separated and outside of the contemporary unified adult human. Through diffractive theorizing I have in this chapter re-turned to the potential of a child-body-nonhuman, childhoodnature within an ecological collective and traced its ghostly presence in over 20 years of research in the field of environmental education and a range of other related disciplines. I have found through diffractive theorizing that my posthumanist approaches are entangled in the ghosts of Devall and Sessions' (1985) new ecological worldview and Merchants' (1992) ecocentric ideologies.

> Ghosts point to our forgetting, showing us how living landscapes are imbued with earlier tracks and traces. (Gans, Tsing, Swanson, & Bubandt, 2017, p. G6)

These new temporalities (spacetimematterings) and emerging diffractive patterns have allowed me to reconfigure my research landscapes and find those past tracks and traces as they now become enmeshed in my newly configured potentialities.

Cross-References

- ▶ Greedy Bags of Childhoodnature Theories
- ▶ Posthuman Child and the Diffractive Teacher: Decolonizing the Nature/Culture Binary
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Troubling Intersections of Childhood/Animals/Education: Narratives of Love, Life, and Death
- ▶ Unplanning Research with a Curious Practice Methodology: Emergence of Childrenforest in the Context of Finland

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Eye-to-Eye with Otherness: A Childhoodnature Figuration

5

Iris Duhn and Gloria Quinones

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Abstract

Taking a narrative approach that follows Haraway's (Staying with the trouble. Making kin in the Chthulucene. Duke University Press, Durham/London, 2016) call for making kin with growing awareness of a looming 6th mass extinction of species, the chapter focuses on multispecies encounters to consider what

The story is a hen and child story. They are the main actors and we thank them for their ability to call us to attention. Chickens and child are members of Gloria's kin and we hope that we have captured their encounters in ways that agree with them. And Ena, thank you for sharing worlds for a time.

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childhoodnature as a concept can do for research. The intention is neither to focus on what can be learned from multispecies child-animal encounters, nor is it an attempt to document such encounters in "real life." Rather, the chapter experiments with the porosity and liveliness of materialized thought (the text) as it gives form to an event (the multispecies encounter) across time and in place. The intention is to speculatively imagine a childhoodnature figuration of a hen and a child as a lively encounter that ripples through time/place and that generates unexpected lines of inquiry. The chapter experiments with a speculative approach to explore new ways of thinking and doing multispecies relationships as "earthly encounters" that matter to politics and ethics of sharing worlds. This, we argue, is an essential task in the midst of loss of diversity as it opens spaces for new imaginings about sharing worlds through kin-making in childhoodnature research.

Keywords
Speculation · Kin-making · Figuration · Stories that matter · Multispecies

Introduction to the Experiment

The intention of this chapter is to be experimental. In order to move beyond well-rehearsed habits of thinking, doing, and perceiving the self with the world, the chapter encourages playful imaginings and speculating with a toolkit of concepts, perceptions, and figurations. In the search for new tools that give rise to new stories, the focus are encounters with ideas, affects, and experiences which breathe life into the exhausted forms and habits of thinking and being with the world that we inhabit most of the time in our everyday life.

We tell a story of EnaSilva, or rather, we create the figuration of EnaSilva as a possible childhoodnature figuration. EnaSilva, as figuration, is more than the child and the hen that appear in the narrative. EnaSilva is an attempt to generate alternative imaginings as it aims to express aspects of the complex, "internally contradictory multifaceted subjects we have become" (Braidotti, 2011, p. 26). As a figuration, perhaps it is also less, and more, than what appears in the narrative that follows, in the sense that EnaSilva intends to undo some of the assumptions about child-animal relationships. Speculation is the method we use to rekindle imaginations about what may or may not happen in the encounters between hen and child, but we also make use of interpretation of what we think we notice and observe. This interplay of interpretation and speculation with a childhoodnature figuration creates spaces for us as writers to go beyond what we think we know, and we hope it does something similar for readers.

It seems that new times, and we argue that we find ourselves in dangerous new times where nothing can be taken for granted, need new ideas, new imaginings, and new figurations to cultivate spaces for diversity in a seemingly narrowing world (Bauman, 2015; Morton, 2010). Childhoodnature is a new imagining, and the idea of EnaSilva is an attempt to see what such an imagining can do for research. EnaSilva as a childhoodnature figuration seeks to steer clear of interpretation as representation of "what really happened," of individualization, and of romanticization (Taylor, 2013). EnaSilva, like

Fig. 1 EnaSilva in the making

childhoodnature, is not a representation of animal and child play or of nature learning with animal-others. It is, perhaps, an attempt to bring into being a transformative possibility for becoming-other without becoming familiar. It is an attempt to keep distance from the known and the assumed in order to create space for further becoming and for inviting the unfamiliar into the conversation (Kristeva, 1991). EnaSilva is not so much an entity of sorts but a vibrant figuring of place, time, and life itself that remains open to ongoing imagination and speculation. Every encounter with this figuration is another figuring which then creates more possibilities for further becoming (Braidotti, 2011). EnaSilva is a figuration that, if successful, sprouts multiple others. Childhoodnature itself is such a figuration and EnaSilva is one of its sproutlings (Fig. 1).

To be upfront about experimentation: this is not the fruit of individual labor nor is it devoid of power relations. There are many threads that make this text, and so the text is a collective endeavor where some ideas take hold whereas others fly by. Threads of this contingent assemblage include places, things, other texts, animals, coffee and food, computers, people, air, talk, atmospheres, movements, and mobilities. This contingent assemblage is a map of power relations in itself. It left traces, such as this chapter. The assemblage contributed CO_2 emissions through the use of computing power. According to this blog, (https://www.custommade.com/blog/carbon-footprint-of-internet/), global Internet usage produces more CO_2 emissions than air travel. Writing this chapter in April 2017 coincides with a terrifying milestone in earth history when:

> the Mauna Loa Observatory recorded its first-ever carbon dioxide reading in excess of 410 parts per million. Carbon dioxide hasn't reached that height in millions of years. It's a new atmosphere that humanity will have to contend with, one that's trapping more heat and causing the climate to change at a quickening rate. (Kahn, 2017, p. 1)

The point of paying attention to the assemblage is to heed Foucault's (1977, 1991, 1994) reminder: there is no innocence or purity. Every action causes something; and every human action is political because human action is always embedded in power relations. Crossing a historical carbon dioxide threshold at the time of writing this chapter belongs

now to the assemblage of this childhoodnature chapter. The other point is that childhoodnature research may have entered the age of speculation altogether as no one knows what crossing a line like the one crossed in April 2017 means for life on earth.

It might help to consider this chapter as a specific materialization of complex ecologies that overlap at times and in places with such force that our human presence and perception were called, temporarily, to attention (Haraway, 2016). The text is a capture of these fleeting moments of an emerging ecological sensibility that begins to perceive experiences across the human self, other embodied matter, and materialities. This is a horizontal experiencing of self with the world rather than a vertical one; the vertical experience of self is one where the human cognitive mind dictates what counts as individualized perception and experience, whereas horizontal perception is less focused on the individual cognitive mind as the fount of all knowledge-making (Bennett, 2010, p. 10). This text is a framed expression of an emerging vertical ecological sense-ability.

The notion of ecological sense-ability draws on Bennett's (2010) suggestion to change perception from a vertical to a horizontal perspective. Vertical perception, it seems, comes naturally to humans. To some degree it is an evolutionary outcome of walking upright, and historically it has intensified in postindustrial cultures which now give preference to the sense of seeing over all other senses (Rose, 2007). Perceiving the world through the eyes which then shapes social interactions is commonly understood as being at the core of social cognition (Itier & Batty, 2009). According to neuroscience, human and monkey brains, in contrast to other species, may be "hard wired" for a social gaze which enables selective responses to other faces and bodies, including following others' gaze (Emery, 2000). This hypothesis underscores the belief in human exceptionalism based on evolutionary biology which, following Darwin, "has become more and more essential to our ability to think, feel, and act" (Haraway, 2016, p. 62). Human exceptionalism is highly problematic, especially if it is tied up with a sense of entitlement and a reductionist understanding of Darwin (Grosz, 2011).

Moving away from an understanding of humans as somehow superior to other species is a wicked problem because humans have been so successful in marking their presence on earth through domination and decimation of nonhuman others (Kolbert, 2014; Latour, 2014; Yusoff, 2013). This makes Bennett's (2010) suggestion for a change in perspective from vertical to horizontal truly revolutionary. It is almost unimaginable to forego interpretation of social interactions of all kinds based on seeing-as-perception. From a vertical and upright position, the human gaze is the direct entry to cognition in most encounters in everyday life. What happens if the mighty human brain is no longer the seat of meaning-making? What happens if human perception of the other and meaning-making of the encounter happens through the soles of the feet, the palms of the hand, and the knees in the dirt?

The Place, Time, and Life/Death Itself

The story begins with a description to generate a sense of place (Dovey, 2010; Duhn, 2012) for the EnaSilva figuration (Fig. 2). Place: a house under ongoing renovation in a semirural community in Victoria, Australia. The house has a fenced

Fig. 2 Horizontal ecological sense-ability in the making

backyard and is surrounded by trees and birds, by natureculture, including the wind, foxes, cars, chain saws, and other heavy farm machineries. Ena was a hatchling in a clutch of seven from a nearby farm. The entire clutch, all female, were bought by Silva's family who wanted to establish a small chicken run to support their daughter's sense of living with animals and to benefit from the hens' egg laying ability. They also liked chickens and wanted to live with them and see them thrive under their care. Despite best intentions, the hens have experienced violent deaths in their backyard chicken community, both through foxes who found their way into the chicken hutch and also through Tina, the rescue dog, who joined the family about 3 years ago. Tina was gentle with Silva but ferocious with chickens and bit two of them to death. At the time of writing, Tina has given up on her chicken killing, and the foxes are kept out of the backyard with improved fencing.

As adult observers who are also part of the childhoodnature storying, we are time travelers and place shifters. Memories of the encounters shape the story (Gloria was there at the time), while imaginings of the encounter then overlay the story (Iris was not there at the time but imagines the event, based on her own memories of other places and other child-animal encounters). The materialization of EnaSilva as a figuring/story/text/trace is an earth story of cantankerous human-animal kinship over time and place. Earth stories matter because of the asymmetry and the incommensurability of kin-making with other earth beings. Feminist speculative fabulation is political as Haraway (2016, p. 12) explains because "it matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts what descriptions describe descriptions, what ties tie ties. It matters what stories make worlds, what worlds make stories." Our story has many enfoldings for us, as writers, as readers, as thinkers, as doers, as sacs of flesh (Plumwood, 2008), as hosts to myriads of microbiological communities (Tsing, 2012), as organic/inorganic vibrant mattered assemblages (Bennett, 2010), and as tiny specs in an unimaginably vast cosmos (Tito & Reinfeld, 2007).

Fig. 3 EnaSilva in a "moment of encounter. . .affective encounter." (Bear, 2011, p. 302)

The encounter in Fig. 3 seems to be close to what Bennett (2010, p. 122) calls "one matter-energy," chicken and child, and child and chicken coming eye to eye horizontally as fellow lively creatures. Silva is young enough to not be "too human" in the sense that she does not seem to care about demonstrations of human exceptionalism and superior cognitive function. The hens probably consider themselves as advantaged in this encounter, as they know how to quickly flutter away if the situation requires it. Silva can only watch and learn. It takes her a long time to move, compared to the swift hens.

As we speculate on possible stories of these matter-energies, we begin to see and unsee how this affective encounter unfolds. It is important to the EnaSilva figuration to point out that this is not about a flattening of difference. The figuring that EnaSilva enables is a mapping of power relations as much as it is a mapping of strangeness and incommensurability. Chicken and child and child and chicken share the vitality of matter-energies and of being in the world right now. But their worlds are incomprehensible to each other and to any observer, as perception of "reality" differs across species. Yet there appear to be momentary affective encounters where tiny sparks or molecules or breaths are exchanged across matter-energies and where worlds are shared (Irigaray, 2008). EnaSilva are more than a child and a hen caught on camera (Rose, 2007). These fleeting exchanges between them, caught in the image as a frozen moment in time and place, generate excess that flows outward as generative impulses to imagine what else is possible to think, to feel, and to do. Speculation feeds on facts, too, as factual knowledge supports meaning-making as a political and ethical task.

Some facts are about being kin in shared worlds. EnaSilva are earth beings in this place, and they get to know one another over time (Latour, 2010). They even share nourishment as both like oats. Their bodies share physiological similarities, such as blood, inner organs, a face, and a physical and social need to be with others and to have kin close by. Their bodies have chemistry together as half of their genes are shared even though their bodies look very different (Potts, 2012). Yet one body can

be made killable (Haraway, 2016) to nourish the other. It is kinship and yet it is more dangerous for one to be close to the other. Time works differently on the two bodies. A year for Silva is a decade for Ena. Silva has a life expectancy of 90 years. Ena's life expectancy as a well-cared for hen is possibly 10 years. As a mature being, Ena is a much more experienced earthling in their early encounters than Silva. While Silva will experience aging, Ena does not age in a human sense (Potts, 2012).

Cutting Together-Apart

> Kin is a wild category that all sorts of people do their best to domesticate. Making kin as oddkin rather than, or at least in addition to, godkin and genealogical and biogenetic family troubles important matters, like to whom one is actually responsible. Who lives and who dies, and how, in this kinship rather than that one? What shape is this kinship, where and whom do its lines connect and disconnect, and so what? What must be cut and what must be tied if multispecies flourishing on earth, including human and other-than-human beings in kinship, are to have a chance (Haraway, 2016, p. 2)?

Gloria's Narrative #1 EnaSilva shape their kinship and both multispecies flourish on earth, they do have a chance, they had a chance, they connected, and there were moments were the lines connected and disconnected. It is when we begin to see how the child-human – nonhuman – lines tie together, because for Silva, Ena might not be a chicken, Ena is kin and is a family, and what matters is that she learns to act responsible. In acting responsibly, in Ena being domesticated, Silva's emerging eco-sensibility is shown by being on Ena and May's level. She is keeping a distance but seeking kinship, a shared gaze, and a response that ties them together. As Bennett (2010, p. 103) *explains nonhuman bodies participate in "conjoint action." Nonhuman and human bodies are vibrant material that relates in affective events. As Silva leans to get closer to Ena and May, as Ena and May keep their distance, they respond, and they affect each other. These are "intelligent improvisations"* (Bennett, 2010, p. 96)*, Ena and May make decisions in the vibrant matter that surrounds them and that make them. They are responding to unprecedented situations "in real time and without predetermined outcome, to each other and to the collective force of the shifting configurations"* (Bennett, 2010, p. 97). *In this event they are seeking closeness, seeking kinship, and making ties as they collectively respond to Silva calling them to come close to eat oats as once they came close to the window.*

Making kin? Making it up? The intensities that create this text were so forceful that they cut through everyday habits of thinking and shifted attention to make details matter which may otherwise have gone unnoticed. For instance, both of us have had many previous encounters with children and animals, yet as we began to tell a story that would help us to create this text, the animal/child events that are familiar to us in principle started to become blurry to the extent that they lost their initial form. When we studied images and short video clips of child and hen, hen and child, it was no longer obvious what we thought we saw. Once perception began to

blur, new shapes emerged, and imaginations began to whisper possibilities that were not there before. Did the hen just encourage the child to come to closer when she turned her head? Or was that an illusion? Did the child's fingers mimic the hen's beak when the child tried to pick up oats from the ground? Was the hen teaching the child how to do this? Are the child's and the hen's body mimicking each other's posture? Was this a shared moment of emerging horizontal ecological sense-ability for hen/child/adult hand-on-video camera? And then the desire to explain "new insights" and to speculate to give them permanence and solidity arises. How does sharing worlds look when hen-child kinship awakens ecological sense-ability? How to balance porosity and impermanence *and* solid knowledge to create ethics and politics for shared worlds?

Facts: Who Is "a Chicken?" How Is a Chicken?

First of all, Ena did not see Silva as the Silva that humans see. Chickens' vision accentuates contrast and brightness, and they sense motion through their vision in much more detail than humans. Their color vision is also very different to human color perception as they have the ability to see ultraviolet light in addition to red, blue, and green. The extra spectrum means that chickens see everything completely differently to humans. Chickens, like other birds, can look at the sky and detect gradients of ultraviolet which assist orientation. This and other well-researched information about chickens can be found on a blog by a veterinarian who cares deeply for the welfare of chicken, both in industrialized poultry farming and in backyard farming. His blog (mikethechickenvet, 2014), is an example of what Haraway (2008) refers to as staying with the trouble of companion species living and dying. Going back to what the video and the images (see Fig. 2) seem to show: hen and child bodies are engaged in postures that appear as a delicate dance where movements are similar yet different for each partner. Yet this is an entirely human story. The world looks different for chickens.

Gloria's memory of the encounter: Silva wants to fed the "gallinas" (chickens) oats, she calls to them, "Gallinas come," and she almost cries at not having their attention this time. They are not very keen to come closer; her mother, Gloria, says maybe they are afraid. Silva persists and walks closer to fed them oats; she leans in for closeness. Maria and Ena feel at ease and they come closer for a couple of minutes.

More Cutting Together-Apart

What we saw in the photo (Fig. 2): *Ena was turning her head toward Silva, and she was coming closer.* Yet what Ena would have sensed and seen is so essentially different from what Silva would have seen and sensed that it becomes increasingly difficult to speculate on what exactly happened (Fig. 4). In addition to perceiving each other in very different ways, Ena's ability for facial recognition only becomes

Fig. 4 Cutting together-apart: speculating on how the shared world looks through Ena's eyes. (See also Fig. 2)

possible at a close distance of about 20–30 cm. When Silva said, "Gallinas come!," she was inviting the hens to get to know her face and to lock eyes in kinship across genealogical and biogenetic categories (Haraway, 2016). We know each other through our faces, and turning toward each other is one aspect of being hospitable with the other (Irigaray, 2008; Levinas, 2004). This is also true across species, even though humans have a hard time recognizing faces of other species. For many humans, faces are most recognizable if they look similar to what is most familiar. The less familiar, the more strange and challenging the other becomes (Kristeva, 1991). Critical race theory tells us as much (Sleeter, 2017). Chicken faces look all the same to humans. To chickens, all chook faces are distinctly different from each other.

Chickens know the faces of fellow birds, as chickens are able to memorize over 100 chicken faces even after months of separation. Chickens also recognize the faces of other non-chicken, including human faces. Chickens have turned away from people they dislike (Potts, 2012). When Ena turned her head toward Silva, she was most likely recognizing Silva's face. She then moved closer which means that in this instance she sought being close to Silva, even though she was not keen initially (see Fig. 2, Gloria's memory of the encounter). To make matters even more complicated, Ena has the, for humans, disorienting ability to use each eye independently, with a focus on different distances for each eye. This is important, should there be hawks or other birds of prey overhead. Speculating again, this might mean that Ena's kinship making with Silva was much more complex than we thought. It is likely that Ena was less focused on locking eyes with Silva than we speculated as Ena was literally keeping one eye on the sky above.

Silva got to know Ena from her very first weeks on earth. When Silva was born, Ena was already an experienced hen, while Silva only just began to make sense of the world around her. Here is another little known fact about chickens. "Three day old chicks are capable of identifying a whole object when part of it is obscured – a feat not accomplished by human babies until four to five months of age" (Potts, 2012, p. 39). In case this matters to any kind of speculation of hen-child kinship, it is

intriguing to note that when Silva and Ena first met, Ena was way ahead of Silva in terms of cognitive abilities. Perhaps it matters, because chickens are stigmatized as particularly stupid, as lacking courage and in general as unworthy of attention as intelligent, capable fellow living beings. This of course makes it more palatable to keep chickens in abhorrent conditions and to treat them as nothing but dead meat, even while alive (Potts & Haraway, 2010). The stories we tell matter.

Most of the stories we continue to tell without questioning them, particularly stories of conquest and domination, are stories that create a specific capitalist-globalized human-centric world rather than shared worlds where differences are valued. Indigenous people know this, and many people from minorities also know it (Adamson, 2012; hooks & Mesa-Bains, 2006; Sykes, 2008). These anthropocentric stories continue to perpetuate global material cultures of suffering. Chicken and humans have been tied together in an unholy alliance ever since a housewife in the US Midwest discovered the basics of industrial poultry farming in the 1950s (Potts, 2012). Chicken and human stories are a type of horror story that came into existence through a tide of postwar intensified industrialization. These stories are told as stories of affluence and general progress when in fact they are materializations of greed, cruelty, and suffering on a massive scale (Silbergeld, 2016). Only a few gain financially and millions upon millions of others pay with their lives. This includes humans who die of the consequences of pollution of soil, air, and water as a by-product of industrialized farming. It includes entire species that are wiped out by intensification of farming practices. It includes small holdings that cannot compete with mass produced meat, grain, and produce in general (Foote, Joy, & Death, 2015).

The story of EnaSilva perhaps also matters because "when it comes to friendships, chickens like humans, are all different" (Potts, 2012, p. 49). In a human-centric world, chickens' individuality is dismissed as anthropomorphic at best and as misplaced attachment to a purely material resource at worst (Bear, 2011). Research tells us that animals are sentient beings who, just like humans, have personalities, communities, problems to solve, and things to celebrate. In short, they have their own lives. Animals, and plants for that matter, communicate, make decisions, and care for each other (Halberstam, 2010; Marder, 2013; Ogden, Hall, & Tanita, 2013; Pedersen, 2010; Power, 2008). Just like humans some do it better than others. Ena likes to be in close proximity with Blanquita and Maria. They tend to hang out together, and they look out for each other, sharing their world (Irigaray, 2004). Chickens have clear preferences and dislikes for fellow birds which make it all the more heartbreaking to consider the conditions of factory-farmed hens. But chickens' ability to be kin with others, including humans, is best described by the story of Mr. Joy (Tomlinson, 2009), a rooster who over the course of his life cheered up people in nursing homes with his charismatic presence. Mr. Joy and his female human did highly effective educational work by demonstrating that chickens are intelligent, empathetic, and funny beings. Their work together changed the way in which people regarded chickens by undoing the story of chickens as nothing but buffalo wings or chicken nuggets (Potts, 2012).

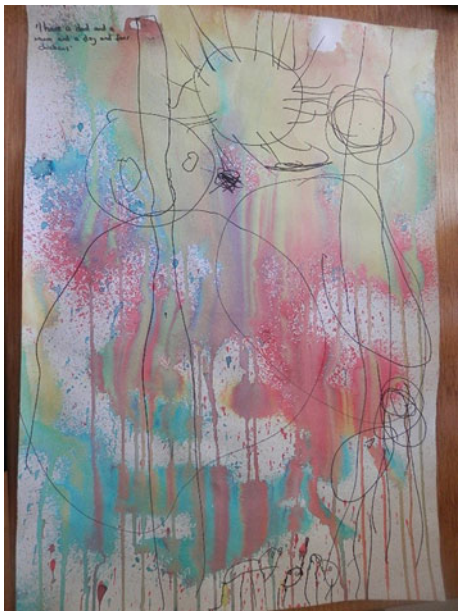

Fig. 5 Kin-making: "I have a dad and a mum and a dog and four chickens"

Gloria's Narrative #2 Silva changed her body movements as she learned from Ena's wisdom, Ena's agency, and Ena's intentions and her negotiation of space. Is this what kin-making involves too? Potts (2012) *explains how chickens are able to demonstrate forms of agency and self-determination. Extending the idea of agency,* Jackson and Mazzei (2012) *explain how in a posthumanist perspective agency and intentionality are not only attributed to humans but to nonhumans, and as* Barad (2007, p. 23) *explains agency is a "complex network of human and non-human agents… specific sets of material conditions that exceeds traditional notion of the individual." Making kin, being family between multiple species, involves understanding a complex network of differences and EnaSilva's own display of agency. This can be seen in Silva's drawing of her family where her chickens are like relatives* (Fig. 5).

Late Hen: Child Time

Gloria's Narrative #3 Ena for the past days comes to the window; Silva's father says, "Ena is going to die soon, I can feel it." Ena comes to the new living area (to say goodbye? We speculate – to search for food/sustanance/ease of pain?); the adults wonder when death will happen. Ena looks as if life is leaving her body. Ena is not in close proximity to her hen family; instead, she stays close to the window. Silva feels: "Ena looks sad." Ena and her sisters lived very different lives to Silva;

her four sisters Blanquita, Tomasa, Rosa, and Clara were eaten by the fox. May was a mother hen twice and now has six daughter hens. Early in the morning Silva's father tell Silva's mother – Ena has died, "I have put her in the drum" (for a latter burning of her body. What to do with a dead hen who is kin?). Silva is listening to the conversation.

Silva: "What happened to Ena?"

Silva and her mother sit in her bedroom as her mother says: "Daddy has told me just now that Ena died."

Silva cries, "I am going to miss her, I am sad, I don't want her to die."

Mother: "Ena came and said goodbye, we are sad too."

Silva cries and she doesn't ask about Ena's body. Ena's body is burned. Silva, weeks later, asks: "Ena, where is Ena." Mother says, "where do you think Ena is?" Silva says: "She is in the moon, in the stars." Mother: "Her body is back to earth, back to the moon and the stars." Ena's body is gone; Ena is remembered. Ena is remembered; her last sister May is the last living hen of all the six sisters. They are all remembered. Ena dies when Silva is 4 years old; Ena dies when she is 5 years old.

Speculation: What Does a Hen Know About Death? What Does a Child Know?

It is easy to criticize our use of language when we refer to Ena and her sisters. The idea of sisterhood is a human idea, based on genetic kinship which then releases a plethora of social and cultural associations, emotions, and meanings. Referring to Ena's sisters, for instance, generates echoes of Woody Allen's (1986) movie, *Hannah and Her Sisters*, or of memories of family events, books, or it may even generate a sense of melancholy for missing a sister in one's life. Would this be different for Ena? What happens when Ena's relationship to other chickens are described in human kinship terms? Common knowledge about chickens is that they have a hierarchical pecking order which can be brutal and even lead to the pecking to death of flock members. Again, it seems, this is more of a reflection of cultural bias against chickens than fact, or perhaps it is true for situations when chickens are stressed to their very bones, as happens in factory farming conditions. Potts (2012) argues that chicken have caring relationships with others, to the extent that in one example when a hen died the other hen stopped eating and died within a week of losing her companion. What do we really know about the lives and deaths of those others who share time and spaces with us? What worlds do we share?

This chapter does not dwell on the event of death that seemed to have put an end to EnaSilva as a figuration. Instead the death of Ena exists as another cutting together-apart of story and matter (Yusoff, 2012). EnaSilva lingers in Silva's ongoing becoming with the world. Is it possible to intensify EnaSilva's presence by creating a space for ongoing EnaSilva becoming in Silva's life? What happens when Silva experiences humans around her who continue to remember Ena as a lively being whose presence added joy, sorrow, care, community, and existential fear to this world? What stories become possible to tell and to live if EnaSilva is more than a fleeting multispecies'

encounter? What if EnaSilva is an ongoing lively figuration that forges a path for sharing worlds even though Ena and Silva's shared physical presence has ceased to exist? What becomes possible once EnaSilva has its own presence in the story? How to magnify the invitation to share worlds, to invite multispecies becoming, and to create ongoing conditions for flourishing? This chapter does not answer questions. It invites readers to consider possibilities and to imagine shared worlds with less suffering and more joy. What stories are worthy of telling and living?

The chapter is an experiment in writing and living. How to create a text that still breathes and keeps its own life force? Our experiment desires to produce a text that is porous and invites further storying, more speculation, and a spreading of lines or waves that may do, as well as undo, with a cutting-together-apart disposition to knowledge-making (Barad, 2014; Ellsworth, 2005; Ingold, 2016). Politically, we see this as a contribution to the ethics of flourishing (Cuomo, 1998) and to the Spinozean ethics of living a life in the pursuit of an expression of our innermost essence – this essence is the joyful affirmation of our freedom, our desire to persevere, to endure, and to become capable to express adequately what it is that we are doing to flourish by sharing the world (Braidotti, 2011; Irigaray, 2008). As Braidotti points out, it is no longer possible to reduce ethical life to bios as the human/nature, now molten, binary of Enlightenment philosophy and modernity's politics. What is required now on a planet where perceptions of time and space seem to spin and twist, noticeable to human senses as climate chaos – floods violently reshaping landscapes where there were no floods in human memory, unseasonable heat or cold or droughts that kill the last nomadic tribes, wild animals and plants who rely on seasonal change that is predictable to some extent? How do we protect biodiversity when time is running out? Latest research paints a dire picture of our futures, with mass extinction well under way and climate change already out of control (Kolbert, 2014). Unless we learn quickly and radically to share worlds and to create worlds together with humans, nonhumans, and more-than-humans in all their forms, there might be no world, shared or otherwise, to come. And yet there is great hope in taking up the challenge for new stories, new imaginings, and new thinking and doing. If not now, then when?

The world invited us to become and we, for once, were open to the invitation. The shared worlds that appear in human stories can go unnoticed, and this chapter attempted to pay attention to the ways in which other worlds become visible in kin-making, for moments in time. Authorship is the privilege of being able to attend to specific threads, waves, or lines and to care for the intersections that tell a particular story. An emphasis on narratives seems important to kin-making as stories hold the self and others in the world. Stories enable the knotting together of mind and body, self, and others and open up possibilities for new perceptions, new imaginings, and new alliances.

A Few Final Words

The attempt to think through kin-making as an experiment in horizontal encounters with difference has opened a space for us as thinkers and writers to push our own imagination and speculation. Another outcome is that our perception has changed. It

is getting more challenging to ignore the sense of horror when faced with images of battery-farmed hens, now that we know chickens a little more intimately. EnaSilva makes it impossible to not at least sometimes shift the deeply entrenched anthropocentric gaze and imagine how multispecies encounter might look/feel/be sensed from the other's way of being. The notion of kin-making across species is troublesome. There is the "danger" of anthropomorphism – but how convenient to ignore animals' individuality and their ability for expression, for perception, for learning, for being, and for becoming at a time when animals are exploited for profit at a never-before scale. One of the risks to take now surely is to have the courage to engage with "nature" on new terms and to experiment with kin-making as new forms of multispecies' alliances for sharing the world. As Haraway (2016, p. 4) reminds us, "we require each other in unexpected collaborations and combinations, in hot compost piles. We become-with each other or not at all." There is more at stake than teaching children to be kind to animals. EnaSilva is not about kindness. We suspect that EnaSilva is fierce and curious and only beginning to feel her own power. Hot compost piles recomposite matter in a furnace of becoming. EnaSilva is only beginning to heat up, and we are curious to see what else is possible in this kind of naturechildhood thinking and doing.

Cross-References

- ▶ Childhood Animalness: Relationality, Vulnerabilities, and Conviviality
- ▶ Greedy Bags of Childhoodnature Theories
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Re-turning Childhoodnature: A Diffractive Account of the Past Tracings of Childhoodnature as a Series of Theoretical Turns
- ▶ Unplanning Research with a Curious Practice Methodology: Emergence of Childrenforest in the Context of Finland

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Posthuman Theory and Practice in Early Years Learning

6

Margaret Somerville

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Abstract

This childhood/nature chapter was provoked by curiosity about the rise of posthuman theorizing in early years learning research and practice. Set in the context of the Anthropocene as the age of human entanglement in the fate of the planet, it takes the view that the primary task of this time is to develop new understandings of the human and new concepts of thought (Colebrook, Extinction: framing the end of the species. Open Humanities Press, 2010). Early childhood has led the field of education in the development and application of posthuman theorizing in response to this imperative, prompting the explorations of the chapter. A review of the literature in this field resulted in the identification of three distinct areas of posthuman theoretical activity: *new materialism*, *child-animal relations*, and *Indigenous-nonindigenous intersections*. The third

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category *Indigenous-nonindigenous intersections* which draws primarily on Indigenous theorizing was so divergent from the others, and so complex, as to be considered outside the scope of this chapter. In gathering the various papers together to make sense of the literature in each of *new materialism* and *child-animal relations*, different modes of analysis were called for. *New materialism* in early childhood education and practice is considered using a genealogical generational analysis following the work of Van der Tuin (Generational feminism: new materialist introduction to a generative approach. Lexington Books, London, 2014), while *child-animal relations* prompted an analytical approach involving Haraway's bag lady method following Taylor, Blaise, and Giugni (Discourse Stud Cult Polit Educ 34(1):48–62, 2013). A particularly interesting and curious finding was that "life" emerged as a major theme from *new materialism* and "death" from *child-animal relations* in keeping with the paradoxical nature of the Anthropocene.

Keywords
Posthuman · New materialism · Child-animal relations · Early childhood · Anthropocene

Introduction

The separation of nature and culture in Western language, thought, and practice has long been identified as the reason for the destructive exploitation of the natural world (e.g., Plumwood, 2002; Rose and Robin, 2004). More recently there has been an increasing recognition that this has resulted in massive changes to the capacity of the Earth to sustain life with the proposal of the new geological era of the Anthropocene, the time of human entanglement in the fate of the planet (Zalasiewicz, Williams, Steffen, & Crutzen, 2010). Despite debates about the timeframe and meaning of the Anthropocene – its emphasis on human power or the reverse – the concept has generated a remarkable flourishing of scholarship across all disciplines with a focus on how to theorize new understandings of the human and new concepts of thought (Colebrook, 2010). This scholarship has a special relevance to education. Young children born into the increasing awareness of the catastrophic impacts of climate change will grow up into a very different sense of the world than the adults of today and can be understood as children of the Anthropocene (Somerville & Green, 2015), leading to the need to learn and research with them. The question to address with these children in their more-than-human worlds is how to move beyond the nature/culture binary in educational research and what does this mean for the practice of education?

Early childhood has long been a leader in the field of posthuman theorizing in its application to educational thought and practice (Somerville & Williams, 2015). My curiosity in contemplating this chapter was provoked by this phenomenon: why early childhood; who are the researchers, what theoretical work are they drawing on; how do they frame their approaches and findings; and how can we apply these new approaches in everyday practice? In reviewing this extensive body of work, three

categories emerged to better answer these questions: *new materialism*, *child-animal relations*, and *Indigenous-nonindigenous intersections*. In further engaging in an in-depth analysis of each of these categories, it became clear that the third category of *Indigenous-nonindigenous intersections* was of a fundamentally different order than the others and would require its own, independent chapter.

In reviewing the many papers in the *new materialism* and *child-animal relations* categories, it became clear that different modes of analysis were called for. The trajectory of *new materialism* was best understood using a genealogical and generational approach (Van der Tuin, 2014), while *child-animal relations* prompted an analytical approach involving Haraway's bag lady method (Taylor, Blaise, & Giugni, 2013).

The approach taken to writing the chapter overall employs Springgay's method of "anarchiving." This method was developed from creative arts and is used to refer to visual artist's renditions of new artworks based on the archived work of others (Springgay, 2014). It does not attempt to offer a complete and exhaustive coverage but instead produces new and creative productions from these past works. In naming the approach of anarchiving the writing acknowledges that many of the words and sentences in this chapter are composed of the words of others, gathered together from the range of papers in each of the categories. All of the sources are acknowledged, but for ease of reading, direct quotes are sometimes paraphrased where they occur within the text. Key quotes are indented and remain in their original form. It is hoped that the contribution of this chapter emerges from the unique combination of words and ideas generated from within this amazing body of work.

New Materialism: Genealogy and Generation

> Starting from the etymological register, the established methodology related to generation is genealogy. . . *genea*-logy enfolds generation. . . the continental philosophy method of writing genealogies, of engrossing oneself in cartographies of conceptual shifting, allows for 'a transformation of history into a totally different form of time' (Foucault, [1971] 1977, p. 160). . . .the genealogical method helps to understand conceptual shifting along timelines that capture the often erratic, utterly nonlinear generation (of thought, practices, and artifacts) itself. Genealogies. . . focus is on the very moment of creating innovative concepts . . . among the most generative of feminism. (Van der Tuin, 2014, p. 59)

This chapter is animated by the question of how posthumanism came to be so prominent in early childhood education as opposed to other sectors of educational thought and practice. My thinking in relation to *new materialism* began by exploring Hillevi Lenz Taguchi's landmark text, *Going beyond the theory/practice divide in early childhood education* (Lenz Taguchi, 2010). I was immediately struck with its beginning in the intense materiality of an official meeting. Hillevi writes: "It felt so hard to breathe in here and smelled like an old museum. . . The wooden chair that creaked quietly as I sat down at the large oval shiny table. The wide leather seat was quickly heated by my jean-clothed buttocks" (p. 1). Hillevi later connects the recognition of the power of the materiality of this room to the book's exposition of

the problem of an ontological divide between theory and practice and between academic knowledge and our sensing bodies, matter, rooms, and material environments and places (p. 3).

But it was not only this that so shaped and disrupted my imaginings of the beginnings of new materialism in early childhood research and practice but a chance remark of an early childhood practitioner when I explained that Hillevi traces her own thought to the Reggio Emilia movement as it was taken up in Sweden:

> Reggio was a grassroots movement in Italy started by women immediately after WW2 as Italy was rebuilding. Very little materials and poor, so 'the environment' was what they had. They were opposed to the dictatorship experienced in the war and this in part determined the politics of the movement. Started by women, first book written by a male, taken up first in Scandinavia (Sweden) and then USA but differently in Sweden. (K. Power, personal communication, 2017)

The search for these women became a process of archaeology rather than genealogy as I sifted through the traces in the only book I could locate that would reveal anything of the origins of the Reggio movement, *The hundred languages of children: The Reggio Emilia approach – advanced reflections* (Malaguzzi, 1998). Chap. 3, "History, ideas and basic philosophy," is an interview with Loris Malaguzzi, universally credited with the founding of the Reggio Emilia preschools in that region of Italy. At first I mistakenly thought Chap. 3 was an interview with Lella Gandini, expecting to find women's presence, but it is an interview by Lella with Loris Malaguzzi and features only Malaguzzi's words facilitated by Gandini. The chapter is framed with a photo of Loris Malaguzzi in the top right-hand corner of the first page. It is labeled "Loris Malaguzzi, founder of the program in Reggio Emilia" (p. 49). Soon after its unpromising beginning, however, I am excited to see the first appearance of the women:

> I hear that in a small village called Villa Cella, a few miles from the town of Reggio Emilia, people decided to build and run a school for young children. . . .I rush on my bike and discover that it is all quite true. I find women intent upon salvaging and washing pieces of brick. (p. 49)

Unfortunately at this point the women disappear into the generic "people" making it impossible to tell whether it is these women's actions in the rest of the chapter (as one might assume) or in fact a group of "people": "We will build the school on our own, working at night and on Sundays, the land has been donated by a farmer, the bricks and beams will be salvaged from bombed houses, the sand will come from the river; the work will be volunteered by all of us" (p. 49). I want to find out who these women were who cleaned bricks and salvaged timber from war-torn homes to make a preschool for the children. I want to know more but the story continues to use the plural generic term "people." I comb through the words, like sifting through the rubble, to find traces of the women. They are few. I learn at the end of the chapter that all the teachers were female: "Until a few years ago Italian law forbade males to teach pre-primary children" (p. 71), which makes the words, "they were ample and

greedy (p. 50)" in the description of the teachers, even more meaningful. Even though that is all there is, it is the image of these "ample and greedy" women cleaning bricks in war-torn Italy, maintaining "enough rage and strength to survive for almost 20 years" (p. 50) that captures my imagination and flows forward into reading Hillevi Lenz Taguchi's book with new insight.

Beyond the theory/practice divide (Lenz Taguchi, 2010) addresses the problem of an ontological divide between theory and practice, drawing "sensing bodies, matter and material environments – spaces and places" into academic knowledge from the pedagogical context of the practices in Sweden that have taken their inspiration from the municipal preschools in the Italian city of Reggio Emilia (p. 3). While many theorists are cited in the context of critical and feminist pedagogies emerging in Western universities in the 1980s, Deleuze and Guattari, and Karen Barad, form the main theoretical underpinnings of this "jumping gene" leap of conceptual thought (Van der Tuin, 2014).

For Lenz Taguchi, Deleuze and Guattari (1994) contribute an ontology of immanence, in which "everything around us affects everything else, which makes everything change and be in a continuous process of becoming" through processes with "a central element of unpredictability, creative and inventive change in the interconnections between different matter and organisms with different potentialities" (p. 15). In this understanding, there is "no hierarchical relationship between different organisms (human and non-human)" (p. 15), drawing a parallel for Lenz Taguchi with Karen Barad's onto-epistemology of intra-activity (Barad, 2007). Intra-activity is described as all matter having agency emerging through relationship in which different bodies of matter mutually change and alter in their ongoing intra-actions. Importantly, for a book based on the Reggio Emilia tradition of teachers learning from children through pedagogical documentation, learning is understood in terms of different matter – human and nonhuman – making themselves intelligible to each other (p. 4), an idea further elaborated in Lenz Taguchi's influential paper with Karin Hultman (Hultman & Lenz Taguchi, 2010).

In *Challenging anthropocentric analysis of visual data*, a "relational materialist methodological approach" is applied to the analysis of two photographs of children's activities in an early learning setting (Hultman & Lenz Taguchi, 2010). This influential paper is significant for its application of complex posthuman theory to a real-world education setting. It analyzes two photographs in detail: one of a young girl playing in a sandbox and another of a girl on a climbing frame. In the following, I focus on the analysis of the girl+sand photograph as being the most mind-opening application of Barad's intra-activity and Deleuzean becoming:

> . . .the sand and the girl, as bodies and matter of forces of different intensities and speed, fold around each other and overlap, in the event of sand falling, hand opening, body adjusting and balancing, eyes measuring height and distance and observing the falling movement of the glittering sand into the red bucket. Thus, in a relational materialist understanding, the sand can be understood as 'active' and 'playing with the girl' just as much as the girl plays with the sand. They come into play. The girl is in a state of becoming with the sand, and the sand is in a state of becoming with the girl (Deleuze, 1990). To be able to see this, we need to think of a relational field of immanence, where there is no absolute or inherent border between the sand and the girl in this event. (Hultman & Lenz Taguchi, 2010, p. 530)

In the intertwining of theory and practice in this paper, Hultman and Lenz Taguchi (Hultman & Lenz Taguchi, 2010) expand on both Deleuze's "becoming" and Barad's "intra-action" through their analysis of the sand+girl dyad. In the above quote, influenced by Deleuzean "becoming," both girl and sand are in a continual state of becoming with and through each other. Barad's "intra-activity" is extended in this article to include the discursive as well as material phenomenon for "neither discursive practices nor material phenomena are ontologically or epistemologically prior. . . .Neither is articulated or articulable in the absence of the other; matter and meaning are mutually articulated" (pp. 529–530). In this sense "the girl and the sand simultaneously "pose questions" to each other in the process of trying to make themselves intelligible to each other as different kinds of matter involved in an active and ongoing relation" (p. 530). The article destabilizes the fixed identity of the researcher as standing outside of the event of analyzing their data. In a move closely akin to the concept of the "sensing body" and the Reggio women, a "diffractive reading" is offered in which the researcher needs to activate all of her "bodily affective perceptions" when intra-acting with data as an entirely new event (p. 537).

Finally, ethics and politics are never far from the surface in this work, influenced by the enraged women of postwar Italy, because what we do as researchers "creates new possibilities and evokes new responsibilities." Hultman and Lenz Taguchi articulate the ultimate aim of doing research and analysis in this new way as making it possible "for others (humans and nonhumans) to live differently in realities yet to come" (p. 540).

Miriam Giugni is the direct genealogical daughter of Lenz Taguchi's sensing body in its material mattering. In *Becoming worldly with: An encounter with the Early Years Learning Framework*, Giugni (2011) positions herself as practitioner-activist, deeply resonant with the activism of the Reggio women of Villa Cella. While Giugni's theorizing references Haraway's "becoming worldly," her method, as with the Reggio Emilia women, is of pedagogical documentation. For Giugni, becoming worldly "encapsulates assemblages of political, historical and geographical entanglements of relationality between the human and the non-human or more-than-human actants" (p. 11). In her narrative telling of two encounters with young children in a multicultural preschool in urban Sydney, becoming worldly offers Giugni a way to include the more-than-human such as animals, technologies, organisms, objects, landscapes, the weather, and so forth (p. 11).

Of the two vignettes in this paper, it is the retelling of the Easter story encounter with young children that emerges as the most powerful example of becoming worldly through pedagogical documentation. When Giugni invites a group of four multi-faith children to express how they might want to investigate Easter, one of them responds, "Easy – just Google for Jesus" (p. 21). From their Google search, they chose an image of Michelangelo's Pietà and print it. After a brief discussion about the beautiful sculpture, together they decide that sculpting with clay would be the most practical starting point. As they fashion their brown clay figures, the children observe the similarity of Giugni's white skin to the marble sculpture, and they explore the topic of skin color, ethnicity, brown color of the clay, and the brown

color of the skin of those children who also come from the Middle East with skin color just like Mary and Jesus.

Giugni theorizes at length about the printed image; the brown, gritty clay; the color of her skin; sculpted draping bodies; and the politics of all these elements, as an assemblage of the more-than-human actants that produce their "becomings with" (p. 23). By including the clay, the Internet, the computer, and their diverse views, beliefs, and cultural practices (p. 23), Giugni demonstrates how meaning and matter are inseparable. In a move more typical of Haraway's theorizing, Giugni "stays with the trouble" (Haraway, 2008), adding a strong activist political dimension as the children and clay become-with in the tensions of their intra-subjective time together (p. 16). This paper extends the possibilities of Hultman and Lenz Taguchi's analysis of girl+sand and girl+climbing frame in its location in examples from practice and its inclusion of the multiple materialities of clay, the Internet, computer, and diverse cultural practices. At the same time, it acknowledges its generational indebtedness to Hultman and Lenz Taguchi's work.

Pauliina Rautio is similarly influenced by Lenz Taguchi, adding another dimension from her "ongoing empirical journey into the materiality of children's everyday life environments" (Rautio, 2013). Rautio's interest is particularly situated in what she refers to as "autotelic material practices" – things children do for no purpose other than the activity itself. *Children who carry stones in their pockets*, the first and most distinctive paper of Rautio's early work, consider "whether bridging the nature-culture divide can be attempted by exploring practices through which children themselves seem to do this" (Rautio, 2013, p. 403). The cited theoretical antecedents of this paper include similar aspects of Deleuze and Guattari, and Barad, as inspired Lenz Taguchi, but the paper demonstrates a more in-depth engagement with Bennett's (2010) vibrant matter: "Material is vibrant insomuch as it has the capacity to not just impede the courses and wills of other material entities, such as humans, but also to act as a "quasi-agent" with tendencies of its own" (Rautio, 2013, p. 397). The "human" becomes differently with stones. Stones, she says, "have intra-agency: stones do things to us and with us. They have us pick them up, feel them, close them in our fist (if particularly smooth and rounded) or hold them between our thumb and forefinger (if small and edgy)" (p. 404):

> We exist as a consequence of stones: the event of carrying stones makes us in the moment. We become stone-carrying with carrying stones. We literally weigh a bit more, balance our walk a bit differently, think certain thoughts and become certain kind of bodies and individuals in relation to what kind of stone-bodies we encounter and interact with. (Rautio, 2013, p. 404)

For Rautio, then, carrying stones with no particular purpose other than the attraction of stones is a political act, differentiated from the economics of extractive mining. In carrying stones, as children do, we come to know ourselves as part of the world, not separate from it (p. 405): "Bodies (human and non-human, organic and inorganic entities) exist as a consequence of the world" (p. 397). The unique contribution of this paper is to think playfully with stones, drawing on Deleuze's encouragement to

experiment with new modes of thinking and being that keep generating novel and endless possibilities (p. 396).

Two further papers by Rautio are based on a study in which 12 Finnish children, aged 4 to 7, gathered once a week for a total of 11 times to assist an adult researcher in studying things, objects, and beings (Rautio, 2014; Rautio & Winston, 2015). Each of these papers makes a distinctive contribution to understanding young children's play from a posthuman perspective. In *Mingling and imitating in producing space for knowing and being*, Rautio explores the relationship between children and things, producing insights into the ways that things constitute children:

> We need to assign agency and relevance to the things that children move, order, clean up, don't clean up, combine, attach, stack, throw, dismantle, feel with and talk to. In a materialist vein of thinking, a chaos of things could serve in keeping the children conversant and open to be played with by the things around them. This is how things are able to invite children to play. (Rautio, 2014, p. 8)

Through processes described as "mimicry," previously regarded only in relation to human to human social learning, Rautio finds that children "engaged in repeating the same bodily or sensory events they witnessed around them – in other humans or nonhumans – so as to try them out" (p. 9). She describes how one child imitated his box by lying flat on his stomach beside the box lid in front of him, on the floor, and then moving the lid with his finger (p. 9).

The categories of mingling and imitating that arise from the analysis of the children's play with things offer new ways of thinking about the agency of things and understanding children and their play differently. The paper also offers a different understanding of the adult human researcher in its connection with the Reggio Emilia women and Hillevi Lenz Taguchi's work. In a way that has become characteristic of Rautio's work, it is the "sensing body" that registers and responds to her full participation in the encounter, continually disrupting the certainty or possibility of any external observing position. Through this she understands the human (child) differently, "children in our meetings were like amebous creatures that overlapped with each other as well as with their surrounding materials, producing assemblages of movement, sweat, cheering and panting" (p. 10).

In *Things and children in play* (Rautio & Winston, 2015), the question of language enters the picture of the posthuman in early childhood where language is understood in its materiality. Drawing on other researchers of language and play, language is rethought "as material, as form rather than function," such as in nursery rhymes which are common to all cultures with sounds and rhythms dependent on patterns, and where meanings emerge from their material form rather than shape it (p. 4). Bennett's (2010) concept of "congregational agency," of beings and things, both material and immaterial (p. 21), is newly applied to language's play with children. In congregational agency, it is the collective, or the combined assemblage of beings and things, that produces the play in its intrinsic value and desire.

The idea of "congregational agency" of languages and play with children is extended in my own research in *Emergent literacies in "The land of do anything*

you want" (Somerville & Green, 2015). In this small informal research project, the emergence of language with and from the world became a significant new insight. Influenced by Hultman and Lenz Taguchi (2010), I became vitally interested in the proposition that the individual subject emerges only through the mutual entanglements of different bodies of matter, each with their own force or agency (Barad, 2007). Two young girls were invited to take part in an "experiment" in which they chose spaces and places to play, recorded in tiny video segments, still photos, and notes on an iPhone. The detailed analysis of these small video segments was surprisingly challenging, and it was in the process of persevering with turning the movements and sounds into Word on the computer that new insights into the congregational agency of language emerged:

(Water gurgling, birds twittering
child singing high bird-like sounds
walks into water with fine stick balancing on stones
flicking stick at water and at stones
wobbles back to stones on island, humming)
that's a daddy (low sing song voice, lifting a rock),
that's a daddy, that's a daddy, that's a bigger daddy (patting a rock each time)
that's a little baby (picking up a small pebble), that's a little baby
got babies cousins dadda (arms wide open in expansive gesture
walks away lifts hands to sky, loud sound to sky
comes back to rock pile singing)
a-gugu a-gugu a-gugu (sing-song to birds trilling)
you're a baby (to me), and I'm a mama kangaroo
I'm a mama kangaroo, you're a baby kangaroo
that's my fire (loudly, pointing to rocks)
that's my fire, baby kangaroo, that's my fire, baby kangaroo
that's my fire, baby kangaroo.
(Charmaine, 3 years, at river)
(Somerville & Green, 2015, p. 119)

Initially in transcribing the small video, the human ear hears only meaningful human words, but when forced to listen minutely to all of the sounds, it becomes apparent that there is no separation of the sounds of birds and water from the soundings of the child. The place is singing to the child and the child is singing to the place. She is also simultaneously playing with stones, telling a story about stones, talking to the sky, opening out her arms and hands, and calling out loudly to the sky, just to call to the world. When the child sings "a-gugu a-gugu a-gugu" with a bird trilling in unison, two songs come together. Both are small incidental songs to the world, with no meaning other than sounding the place, a meaning that suddenly appeared transformative. This emergence of language within new materialism enacts Barad's proposition of the mutual entanglement of discursive practices and material phenomena as mutually implicated in the dynamics of intra-activity (Barad, 2007, p. 152).

In amongst the glitter and the squashed blueberries (Hackett, Pahl, & Pool, 2017) similarly addresses questions of language and materiality in a study located in a community setting with open-ended exploration of children's emergent play. It also

references Barad (2007) and Lenz Taguchi (2010) but adds some significant new dimensions and theorizing. Based on their collaborative arts-based practice of exploring children's play with cardboard den constructions, they include concepts of place (Somerville, 2015) and nonrepresentational theories of language (MacLure, 2013). In what they describe as "a methodology of blueberries, glitter, cardboard and chaotic, embodied meaning making" (p. 66), they venture unexpectedly to the "cusp of chaos":

> The scene begins with a shot of the castle and a path made of two narrow parallel sheets of cardboard … Giggling, a little girl climbs into a wooden trolley (intended for wooden bricks), while her slightly older brother takes up position to push her in the trolley down the cardboard path. The trolley is too wide to fit down the path, so as the boy pushes his delighted sister faster and faster down the path, the paths falls apart, the cardboard becomes caught in the wheels, the whole structure collapses. At the end of the path, the trolley falls over, spilling the little girl onto the floor where she lies laughing. (p. 66)

In the many examples of children's meaning-making with arts materials, they note both the role of intra-action with materials in moment-by-moment meaning-making and the embodied sensations and notions of emplacement in how the children collaboratively create and share meaning through their play with the materials. These insights are connected to a pedagogy of unknowing, the agency of materials within processes, and an understanding that the processes of making were themselves forms of thought. They conclude that this pushes the field of literacy and language away from strongly representational forms and toward knowing from the inside and acknowledging the ways in which we might come to know through place, body, and materials (p. 70).

Language also features, but somewhat differently, in Iris Duhn's, 2015 paper, *Making agency matter*, which works to counteract the significance of language as a marker of agency in very young children: "It is argued that agency, when conceptualised with emphasis on individuality and the autonomous self, poses a conceptual "dead end" for those who are not-yet-in-language, such as babies and toddlers" (Duhn, 2015, p. 920). Drawing inspiration from Thrift's notion of "wild ideas" that "invite the world to speak back and take part in the production of different futures" (p. 920), the subject/object divide is unsettled by viewing toddler's through the lens of vibrant matter (Bennett, 2010):

> The wooden floorboards quiver in rhythm with stamping feet. The phone rings behind the closed office door. A mouse moves through the paper clippings in her little cage on the floor beside the shelf. Mia wriggles in her father's arms. Carl drops a cup, which he was going to put on the table. The cup rolls under a chair and continues to move in time with the stamping. Jay, Adam and Mia along with the other bodies in this space are affecting, and are being affected, by the forces and forms all around. (Duhn, 2015, p. 927)

For Duhn, viewing the world in this way is "a pull towards life and vibrant matter, a bodily awareness of the world" (p. 928), because infants and toddlers are less caught up in the illusion of a self that controls and governs than older humans who have learned to see, feel, and think the self and the world in other ways. Such "wild

thinking" forces thought out of its patterns and opens up possible new futures that are less human-centric and allow for reimaginings of how we might think differently in a world of vibrant matter (Duhn, 2015, pp. 927–928).

Inspired by this paper and its focus on Bennett's vibrant matter, Marek Tesar and Sonia Arndt (2016) investigated the *Vibrancy of childhood things* in relation to yet another different approach to language in new materialism. The substantive material for analytical attention in this paper is provided by literature, "the well-loved stories of Pinocchio and Little Otik" (p. 193). These stories are animated by considering "these dead-alive, wooden-thing-materialities as vibrant thing-hoods with agency and power" in a philosophical genealogy of thought embracing both Foucault and new materialist philosophies (p. 193). In an interesting move that resonates with the framing of genealogy and generation, Tesar and Arndt begin the paper with a quote from Barad (2015) on transmaterialities:

> Lightning mucks with origins. Lightning is a lively play of in/determinacy, troubling matters of self and other, past and future, life and death. It electrifies our imaginations and our bodies. If lightning enlivens the boundary between life and death, if it exists on the razor's edge between animate and inanimate does it not seem to dip sometimes here and sometimes there on either side of the divide. (Barad, 2015, p. 390 in Tesar & Arndt, 2016, p. 193)

In this sense, the paper is as much about the process of generation and genealogical thinking as it is about new materialism. The authors' method is described as "a theoretical re-reading, in a sense a deterritorialization, of Foucauldian thought through new materialist philosophies" (p. 193). Through the genealogical approach, they enable subjugated discourses to resurface as resistance and create possibilities for the emergence of the impossible/possible in assemblages of matter, energies, forces, or things beyond the discursive and beyond the human (Tesar & Arndt, 2016, p. 195). While they draw on Barad's materialism of all bodies, both human and nonhuman, they rely more strongly on Bennett's vibrant matter:

> For Bennett (2010), a political act does not need to have been consciously planned or conceived as such. In other words, non-human actants – such as worms – might be equally as political in their acts as humans (and perhaps contribute in a greater sense to certain interdependencies and ecologies). Furthermore, matter or things, such as piles of rubbish on the street, also possess agency. Matter, objects, things, and humans become something different as a result. (Tesar & Arndt, 2016, p. 196)

In returning to Foucault, they note the entanglement of past and present, new and old, in genealogies of thought: "Foucault's thinking about bio-politics . . . establishes and enacts the boundaries between socially relevant and politically recognized existence and "pure matter," something that does not possess legal-moral protection and is "reduced" to 'things'" (p. 7) (Tesar & Arndt, 2016, p. 199). For Tesar and Arndt, materialist philosophies are seen as "approaches, tentacles, and versions that have in common their urge to move beyond simplified, absolute, and objective definitions and classifications of matter as unitary, passive, inactive, and dead" (p. 197).

Summary: Life as a Theme in New Materialism

The overwhelming sense of new materialism as it is theorized and applied in early years learning is about its emphasis on "lifefulness." New materialism derives its understanding from the processes of life itself, from the cellular level, and from the philosophies of physics to the vibrancy of matter and all material things. Beginning with the women of Reggio Emilia who were "ample and greedy" in their desiring a new life for their children after the ravages of the war, to Lenz Taguchi's sensing body, the urge of new materialism is toward life. The way is opened for the materiality of sand, stones, things, and children in play, the river's songs, quivering of wooden floor boards, and wooden images of Pinocchio and Little Otik to generate new ways of thinking and being where the world becomes present in all of its vibrant vitality rather than reduced to the dull and abstract forms of universal generalizations more typical of Western knowledge theorizing.

Animal-Child Relations (Multispecies Ethnographies)

This section largely owes its very substantial contribution to the *Common Worlds Collective* initiated by Affrica Taylor and Veronica Pacini-Ketchabaw. I am indebted to their website for its compilation of this work. Although the "common worlds" website includes both new materialism and Indigenous/Western intersections in its collection of publications, its distinctive and major contribution lies in its theorizing of human-animal relations and methodologies of multispecies ethnography. My first question of this collective work, after my experience with the Reggio Emilia women, was to ask from where did it emerge and what was *the before* of this movement of thought? I found in *Queering home corner* the beginnings of an interest in child-animal relations in early childhood education in the account of Lily and Margie taking turns performing themselves as horse:

> Their embodiment of horse demands a physical performance that appears to be both satisfying and liberating. Margie's performance is impressive and compelling and the result of her conviction that she is, in fact, a horse. Determinedly equine, she performs horse consistently, only changing to princess when playing in the home corner. However, as Margie's home corner is a queer heterotopia, it does not require her to commit to one identity category. Rather, it enables her transformation from horse to princess and then back to horse again. (Taylor & Richardson, 2005, p. 170)

It is in this paper that the thread of influences on the emergence of child animal relations is linked to Elspeth Probyn's (1996) Deleuze-informed musings upon girls and girls and horses (Taylor & Richardson, 2005). Taylor herself, however, locates the beginning of the common worlds research and collective movement to a paper published with Miriam Giugni that first outlines common worlds theorizing. *Common worlds: Reconceptualising inclusion in early childhood communities* is a landmark paper for the common worlds movement that brings together Latour's (2005) generative and entangled common worlds, Haraway's (2008) queer kin, and Massey's (2005) "thrown togetherness of place," "to deepen the pedagogical

opportunities afforded by place-conscious early years researching, teaching and learning" (Taylor & Giugni, 2012, p. 114). It is important to note the interventionist pedagogical intention of the common worlds framework, largely informed by "the central ethical and political question" of "how do we live together with human and non-human others?" (p. 111).

There are two crucial elements of common worlds theorizing that draw together the work from the past and forecast new work to come. The first, connected to *Queering home corner*, is Donna Haraway's "reconfiguration of kinship beyond the conventions of the biological heterosexual human family and into the species (as well as gender) border-crossing terrain of 'queer kin'" (Taylor & Giugni, 2012, p. 112). Queer kin "encapsulates the possibility of sustaining relations with unlikely and very different but nevertheless significant others through a process of continual questioning" (p. 113). Because "queer kin relations, with all their unlikely intimacies, predictable asymmetries, and radical differences pose significant challenges for living together," Haraway's "staying with the trouble" (p. 113) is evoked as a central and repeated feature of the research papers developed subsequently within this framework. "Staying with the trouble" implies going where it is too difficult to go; entering a realm of struggle, difficulty, and conflict; and reflecting there without generating solutions.

Another key feature of Haraway's contribution to common worlds thinking is the idea of "worlding." Throughout her prolific writings about human/more-than-human relations, Haraway (2003, 2004, 2008) interchangeably names her generative relational ontology a process of "becoming with," "becoming worldly," and "worlding" (Taylor & Giugni, 2012, p. 112). Bringing together "worlding" and common, Taylor and Giugni (2012) draw on Gibson-Graham's (2006) notion of commons because an "ethical practice of commons management . . .creates and reproduces 'common substance' of the community while at the same time making a space for raising and answering the perennial question of who belongs." "The commons are the political grounds of belonging" (pp. 109–110). While Taylor and Giugni themselves explicate a very elaborate and rhizomatic web of theoretical connections in relation to "worlding" and "commons," it is to Latour (2005) that they credit the combination term "common worlds," which owes its origins to Plato's philosophy of the commons within the significantly extended notion of "common worlds" (p. 110). Revealing Haraway's indebtedness to Latour, Taylor and Giugni quote Latour's assertion "that a common worlds ethics requires us to remain radically open to the composition of these worlds. For it is only when we exercise curiosity to find out more about where we are, and who and what is there with us, that we find hitherto unknown dimensions" (p. 110). This question of who and what is there with us in this place is a perennial question that informs research within the framework of child-animal relations.

Haraway's Bag Lady Stories as Method

It was at this point in reviewing *child-animal relations* that any form of generational or genealogical tracing failed as the collective proliferation of common worlds papers functioned as a network, creating myriads of rhizomatic connections and

disjunctures. Haraway's *bag lady storytelling* (Taylor et al., 2013) offered another analytical possibility:

> . . .the practice of 'putting unexpected partners and irreducible details into a frayed, porous carrier bag'. . . .Haraway's bag lady stories are collections of ordinary everyday encounters between these 'unexpected partners' – human and non-human. They are stories that trace the 'living histories' of. . . relations 'in the contact zone' of entangled human/non-human lives. (Taylor et al., 2013, p. 49)

The papers were gathered together into bag lady story bags loosely categorized according to the focus animals with the categories enlivened by the frayed, porous nature of Haraway's carrier bags. As I read and thought with the papers, the idea that birds, bears, dogs, raccoons, and kangaroos are different groupings to ants, worms, wasps, bees, and stick insects (Taylor & Pacini-Ketchabaw, 2015, p. 508) became the basis of the bag lady categories. The bags emerged in the following forms: a *bird bag*, a *large animal bag*, and a *small animal bag*. These seemingly childlike categories enabled new questions to emerge about what different theoretical responses are called forth by different animal-child relations and through what events and processes does this occur?

Bird Bag Stories

Miriam Giugni's bag lady story is the only one in this paper that focuses on early childhood (Taylor et al., 2013). Giugni's story "attends to the everyday grapplings of a group of early childhood teachers, as they searched for new ways to include chooks' in search of a companion species curriculum" (p. 56). The theoretical underpinnings are similar to those elaborated in the earlier paper with Taylor, with Haraway's "worlding" described as "a practice that explicitly recognises that the worlds of animals, plants, places, waterways, skies, technologies and so on, as not synonymous with human worlds, or human imaginaries of the world" (p. 56). In this paper, it is Giugni's acute observations of the human-animal encounters in practice that offers extraordinary insights from the world of chooks in an early childcare setting. It was the tension between Giugni's chooks and Rautio's raven and crow that made these unlikely bird bag-fellows productive.

Giugni's chooks story is told in the context of the common practice of renting chooks in early childhood settings. Both the teacher and Giugni were keen for the chooks to roam free because "they wanted them to be part of the centre community and something more than an object of study." They felt that the "children could benefit from co-habiting with chooks, and chooks could benefit from living with the children" (p. 57). However, certain events relating to the rights of the chooks to roam free turned this seemingly straightforward concern into a conundrum of contested rights:

> . . . The children' s belongings were kept in an open shelf with individual cubed spaces, so the chooks could hop and flap their way into any of them when they were out of their cage. By nesting in the children' s belongings, the chooks caused two main dilemmas: first, the chooks had laid eggs in the children's bags . . . and, second, the chooks had pooed in the children' s bags and all over the lockers. (Taylor et al., 2013, pp. 57–58)

The story goes on to examine how the teachers "engaged with the ethical dilemmas thrown up by this conundrum of chook" (p. 58), adding that both the children's and the chook's relatings needed to be considered, including how chooks also grappled with and responded to this new relationship, to living with unfamiliar plants, people, furniture, light and shade, and new routines of roosting, laying, nesting, and scratching (p. 58). As well as thinking with chooks in this way, however, Giugni's interest is intentionally pedagogical, desiring a "companion species curriculum" that takes account of an ethics and politics of animal rights. In concluding that a companion species curriculum requires that we "become worldly with," the response-ability that we share with our nonhuman companions is recognized, reinforcing the collective framing of common worlds pedagogies in their intimate and detailed attention to the ethics and politics of child-animal relations.

Thinking about life and species lines with Pietari and Otto (Rautio, 2017) relates to a personal practice with birds as companion species. While not directly related to early childhood, it is part of the common worlds collective and an important story about human/bird relations. Pietari, a pigeon, and Otto, a crow, "write with" Rautio about life and death. In her moving accounts of growing attachments to the injured and motherless baby birds whose death she experiences as a loss of self, Rautio questions the very idea of species as determining the limits of the way "a life" is categorized and understood:

> What if you defined who counts as your family by including all who eat from the same fridge? What if you defined your kin by thinking about who share and get by with the particular environmental conditions in your neighbourhood (in my case the harsh winters and darkness)? What if you bonded with all who have garlic breath? (Rautio, 2017, p. 97)

In thinking with pigeons and crows, "attuning" and "attending" are proposed as methods of understanding how something *not-self* is *similar to your self* and attending that not-self *as part of your self* (p. 97). In following this line of thought and practice, the category "human" is destabilized as Rautio's relation with animal is formed through their similarity to human: "like her, they suffer, rejoice, feel hunger, face difficult situations and overcome them, sleep, have sex, communicate with others, can be hurt, are vulnerable, can and will eventually die" (p. 100).

By combining these different stories of chooks, ravens, and crows in this bird bag category, the category "bird" itself is fundamentally destabilized, as it becomes evident that in each case, the bird animal becomes other in their human encounters. In this way, species constructs, which differentiate human from animal, break down at the edges like Haraway's frayed and porous bags. The questions "what is *a* life" and "what is *a* death" are fundamental in this category.

Large Animal Bag Stories: Bears, Raccoons, Kangaroos, and Dogs

Large animal stories include bears, raccoons, kangaroos, and dogs as affective presences in early years learning. As a reader, it is the closely detailed accounts of the intimate and intertwined responses of children and animals that animate this work. In bringing the different theorizing from these papers together, it again becomes apparent that animal-human-becoming is part of human-animal mutual meaning-making.

Bear-child stories begins with some charming stories of young children's encounters with bears in an early childhood community where they go for walks to the forest:

> When we encounter holes, both tree hollows and holes in the soil where trees once stood, the children imagine them as 'bear holes': 'This is where the bears would take a bath,' they chant. (p. 26)

In indoor bear play, the children transform the classroom into an "indoor forest" using sand, tree stumps, rocks, indoor plants, and several sticks and branches, making dinner for bears, feeding them pancakes, and making a dark cave for a bear to sleep in (pp. 26–27).

The paper engages with a number of very different public stories of bears, including news stories, children's story books, Indigenous stories, scientific stories, and eco-tourist promotions, which are analyzed according to Povinelli's account of late liberal colonialism, Haraway's (2008) species interdependence and worlding, and Tsing's (2005) frictional encounters. The aim of considering these public discourses of bears is to grapple with "the complexities and tensions that emerge in these late liberal colonized and colonialist spaces where bears and human children meet and contradictory images and figures of child and bear abound" (p. 34). These wide ranging stories are then analyzed in terms of how they shape children's entangled relations with bears in British Columbian early childhood, evoking Haraway's "response-ability" as a way to disrupt taken-for-granted notions about bear-child relations:

> Our stories are entangled, not neatly packaged together, without following a linear trajectory. The stories aggregate; they add up to create other stories and to disrupt taken for granted stories. They are stories that grapple with troubles, with connections that trouble us, but have no generalized moral teachings nor are they finished stories of grandiose research findings. They do, however, have 'consequences for response-ability.' (Haraway, 2012, p. 312)

The paper is typically inconclusive as Haraway's "staying with the trouble" does not attempt to offer solutions but considers how thinking with animals might require paying attention to the ways in which nonhumans are typically left out of children's histories and futures (p. 49).

Raccoons and roos offer different opportunities for theorizing in *Kids, raccoons, and roos: Awkward encounters and mixed affects* (Taylor & Pacini-Ketchabaw, 2017) provoking a tracing of "the imbroglio of child–animal curiosities, warinesses,

risks, inconveniences, revulsions, attachments, and confrontations" (Taylor & Pacini-Ketchabaw, 2017, p. 131). A family of raccoons actually moves into the early learning center in British Columbia, confounding interspecies separability, in common with Rautio's animal-becoming-human destabilization of species separations:

> One particular encounter on a rainy afternoon especially moved the children to ponder about their relations with the raccoons. Looking from the classroom window into the playground, the children watched the mother raccoon carefully pick up a bucket of water that the children had left that morning and place it in front of her cubs. The cubs set about to splash their paws in the water (as the children often do) and wash the sandbox toys. All the while the mother raccoon attentively watched her cubs, intermittently turning her head to also watch the curious children. (Taylor & Pacini-Ketchabaw, 2017, p. 135)

Not only are the raccoons constituted as their own family group who mimic the children in their actions, but they also communicate directly with the children. When one of the children places his hand on the window to say hello to the raccoons, the mother comes to the window and raises her paw to meet the child's hand through the glass (p. 134). The children are described as beguiled, entertained, amused, perplexed, and confronted by what they had witnessed, suspended between their interspecies experiences and "the ubiquitous public discourses that provoke anxiety and panic about the threats that wild animals pose to human safety" (p. 136).

The kangaroos in this paper occupy a common ground that the children enter, and different opportunities for animal-child relations emerge. The emphasis moves more toward the children than the kangaroos as the children repeatedly engage in mimicking what it would be like to live in a kangaroo' s body:

> They find or make big tails, attach them and hop around. They put their hands on their heads to listen carefully with protruding swivelling ears. They pay new attention to the feel of furry fabrics. This comes into play as they scratch their (imagined) furry chests, tuck themselves up and simulate what it would be like to be securely ensconced in a warm furry pouch. (p. 149)

The agency of the kangaroo comes powerfully to the fore in an account of children's response to a dead kangaroo that has been killed by a car:

> The tension of this grisly and awkward encounter was broken when a couple of the children ran away from the kangaroo corpse and suddenly dropped to the ground. Others ran to try and rouse these dying child-kangaroos. . . performatively enacting what it is like to die in a kangaroo's body. It was intense and chaotic. With much shrieking, laughter, and release, the child-kangaroos started rushing around, listening for and fleeing from imaginary cars, being knocked over, lying dead or dying on the grass, and going to the assistance of fatally injured kangaroo kin. (p. 141)

The theories evoked by these raccoon and kangaroo encounters are framed within the context of the Anthropocene and the need for a new ethics and politics of

encounter. Mimicry or mimesis is a new addition to this theorizing. In this paper, both raccoons and children can be understood as engaged in processes of mimesis, each trying out what it might be like to be other, animal-becoming-human, and human-becoming-animal. In each case, the other is required, neither animal nor human can be seen as initiating the interspecies mimicry, and there is no particular purpose except the experience of sameness. Especially poignant is the resonance of the children's response to the dead body of the kangaroo with Rautio's encounter with the death of Pietari and Otto. Both examples beg the question what is "*a* death," asking whether the concept of a life or a death can be limited to an individual or is it much more than that?

Finally, in *Reconsidering children's encounters with nature and place using posthumanism*, Malone (2016) considers child-dog encounters in the slums of La Paz, Bolivia. The dogs in La Paz are street dogs who "are neither pets, strays, or wild; they are left to scavenge for themselves, loosely connected to families, coming and going, sometimes wandering into yards, but mainly hanging around on the streets" (p. 51). Dogs associate with children (or children associate with dogs) in different ways and for different reasons, captured by the children's own photographs and stories: The street dogs are urban scavengers, not Western-style, house-dwelling, middle-class "family pets"; and children spend long periods of unsupervised time on the streets with the dogs, where the dogs live; they coexist as dog-child, as a unique body, and as a street collective entity (p. 47).

In this paper it is as if these intimate, material, and entwined relations between dog and child themselves call forth Barad's concept of "intra-action" "to help to understand relations in which object and subject are mutually constituted. . . they do not exist as separate individual elements" (p. 51). The bodies of children and dogs are fully present in "the fleshy detail of the physicality of the relationships" (p. 46). It is as if they merge in these mutual encounters in the streets of La Paz with much in common with animal-child encounters in the more regulated environments of early childhood education.

By pulling the threads of these large animal bag lady stories together, it is possible to weave other insights emerging from the frayed edges. The idea of mimicry is interestingly resonant with *Things and children in play* (Rautio & Winston, 2015). If mimicry is not a conscious choice for human or animal but an involuntary bodily response evoked by unconscious desires, then this links to the destabilization of species itself (Rautio, 2017). The raccoon family clearly experience themselves as human in many respects and the children as kangaroos. Similarly bears and children are deeply intertwined. Dog and child bodies become as one in La Paz. It is possible to reread bears, raccoons, and kangaroos as all like the street dogs of La Paz, habituated to living with humans, animal-becoming-human simultaneously with human-becoming-animal. The meaning-making that emerges from this theorizing with large animals disrupts the boundary between animal and human child, bringing into question the categorization of species itself, particularly the hyper separation of the human species.

Small Animal Bag Stories: Wasps, Worms, Ants, Bees, and Stick Insects

The last of the frayed and porous bags that make up this section on human-animal relations is the small animal category, probably the most significant and certainly the most numerous form of animal life on the planet (Taylor & Pacini-Ketchabaw, 2015). More than any other, the small animal bag raises questions about how different animals call forth different theoretical responses. Whatever we think of the concept of species, it is clear that ants, bees, wasps, stick insects, and worms are of a different order than birds, bears, dogs, raccoons, and kangaroos. While the papers engage the same theoretical framings around ethics and politics, mainly referencing Haraway, an additional layer of complexity is added when considering animals that are "less appealing, very small, and invisible and that may bite or sting" (Taylor & Pacini-Ketchabaw, 2015). In the following, seven papers generated by small animals are discussed, first in terms of the separate contributions and finally in relation to the theme of death, which is common to all of these small animal papers.

Learning with children, ants and worms (Taylor & Pacini-Ketchabaw, 2015) is generated by worms in the wet forests of British Columbia and ants in the dry forests of Canberra, Australia. In both cases the small animals are agentic: The earthworms "attract the children who are fascinated by the movements of these red wigglers" (p. 517), and the ants get faster and feistier as the weather warms up, sometimes running up the children's legs or into their clothing and biting them (p. 523). The worms and ants evoke the theoretical framing of Myra Hird's of "multispecies vulnerabilities," an extension of Haraway's entangled species ontologies into microbial worlds (p. 512). For Taylor and Pacini-Ketchabaw, "agency is completely reversed when we become beholden to the myriad of micro life forms we rarely see, let alone acknowledge, and yet which sustain the lives of all large animal species, including our own" (p. 512). This in turn gives rise to "inventive and experimental co-implicated research practices" that necessitate "paying attention to the movements and actions of the worms, ants, water, rain boots, fingers, sticks, rocks, mud, pebbles and dust" (p. 515). The experience of embodied intimacy with these small animals raises awareness of "the precarity of life through (literally) holding the responsibility for another life, at the same time as making themselves vulnerable to another species" (p. 525).

In *Wasps-bees-mushrooms-children* (Atkinson, 2015), the children walk in a park where they find dark shady places with piles of rocks, prickly mounds of garden debris, discarded pipes, tiles, and chunks of concrete. A slug attaches itself to a child's princess dress and is rescued by another who places it carefully on a flower that she carries for the duration of the walk. Wasps fly crazily in all directions when the children move a large slab of concrete to expose a wasps' nest and a bee lands on a boy's leg when he is observing its movements through the grass. These small animal encounters evoke another new theoretical framing to add to common worlds theorizing: Ginn, Beisel, and Barua's (2014) "unloved others." This entails "an ethic of flourishing that requires us to look at the knotty relationships between human and

non-humans, to notice who prospers and who does not, who lives and who dies, and the vulnerabilities that emerge in multispecies encounters" (p. 71). The strategy of "deep listening" generates "small conversations" and a sense of mutual vulnerability through which worms, slugs, and wasps are acknowledged as having a role to play in the pedagogies of early learning and in mutual survival (p. 78).

In *"Staying with the trouble" in child-insect-educator common worlds*, Nxumalo and Pacini-Ketchabaw (2017) trouble human relations with small animals in the very different situation of imported stick insects in a child care center. The stick insects breed so prolifically in captivity that it forces educators to deal with death through the need to reduce the large populations of the prolific breeding insects. For the educators:

> acts of culling required them to juggle regret, resentment, guilt. They questioned who these acts of caring benefited – the children? the stick insects? themselves? . . .They questioned what living and dying well meant for the stick insects. . . They grappled with how 'best' to kill the insects to relieve their crowded living conditions: Should they boil the stick insects or freeze their eggs to death or perhaps withdraw food and water? What practices of 'mindful killing' and 'ethical detachment' might they enact in relation to the stick insects? One educator asked, 'Do we keep killing them little by little forever?' (Nxumalo & Pacini-Ketchabaw, 2017, p. 10)

In order to address the knotty problem that the stick insects pose, another new theoretical framing, "a practice of becoming witness to others," is introduced. This involves an "openness to others in the material reality of their own lives [as] noisy, fleshy, exuberant creatures with their multitude of interdependencies and precarities, their great range of calls, their care and their abundance along with their suffering and grief" (Rose & van Dooren, 2017, p. 124, as cited in Nxumalo & Pacini-Ketchabaw, 2017, p. 6).

The concepts of "wildness" (Collard, Dempsey, & Sundberg, 2015) and "wildlife" (Lorimer, 2015) are also evoked by these tiny commodified animals in order to interrogate what it might mean to live and die in captivity in this way. Wildness encompasses the degree to which the animal can come and go, express itself, work for itself, and form social networks. These are conditions of possibility, of potential, not forced states of being (Collard et al., 2015, p. 328). "Wildlife" is evoked by the concept of wild as "a vernacular political concept that counters the idea of wilderness" (Nxumalo & Pacini-Ketchabaw, 2017, p. 6). Wildlife describes "ecologies of becoming that provokes curiosity, disconcertion, and care, and demand political processes for deliberating discord among multiple affected publics" (p. 11). Ultimately, the intention of this paper, in common with common worlds theorizing, is to "stay with the trouble" of these imported stick insect pets and the challenges they pose of contemplating the ending of a life.

Finally, *Stories for living on a damaged planet* (Nxumalo, 2017) considers the endangered Western bumble bee's engaging presence in an early learning center. This paper introduces new concepts and modes of thought as it "brings attention to the particularities of the emergent assemblage of children and bumble bees as well as its multiple and contingent material-discursive relations" (p. 1). Concepts such as

"assemblage" (derived from Deleuze) and material-discursive relations (new materialism) are evoked as the plight of dying bees and failure of pollination are contemplated:

> As bees, children and educators responded to their mutual presences, children began to make offerings to the bees they encountered crawling on the ground outside. Some children built 'homes to try and make the bees feel better', while others kept their distance and watched. Some children picked up some of the still-moving bees and placed them on flowers in the classroom or outside, or tried to find the bees' nesting grounds. Some children also prepared, with educators' help, a sugary water to feed the bees – occasionally a bee would respond to the offering and then fly away, to the children's delight. Some responded by covering the dead bees with article 'to stop them blowing away' and by building a wood 'bridge' so that the bees could 'walk' to the flowers. (Nxumalo, 2017, p. 8)

This paper reworks Haraway's "worlding" with related concepts, drawing on Stewart's (2010) *Atmospheric attunements*, considering "in any worlding we can ask how things come to matter and through what qualities, rhythms, forces, relations and movements" (Nxumalo, 2017, p. 3). Worlding, then, becomes a methodology introduced by these dying and endangered bumble bees, a methodology that focuses on "particular affects, bodily (dis)orientations and sensory modes of attention in relation to children's and educators' situated encounters with bee-life and bee-death" (p. 3). It can be read as a "bee methodology" that focuses on "what potential modes of knowing, relating, and attending to things are already somehow present in them as a potential or resonance" (p. 3).

Death is the predominant concept in this paper in which "children's modes of bearing witness to bee death and caring for bees" is "inseparable from their knowledge-making about what was harming the bees" (p. 8). Children learn by "touching death" as they interact with the growing pile of dead bees they collect from their grounds. The death of these endangered bumble bees is connected to the question of mass extinctions in the age of the Anthropocene, "because the death, and subsequent absence of a whole species, unmakes these relationships on which life depends, often amplifying suffering and death for a whole host of others" (Van Dooren, 2010, p. 273, cited in Nxumalo, 2017, p. 8).

While these small animals present experiences of death to the human child, they gesture toward the presence of death as an overriding theme across the papers that represent animal-child relations in early years learning.

Summary: Death as a Theme in Animal-Child Relations

Commonly set among the mass extinctions of the Anthropocene, the researchers in the small animal bag stories recognize the smallness of these encounters as necessary minor and incremental steps in young children's learning. The one commonality across all the different theories these small animal bag stories evoke is the idea of touching and being touched in the double sense of being affected by, or *touched* by, death and *touching* death with the hands, the sensing body. The same can be said of

the ravens and crows, the dead kangaroo, the risk-taking raccoons, and the dogs in La Paz who get beaten to death and die in the streets. In these encounters, animal and human body become intercorporeal where each is affected by the other. In this affecting and being affected by the intertwined materiality of bodies, each becomes different, and new ways of being and knowing are born for both. Through becoming-with both living and dying/dead animals in these ways, life and death are comprehended differently; the life and death of the individual and of a species are newly understood through death giving ultimate meaning to life and both life and death questioning the singularity of species.

Concluding Thoughts

The dominance of the posthuman in early years learning is traced to two major movements, or categories of theorizing, *new materialism* and *animal-child relations*, each requiring different analytical strategies. A genealogical/generational model adapted from Iris van der Tuin (2014) identified the origins of new materialism in the "ample and greedy" women at the beginning of the Reggio Emilia movement in war-torn Italy. This movement informed the materiality of the sensing body in Lenz Taguchi's influential text, *Beyond the Theory Practice Divide*, which added Deleuze's theory of immanence and Barad's intra-action to open new possibilities of emergent materiality in early years learning. Many researchers have applied these philosophical influences in practice, with a particular interest in language and materiality emerging as a major focus. While additional theoretical influences are noted in the papers, it is the extensive iterations of Barad's theories of materiality derived from quantum physics that open up a new paradigm of thought. This new paradigm emphasizes the vibrancy of all life and matter where human life comes into being only within the materiality of the world and young children's play arises from this mutual emergence.

Animal-child relations with its network of common worlds collective theorizing evoked a horizontal rather than a genealogical approach. Donna Haraway is the major theoretical and philosophical influence, and the adoption of Haraway's "bag lady story" strategy as a rhizomatic analytical tool produced a "bird bag," a "large animal bag," and a "small animal bag." This categorizing animated the papers to make evident the ways that different categories of animals evoke different theoretical understandings. Small animals, for example, call forth Myra Hird's "interspecies vulnerability," an extension of Haraway's entangled species ontologies into microbial worlds. The small animal bag is uniquely powerful in generating the dominant theme of animal-child relations, that of being affected by, or *touched* by, death and *touching* death with the hands, the sensing body. The question of what is a (singular) life and what is a (singular) death disrupts the certainty of species categories where animal-becoming-human is as present as child-animal becomings. The animal bags offer a way of reading these papers to make evident their contribution to new ways of thinking and knowing emerging from early childhood research and practice as a major contribution to Anthropocene scholarship.

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Outlining an Education Without Nature and Object-Oriented Learning

7

Stefan L. Bengtsson

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Abstract

This chapter interrogates the concept of nature as central to the understanding of education, learning, and the position of the child in education. Based on a problematization of the concept of nature, a philosophy of education without nature is outlined. This philosophy is substantiated by a conception of object-oriented learning, where learning is reconceived as a primarily aesthetic process of unappropriation. In sum, this chapter aims to develop an alternate ecological outlook on education that wants to open up processes of learning as to foster nearness and compassion with other objects.

Keywords

Objects · Speculative realism · Object-oriented ontology · Aesthetics · Philosophy of education · Nature · Learning

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Introduction

This chapter aims to reapproach the question of the relationship between learner and nature by first problematizing the conception of nature in education. Second, we will engage with what this reapproaching will mean for the understanding of childhood and the mesh of childhoodnature. In the first section of the chapter, I will engage in an interrogation of the concept of nature in foundational thought about education, learning, as well as maturing through education. As will be shown, the concept of nature is fundamentally linked to the concept of subject and an integrative part of the dialectics of enlightenment as they still shape the very core of contemporary thinking about education and learning. According to this thought, learning can be understood as appropriation of nature by the human subject. This process of maturing by appropriation, that is, a rational and human project, leads, in a paradoxical move, to the emancipation of the human subject from nature, where that human subject is simultaneously seen as still emerging from nature and essentially different from nature. Problematizing the very form of reasoning inherent in this thinking of nature in education, I argue for a radicalization of the conception of education through a tentative outline of a philosophy of education without an appeal to the concept of nature. Drawing on emergent thought in object-oriented ontology (OOO) and especially the work of Timothy Morton, I engage in an experiment of rethinking education once we abandon nature as a guiding reference point for learning. The proposed notion of object-oriented learning is to counter the enlightenment ideal of learning as appropriation. What I offer is a reconception of learning as unappropriation that recenters learning on the primacy of aesthetics and fosters processes that sensitize the learner to the interdependence of objects and the emotional reaction this nearness to objects might provoke. Thus, what the, in this chapter, outlined philosophy of education without nature and the related theory of object-oriented learning offer is a dismantling of the humanist learning subject and a vision for how learning and consequently education can again become a broadened communitarian political project that seeks to distribute and multiply enjoyment. This political project feeds upon a rehabilitated notion of an immature learner or the childish learner that is to be overcome in the enlightenment notion of the learner by her very nature.

Education, Nature, and Childhood

In this section, I aim to unpack a number of core assumptions that shape how the relation between education, nature, and childhood is conceived in education. While human/nature relationships have been discussed in other fields (e.g., Horkheimer & Adorno, 2002; Plumwood, 1993), I will explore how the conception of the relation between the learning human and nature in education can be seen to share parallels with the seminal work on human/nature relation by Kahn (1999). In particular, I am going to highlight the ontological outlook that is at play in the conception of this relation and how correlationist accounts (Meillassoux, 2009) of a nature for us

humans gives expression to a double notion of nature. The focus of this section is then preempted by the two sections that are to come, that is, this section is to highlight how the conception of nature restrains our potential engagement with objects in ecologically oriented education.

I will throughout this and the following sections argue that the relation between education and nature in Western educational thought is historically framed by particular ontological outlook that can be rooted in the Enlightenment's dialectics of rationality and social reality (Horkheimer & Adorno, 2002) and the subsequent Kantian (1781) hard separation of things into inaccessible noumena (thing-in-itself) and apparent phenomena (things as they appear to the transcendental human subject). It is primarily through the Hegelian notion of a historical and communitarian subject that educational thought became focused on phenomena (Hegel, 1807), thereby following the Kantian precluding gesture. Yet noumena, while barred from human access, remained a crucial role as the world of things in themselves, that is, nature, provided a horizon for the world of humans. Such a nature as *horizon* for the play of human emancipation can be seen to surface in the naturalism that is appealed to by educational thinkers such as Rousseau (Babbit, 2009) or Dewey (Santayana, 1925). Thus, a crucial point of departure for educational thought is the distinction between a cultural, social, and technological world of humans and one that is separate and which is called nature or natural world (e.g., Dewey, 1928; Durkheim, 1922). For example, in the Marxist/Hegelian tradition, education and learning is consequently positioned on the side of production and reproduction of a human social, cultural, and technological world, where nature as a lump of immediate things is translated or appropriated according to different historically determinate social and cultural paradigms, discourses, or ideologies (e.g., Apple, 2013; Bourdieu & Passeron, 1970; Giroux, 1981).

While the conception of this separation differs according to the specific underlying theoretical outlook that is appealed to, a shared feature is the by the Enlightenment and Kant established separation between the world of humans (culture, technology, language) and a distinct realm of nature. It is the emergence of environmental awareness in the later half of the past century that can be seen to have called for a return to the world of nature as part of efforts to address an alienated and malignant relation to nature. Kahn (1999, p. 226) calls here, for example, for a *fostering* of the human relationship with nature.

What this return to nature in educational thought is taking for granted and at the same time highlighting and problematizing is that these two realms stand in a relationship – a human/nature relationship (e.g., Bowers, 2001). Further, this distinction informs a dualism of immaturity/maturity that is crucial for understanding childhoodnature relations, as childhood and nature are essentially associated with *immaturity*. The educational prerogative is, hence, to assure maturity and a departure from nature. I argue that education, which is addressing environmental issues and human/nature relations, remains committed to the dialectics of enlightenment and the notion of fostering as a guided movement toward maturity. Without addressing this outlook, I argue, a reengagement with the world of things is caught up in the loop of thinking and writing double nature, thereby preemptively closing down

alternative possibilities of thought and engagement. In the following, I will explore how this ontological outlook, as a loop of thinking nature, might have led to a conception of environmentally oriented education that is doubling down on a concept of nature that, as I will argue, should have been abandoned. Consequently, this abandonment can open up for new understandings of the childhoodnature assemblage.

As stated, historically, direct access to the world of things, or nature, has been barred, and this prohibition has been dealt with in different ways. In Kahn (1999), I see the Hegelian approach of appealing to mediation to resurface. Mediation refers here to the observation that nothing is immediately present but that everything is mediated in relation to and through something else (Hegel, 1816). For education, this meant that nature is always already mediated, that is, a nature for us humans. Hegel and German idealism pursued this correlationist reasoning of things as they appear to us to its maximum, erasing the traces of noumena in their accounts of education fully. For Hegelian- and absolute idealist-inspired educational thought, this means that things of concern only emerge as artifacts, as already mediated by a history of use and human engagement with the world. Thus, in order to have any educational value, things have to be relative to or mediated by a human standard that is historical and social.

This standard is also *maturing*, that is, it is relative to a process of historical unfolding of an absolute spirit (*Geist*), which is progressing (Hegel, 1807). To put this into an educational context, to learn is to attune to the historical process of maturing, where there can be seen to be two standards of maturity. First, the current adults who express a current spirit or state of progress and then the future state of absolute knowing toward which human history is moving. The former can in education be seen to stand in for the later as guarantee for progress.

With the emergence of environmentally oriented education during the late 1960s, the process of reducing nature to processes of human production became an issue of problematization. Environmental awareness in education became related to the problem of reduction of nature as means for human activity (cf. Bonnett, 2004; Bowers, 2001). Thus, what was problematized was a reduction of nature to processes of appropriation of nature as part of economic and social processes of production. This figure of reasoning can be seen to reconfigure an earlier concern in educational thought, one already articulated by Rousseau (1762), that is, education as a historical process that is to denature man. Rousseau can here be seen to articulate a proto-form of Hegelian dialectics (Szkudlarek, 2016). Education is, for Rousseau, to transform over time the nature of man. Thus, what I find in this figure of reasoning is a notion of education that should alter the nature of man, that is, to overcome a corrupted and egoistic nature and to foster a nonnatural general will that is based on reason (Riley & Welchman, 2003). What this figure of reasoning expresses is a paradox (cf. Baker, 2001; Szkudlarek, 2016). While education is to denature, this denaturing, as a process of realizing true nature of man, is accomplished through experience of our surroundings and things, or, I might say, experience of nature. The paradox emerges in the appeal to man as both having a false nature and a true nature. Hence, there is an underlying tension between experiencing nature and of deviating from it, that is, a true nature that is to be fostered.

Rousseau and peers of his generation of enlightenment thinkers turned here to reason, where Kant (1784, p. 51) appealed to the Enlightenment as the process of "man's release from self-incurred immaturity" given the "ability to use one's understanding without the guidance of another." Maturity is in this sense the true nature of "man," and this progression from immaturity to maturity can paradoxically be seen as given by nature. Thus, nature can be framed in two paradox configurations in the context of the discussion of child/nature relations. First, there is the false child/nature relation that is irrational and unfree. Second, there is the true adult/nature relation, as defined by a reason and freedom.

However, the paradox of Rousseau can be seen to resurface in terms of the grounding of reason. If man's release is dependent on his ability to understand without guidance, we might ask us: What is the reason for this release? Thus, if immaturity is self-imposed, and release is self-incurred, both release and immaturity can be seen as grounded in a reason to do so. What can be seen to be at stake is the potential collapse of the hard distinction between maturity/adulthood and immaturity/childhood once we take a closer look at the status of nature in the conception of the dialectics of enlightenment and, I argue, the underlying notion of the learner in education.

I argue, this Kantian paradox is still informing education as curricular objectives can be seen to be grounded in the idea of maturity, that is, what an adult is necessary to know and do in contemporary society. However, the Kantian paradox and the dialectics of enlightenment can be seen to haunt educative narratives of progress, development, and attunement to societal demands with regard to the underlying double notion of nature that is at play in these narratives. That is to say, if the development of the capacity of reason in learning turns to nature for determining maturity and immaturity, there is the danger of subversive learning. What I mean by this subversive potential of learning is the inherent necessity of learning to contribute to a teleological general progress of humanity's ability to reason. Thus, there needs in the process of learning that is turning toward nature a potentiality of release from immaturity that undermines the childhood/adulthood distinction. Learning, irrespective of the status of the learner, must have the potential of approaching absolute knowing by reflecting on nature. If this would not be a condition, then there would be no condition for progress. Thus, in the dialectics of enlightenment, nature has a paradoxical double didactical function.

Leaving this paradox briefly aside, I argue the human/nature relationship is framed through the dialectics of the enlightenment by the idea of the demystification and disenchantment of the world. This disenchantment has, as I stated, an essential didactical dimension to it; man is to learn from nature in order dominate it: "What human beings seek to learn from nature is how to use it to dominate wholly both it and human beings" (Horkheimer & Adorno, 2002, p. 2). What Horkheimer and Adorno are interpreted to underline is that the concept of nature plays a crucial role not only when it comes to substantiating rationalism but also to uphold particular forms of social production. The double character of nature orders according to the dialectic distinctions that substantiate and praise Western white, male patriarchy, by categorizing according to dichotomies such as civilized/uncivilized, man/women, or adult/child according to the true/false logic of true and false nature of man.

I argue, environmentally oriented education tried and tries to reconfigure the Enlightenment's outlook on education. However, I argue that for the most part, it aims to reconfigure the latter part of Horkheimer and Adorno's characterization of the dialectics of enlightenment, that is, human beings still seek to learn from nature but this time in order to live in accordance with it. Thus, I argue environmentally oriented education is still committed to the principle of demystification and disenchantment, arguing that we are finally starting to figure out nature. As a result, a continued appeal to the concept of nature in the diversity of its forms and expressions can be seen to reinforce a dualistic standard that reinforces notions of immaturity and maturity.

For example, in Kahn (1999), reason is to shed light on the human/nature relationship, showing through the development of reason over time that our true nature is to affiliate with nature. Hence, I argue Kahn is rearticulating the dialectics of enlightenment, reinstalling the paradox role of nature in learning, and giving expression to an understanding of learning that is essentially teleological. There is a notion of progress and maturing at play. The Kantian paradox can also be seen to reemerge in Kahn's (1999, p. 226) double notion of nature, that is, nature and human nature, where human nature is characterized by our intellectual ability to construct increasingly sophisticated ideas. Thus, repeating our interrogation of Kant, why would these human constructs be *increasingly* sophisticated if they are essentially and a priori grounded in nature?

I argue, it is the same notion of nature in the Enlightenment, which is to teach us humans something, that common to conceptions of environmentally oriented education as well as other notions of education draw on. The notion of nature feeds on the idea of nature's inherent didactical character. As I will show below in the exploration of this didactical character, it is problematic not only with regard to the logics by which learning is conceived but also the moral and political consequences of such an understanding of learning.

I argue that nature plays a crucial role in three processes of education: *ecomimesis*, *ecodidacticism*, and *ecorhapsody*. I derive these terms from Morton (2007) and will in the following elaborate how they reemerge in conceptions of the relation of learning and nature in education.

Ecomimesis can be translated into "nature writing," or, to put it in the terminology introduced above, a presentation of nature in the writing of nature. Ecomimesis can be seen to be at play in the act of "rooting" learning about nature in experience. In line with Rousseau's thought, the writing of nature is a process guided by nature, not by the corrupting learner or writer. This requirement relates to the possibility of children to learn, who can be seen to be too close to nature and further away from the true nature of man. The learner or writer tunes into nature, or as Morton (2007, p. 55) puts it, "the mind lets go while the body takes over." Ecomimesis is in the writing of nature, as a process of learning, an attunement to nature. Thus, what ecomimesis does is, first, to point to an "over-there nature" about which the learner is *here* writing and learning about. Thus, ecomimesis as an eco-didactical move *points out* nature as a background or the horizon for learning. It is here that I see the paradox of the dialectics of enlightenment to resurface, as I question *where* the source of inspiration

for reason is located. In a weird twist, learning cannot be grounded in reason itself but requires an external/background inspiration for learning that is taking place in the foreground (thinking about nature): "I choose to not reason forth my experiences of nature as a basis for learning something about it." This experience of the background is to teach me something; it is to allow for a change of my reasoning without determining that very process of reasoning. Nature is in this function of the background terrifying, in a double sense, as it undermines the possibility of continuity of progress in learning as well as can be seen to bring into play the potentiality of the intervention of future nature of man. To clarify this potential of subversion, the playful engagement of a child with nature may be closer to nature than the reasonable and mature position of an adult. Hence, here the paradox notion of nature in Rousseau emerges again; the child might be closer to nature than the mature and rational adult.

To summarize the process of ecomimesis, I argue it consists of two related processes. First, there is the act of pointing out nature that ascribes significance to "over-there nature" for learning. This is the dimension of *ecodidacticism* (cf. Morton, 2007, p. 62) that I already observed in Rousseau. Nature is to teach us, humans, something but we have to look beyond corrupted and egoistic nature to encounter true nature. The "here" where learning is taking place, or in the environmental education commonly appealed to place, attains its significance from nature . The child can here be seen as to remain in a mystical relation to nature that is judged as both adorable naive in its engagement with nature and frightening attuned to something that corrupted adults cannot be seen to have access to. Similarly, the here is also a place for "we" in the thought of Rousseau, where that "we" emerges as the distance to nature over there. Hence, ecodidacticism points out the significance of the background as the basis for writing it as a foreground in the process of learning (ecomimesis). Children in their play can be seen to be too close to a here, both spatially and intellectually, and a common didactic intervention is to call for perspective and distance. A mature position to be gained through learning is calling for a detachment from the "here," where the learner is to attain a distanced and detached position toward that "here." The child is to "see" things fully for what they truly are given its intellectual capacities as a maturing human subject. The things encountered here are or should be in a particular or natural way according to the naturalness provided by nature over there. However, ecodidacticism can be seen to haunt the mature "we," as the immature and childish proximity can be seen to have access to a surplus, which we are no longer able to see from over here. There can be seen to be a mixture of despise and envy of the childish perspective in ecomimesis.

What I argue surfaces in this eco-didactical move is a paradoxical ecomimesis, writing of and learning about nature, where the background is written in the foreground. Thus, ecodidacticism points out the significance of nature over there in the here, which is to teach us something. Ecodidacticism points out a position to be attained by the child, that of the adult "here," distanced from the over there. The writing of nature over there (background) in the foreground (here) is articulated as a form of *ecorhapsody*. Ecorhapsody is the resonance of the background in the foreground (Morton, 2007, p. 57). We might here think of Plato's allegory of the

cave with a twist, as there seems to be something more natural in the reflections on the wall than the objects reflected. Thus, there is not only a reflection but also an appropriation of that reflection by a reasoning subject. In line with the enlightenment dialectic, there is a human subject appropriating the reflection or resonance of over-there nature. Yet, there seems to be a double distance at play. While the child can be seen as caught up too much with the objects over here, the mature adult can be seen to not yet distanced enough. There can be seen to be a distance between we and "here," as the wall needs to be looked at. I argue that the mature position of "we" still needs to mature, to attain absolute knowledge, as the writing requires a poetic act and not literal translation. The play at work in this poetic act can be seen to entail a potential relapse into the childish proximity, which is a fascination with the surplus of things over here. The danger is that we do not know if the rhapsody went too far or remained too close.

It is in this conception of ecorhapsody, as a process of learning, that I see Kant's rationalism to concur with his transcendental humanism. It is the human subject's cognitive special status, as on the one hand part of nature, subject to its laws, but who also as an actor and knower transcends nature and actually becomes the authors of the laws of nature (Allison, 1971). Thus, here we are thinking nature in a loop. In this thinking-nature-loop, nature is not only writing itself through us but also wants to make a point about an "ought," which is implicit in ecodidacticism's imperative "Look over there, Nature"! Nature is, in this appeal to an "ought" related to Rousseau's nature that is still to come, while at the same time making itself already present to the human mind. There is in the thinking-nature-loop an appeal to a transcendental principle (principle of sufficient reason) that establishes, through the thinking of nature, that which is natural or how it ought to be (purpose). Yet, in an almost ironic gesture, the transcendental subject thinking the nature loop seems to have to erase itself from thinking this loop in order to conceal the loop-like form of thought and to present thinking nature as linear.

Consider for a moment the following form of thinking nature that could be seen as appealed to in Kahn (1999): Me thinking and reflecting about nature in order to unveil my true nature as human being is coming to the conclusion that I should affiliate with nature. Nature has a funny way of sneaking up on you – don't you think? For the childhoodnature relation, this transcendental principle means that there is an inherent pregiven imperative for the child to grow up through means of learning. Environmental education can in a number of instances then make the addition that the child should learn from nature in order to become aware that where I was is where I should have stayed.

I argue similarly to Morton (2016) that nature is, as we already saw in Rousseau, a project and a product of human ambitions that precedes the Enlightenment. Thus, the naturalness of nature is a by-product of particular forms of reasoning, that is, reasoning in loops that wants to present itself as linear. This is a presentation of the loop, where the presenter erases herself from the presentation, given her self-declared transcendental status. As argued above, nature plays a crucial role in thinking that wants to appropriate a political and moral outlook that seeks to fully dominate and to open itself up in order to consolidate itself from within. In line with

critical and reflexive traditions in environmental education, I aim to problematize the consequences of such an underlying outlook. Especially against the background of the processes of becoming aware of the effects of such an outlook, that has been labeled the Anthropocene, I would like to engage in elaborating what might happen if we start thinking learning and education without nature. I am to explore an alternate loop of thinking, ecological thought, that, as a strange loop, might allow us to leave behind attempts to appropriate and dominate and instead open us up to compassion and coexistence with other objects. In parallel, I will also explore what this might mean for a rethinking of childhoodnature relations.

A Philosophy of Education Without Nature

When arguing for learning and education without nature, I am not arguing for a form of ontological or epistemological idealism, claiming that everything is or can be known as human mind. On the contrary, I am rather pursuing a form of German realism that, as Harman (2013) puts it, could have been a feasible alternative to German idealism. Following Kant, I do reinstall the thing-in-itself (noumena) as unknowable. However, instead of installing the barrier between the knowable between the world-for-us-humans and the world-in-itself (Nature), I argue in line with object-oriented ontology (OOO) (Harman, 2011), for a barrier between sensible object and real object. As a result, I end up with an ontological outlook that is different than the notion learning as appropriation as it is defined by a human/nature distinction. OOO has only initially been translated into the context of education (Oral, 2014, 2015), where I in this chapter aim to outline some consequence of OOO for rethinking childhoodnature relations in an educational setting.

In this section, I am exploring how OOO and Morton's ecological thought might allow for an alternate entry point for understanding childhood in education and learning. Thus, in this section, I will begin a translation process from ontology (OOO) into a philosophy of education. In the next section, I will translate this philosophy of education into a conception of learning as *unappropriation*.

In the philosophy of education to be developed here, there is no lump of real things called nature, fully transparent to itself. Instead, I argue, in line with OOO, for the existence of real objects that are withdrawn from other objects, where humans are not special in the sense that they are withheld access to real objects. What I end up with is an ontological outlook that holds that humans, as well as other objects, have access to other sensible objects, without the possibility of access to the related real objects (Harman, 2011). Thus, there is no mature access to real object or nature given that neither reason nor experience has any full access to real objects. Consequently, objects remain in some sense mystical or magical, exerting, like in an immature position, a power of attraction in their sheer infinity of apprehensible qualities (cf. Morton, 2013b).

As it might become obvious, what I am starting to withhold is the humanist attitude's special position of humans and in particular a mature position toward nature. Hence, I do neither essentialize human access to the world nor claim a view

from nowhere (Nagel, 1986). I do no longer want to erase myself from the loop of thinking other objects. What OOO can be seen to bedding for is the attempt to replace the hierarchal conception of nature, where everything is judged according to a human standard of maturity, with a democratic playing field of objects. Thus, what OOO is by me seen to offer to the study of childhoodnature relations is a reengagement with the seeming infinite surplus of objects in learning and education, where we fully engage with that surplus without the danger of an immature position toward the objects of study looming over our heads. Thus, what OOO offers to this outlook is a position where the "childish" absorption with its surroundings is elevated to a general position for what it means to be an object among others, including humankind.

Thus, OOO claim of the uniqueness and withdrawnness of objects is tied into a political engagement with current forms of interaction with the world in the widest possible meaning of the word, even looking beyond the world. What OOO offers here to childhoodnature relations is a theoretical basis for political engagement that embraces the nearness in our relations to the world as well as the magic capacities of aesthetics of learning. It refocuses on how we are mesmerized by appearance, and where this aesthetic encounters does things to us. The learner's path is according to this outlook not a teleological process of development, from immaturity to maturity, but rather OOO opens up an understanding of learning as being essentially concerned with openness and how that openness appears to us in inter-objective encounters. OOO engages thereby not only in theory for theory's sake but wants to open up alternative modes of being with the other in the world.

In my engagement with OOO, I turn particularly to Morton's work as he offers an ecological political outlook in line with OOO. In the following, I will be considering what Morton offers in a possible reconception of the relation between childhood and nature in an educational context. I argue that Morton (2010a) conception of ecological thought opens up new ways of thinking of ecological learning as a form of education without nature.

Fundamental to ecological thought is the notion that every object is interconnected to other objects in the form of a mesh. This mesh has no center and no edge, and objects in this mesh have no clear within and outside to them (Morton, 2010a). It is as if objects are sticking to another and that all other objects are reflected in a particular object. Thus, what the notion of mesh withholds is both the possibility of knowing other objects fully and the notion of distance and holism that I discovered in the notion of nature are discussed in the previous section. What this means for childhoodnature relations is that a critique of childish proximity to environment and objects becomes a lame critique as the notion of mesh withholds the possibility of a distanced, mature, and objective perspective. Thus, we are not able to attain a mature position in which we separate or distance us from other objects as held apart by and in relation to the horizon in a distance (in relation nature). The capacity of reason is in this outlook not capable to provide a third, objective perspective that is distanced. What I instead acknowledge is that if we remain committed to proximity, we remain open for the mesmerizing seeming infinity of qualities that any object emits. Once we allow for the proximity of objects to get hold of us, we experience how we are

entangled in a mesh of objects. The mesh should not be understood as a form of holism, where the whole is something more than its parts, for example, the whole is determining the functioning of its parts. On the contrary, with Morton (2013a, 2017), I argue that the whole is strangely less than its parts.

To illustrate this mesh, where the principle holds that an object as a whole is less than its parts, we might think of our hand (Morton, 2017). We encounter this mesh once we start to count what characterizes our hand. My hand consists of five fingers, a ring, a couple of finger nails, some reminders scribbled on my forehand, etc. By counting these features, we see that the whole of my hand is less than the things that we just mentioned about it. The "etc." in my efforts to account for my hand highlights something of ontological significance. I cannot account fully for the excess of my hand, or to put it differently, objects like my hand are bigger on their inside (infinite real object) than they are on their outside (finite sensible object) (Morton, 2013a, p. 113).

A classical ecorhapsodic approach is to counter this experience of seemingly infinite qualities by referring to a necessary *rational reduction* of this surplus in experience. The child is encouraged to look beyond the seeming excess it apprehends; it is to look for nature, using its faculty to reason and to learn to focus its gaze according to particular disciplinary perspective on the object of study. The mesh reminds us of the impossibility to attain such a look from beyond, as the whole is indistinguishable from its parts as it is inseparable and dependent on all of its parts (Morton, 2010b). What an ecorhapsodic move does is to organize the look according to what can be separated according to a particular and disciplinary way of looking. What the thinking of the mesh resensitizes us to is that excess and the way that the whole, that, for example, an object represents, is less than its parts. A disciplinary perspective on my hand, for example, a biological perspective, might reduce it to certain anatomic features. However, I ask: Is my hand only a set of anatomic features and not the ring or the scribbling on it? What I see here at stake is what counts as being of significance, as well as an ontological assumption of what is more real than something else.

Thinking the mesh is to counter this stance that claims that some things are of greater significance, and we have to look beyond their infinity of qualities. Thinking the mesh holds instead that the mesh is infinite and beyond concept, it is unthinkable as such (Morton, 2010b). Why is it unthinkable? Because its conception and the ability to capture, the mesh would require our separability from it, a distinct, distanced, autonomous top-level position or view (a view from nowhere), where its parts would become separate and displaceable from the whole (Morton, 2010a, p. 49). This is again to erase oneself from the thinking loop, to attain a transcendental look from nowhere. It is here that I would like to argue that the mature approach of distanced, reasonable, claim of access to a view from nowhere is ecologically problematic as that sort of strong holism, which sees the whole as larger than its parts, assumes not only the redundancy of the parts but also their disposability of these parts. Thus, my hand would still remain my hand even if I would cut of a finger or lose my wedding ring. An ecosystem will remain still that ecosystem even if that polar bear or that species will become extinct, once we look at the "bigger picture."

There is no worry or to grieve for the ring or the species if they should be lost, they are fully replaceable by something else as the whole is always more than its parts.

Thinking the mesh is thinking the childish closeness to things, to remain absorbed in and with things close to us that touch us and that make us what we are. Thinking the mesh is thinking and feeling the inseparability, interdependence, and interconnectedness of objects.

Thinking this inseparability, interdependence, and interconnectedness leads to a thinking that is getting lost in the mesh of objects; it leads to the experience of non-locality. We are too close to orient ourselves. Non-locality and the collapse of the immature/mature differentiation are due to the absence of nature as a horizon and reference point for us to orient ourselves. Thinking childhoodnature relations without thinking nature is frightening in the same sense that an experience of non-locality is. Those who have gotten lost in a forest know how that feeling of non-locality relates to an absence of reference points. The thinking of childhoodnature relations without thinking of nature requires this uncanny feeling that we can experience when getting lost. What it relates to is a transformation of something we have learned to encounter in a particular way; let's say that forest, with new eyes, where that what we take as familiar becomes something strange, unfamiliar, and, potentially, even frightening.

I argue, it is exactly this rendering of the familiar into the unfamiliar that is needed in the context of current environmental crisis. What has led us to this crisis is a thinking that relies on a notion of nature, a nature that we know, appropriate, and control. Hence, we might think of the Anthropocene in the context of climate change. Thinking nature surfaces in the very conception of "climate change." The idea of a change in climate feeds on the idea that we know what the climate is and that we given that knowledge can state that it has now changed. Hence, in contrast to conceptions of the Anthropocene as a becoming aware of planetary boundaries and systemic functions, I argue that the Anthropocene relates to the encounter of the limits of our ability to know and to appropriate. I might say that what we become aware of is the absence of nature. Instead, we might think of the Anthropocene as a becoming aware of hyperobjects.

Hyperobjects are like all other objects and made up of smaller objects without top or bottom (Morton, 2013a, p. 116), that is, there is no background like nature that would provide a top or bottom view. Hyperobjects are also part of the mesh. However, hyperobjects differ from other objects only in the sense that they are so massively distributed in time and space that humans cannot apprehend them. However, what we, humans, are becoming aware of in the Anthropocene is that these hyperobjects are real and that we are caught up with them. We cannot perceive, for example, the climate, what we humans have access to are experiences of weather. However, given modeling techniques that try to account for patterns of weather distributed in geological space and time, we become aware of the climate as a hyperobject. We are part of that hyperobject and it is real; yet we can neither fully know nor control it (Morton, 2017). I argue, this emergence of the Anthropocene is a process of attunement to the fact that what we labeled nature was instead our enmeshment with other objects. Some of these objects are so massive that is

paradoxically in the rational pursuit to know them that we become aware of their existence as well as our inability to fully know them.

To put if differently, the emergence of the Anthropocene can be seen to highlight to us that we have not been sufficiently immature in our engagement with other objects. Our educative and enlightening efforts to achieve maturity and a distance to the world can be seen to have created something like a reality distortion field, a field that has had real and devastating effects on other beings and the biosphere. We can be seen to have engaged in a dream the maturing self of the Enlightenment, where that dream has real effects, which we are now becoming aware of in the terms of global warming. This explication of the Anthropocene is to illuminate two aspects of what OOO means for childhoodnature relations.

First, it highlights that nothing exists all by itself, and so nothing is fully "itself" (Morton, 2010a, p. 15). Hence, it undermines the "/" in childhood/nature relations, where there can be seen as something as a co-contamination of objects. The learner in this sense becomes *distributed*. The learning self is, according to this ecological thought, both myself (a distinct object) and not myself (other objects) at the same time. Second, this relates to possibility of change that the Anthropocene as an event can be seen to signal, as I am both myself and not myself, that what I am is *open*. What this means is, what I am is not fully present to me, and given this presence of an absent self, change can happen. It is only due to that I am co-defined by other objects and not fully present to myself that things in general can happen. Consequently, there is no determined pathway from immaturity to maturity, from childhood to adulthood, or from proto-me to a me that is more real or that was already given in advance, as such a notion of learning subject can be seen to figure in appeals to talent or natural ability. The learner is no longer approaching freedom or emancipation but rather open.

So what does OOO offer for education? I argue the here outlined thought of education without nature leaves behind the assumption that learning is *naturally* confined to humans. What is fundamental to OOO is the assumption that humans do not hold a special place or position, either having or are being withhold access, to nonhuman objects. What this means for education and childhoodnature relations is that there is no hard separation or transcendental limit that human learners or children either can transgress or to which they are confined. To recall, I stated, drawing on Morton, that nothing exists by itself. This means that there is a self, yet this self is interconnected with other objects. For education this means that this also applies to nonhuman objects. The interconnection is an ontological feature, yet other objects might apprehend that connection differently.

What the mesh can be seen to highlight is that learning is always relative to an asymmetric relation between objects, that is, an object sensing another object. How one child might sense another object might be different from another child but also to another object. For childhoodnature relations in an educational context, this means that childhood becomes *subscended* by, for example, individual learners (Morton, 2017). Subscendence refers to how wholes are less or subscended by their parts; thus objects as wholes render them partial and implosive in a sense that they are subscended in turn by other objects (Morton, 2017, p. 104). While I might speak

of species, humans, which are made up what I might call children and adults, these hyperobjects are subscended by individuals. I might be human and I might be a child, but I am at a same time myself, different from other selves and not reducible to humankind or childhood.

For apprehension in learning, this means that there is a form of intimacy that works in all directions, upward, downward, and sideways. I might feel a form of intimacy with or allure radiating from all three objects: humankind (upward), my hand (downward), but also a squirrel sitting outside my window (sideways). What this remark on the directionality of intimacy and allure is highlight in an educational context is that we cannot draw boundaries around what category of object to feel intimacy for or what allure might have educative value for learning. To feel intimacy or attraction for society, my wife or the sprinkler in the garden is equally valid from this perspective. These objects have significance for me in their own right and without differences in degree. Thus there is nothing "natural" about certain objects that might give them more or significant educational value, as the notion of educational substance or *Bildungsgehalt* (Klafki, 1995) might be seen to argue for. The educative essence seems to be strangely open, as nothing is fully itself. I argue, with Morton (2017), the educative essence is subscended in a form of holism, where the whole is less than its parts.

In this lesser form of holism, that can be seen to inform my education without nature, learning is focused on the aesthetics of subscendence. What this means is that the learner is caught up in the allure of the seemingly infinite excess of an object of consideration. For example, I might be fascinated by how global warming seems to expressed in a myriad of different forms of weather as well as floodings, power cuts, etc. I am caught up in this subscendence of climate change, too close to extract myself emotionally and intellectually.

In this lesser holistic outlook on education, learning is taking place in the aesthetic realm, as it is the aesthetics of the objects encountered that I feel myself caught up in; they are doing something to me, or they are able to influence me over spatial distance. This influence is not a misguided position that is too close to nature and that I have to overcome by extracting or distancing myself as part of a process of maturing. Rather, it is in the aesthetics of learning that we should move closer toward the objects, acknowledging that we cannot fully know them but that we are still fascinated by them. Moving closer is in this sense rather emotional than spatial, to *feel* closeness. To remain "childishly" fascinated allows us to be surprised. This in turn allows for a breaking down of the projected image of the object to be deliberately reconstituted as part of staged educative encounters, where the teacher is to create an environment in which particular learning situations become possible (Szkudlarek, 2016).

Thus, an ecological learning can be seen as involving a twofold *infinite* recursive response pattern. It involves a movement back and forth between an arbitrary delineation of appearances of a content and acknowledgment of that these appearances are disturbed or subvert by subscendence of the content initially focused upon. This means for education without nature that the educative potential of a content cannot be judged in relation to a present. An education without nature, or

ecorhapsody as learning, does therefore not only concern that what is sensible or present to the learner but also involves thinking and reflection about potential objects and qualities of objects that might not yet be present to our senses. It remains committed to the allure of objects not present yet to us but the shadowy appearance of which we are becoming aware of when we engage with the subscendence of objects by other objects. Hence, I argue an education without nature entails a "childish" or "naive" engagement with things that are not fully present, yet exert a force of attraction upon us. To be naive is to be emotionally close, to not let reason distance you or extract yourself entirely.

Thus, education without nature is engaging in the process of opening up the learning "self" toward a nearness of objects, one in which we have to learn to lose ourselves where learning entails a form of getting lost. I argue that "childish" proximity and a lack of perspective are exactly the right educative responses to the Anthropocene, responses that requires us to loosen up our distanced positions and gaze upon the world and to move closer. This stance allows us to be touched again by objects too near to attain emotional and cognitive distance from.

Object-Oriented Learning in a Nutshell

This section is going to explore further what a philosophy of education without nature will imply for learning. It needs to be pointed out that the ambition is to provide a notion of learning that is conceptually different to the contemporary focus on learning as contrasted by an earlier focus on teaching and schooling. As I will argue, such a contemporary focus on learning seeks to abandon underlying notions of appropriation and the entailing notion of progression as a form of increasing maturity.

This shift toward a focus on learning is conceived to be connected to the emergence of new public management in the education sector. As Simons and Masschelein (2008, p. 699) highlight, this focus on learning is connected to a notion of environment, that is "to experience oneself as being part of an environment implies that the appropriation of one's finitude (through learning) [. . .]." Learning is in this common understanding an appropriation of environment, where in that appropriation, an innovative or productive reconfiguration of the environment takes place (cf. Simons & Masschelein, 2008, p. 698). Object-oriented learning is an inversion of this notion of learning. To put it differently, the experience of being in the presence of an ecology of objects implies the appropriation of one's *infinitude* (through learning). What object-oriented learning dissolves is a sense of growth, progression, or expansion of self through learning in environment, that is, to say, learning as the capacity of appropriation of something by a subject in order to reproduce itself and to gain greater maturity.

As already highlighted, this conception of appropriation is still very much inspired by a sense of maturity, where the productivity or innovativeness of learning is to be judged in relation to a human escape from nature. What I am breaking with is the earlier discussed notion of learner of the Enlightenment who "[. . .] wants both

to learn and to legislate for all time, to open up itself to the other and to consolidate itself from within, to expand indefinitely whilst reproducing itself as the same. Its ultimate dream is to grow whilst remaining identical to what it was, to touch the other without vulnerability" (Land, 2011, p. 64). I argue here that this notion of learning is directly feeding issues leading to the emergence of the Anthropocene. The Enlightenment educator's fantasy imagines human learning to allow for a control based on the capacity to reason. In the Anthropocene, we are becoming aware that this fantasy of the Enlightenment intertwines with the fantasies of other entities, for example, that of the biosphere. The fantasy or dream of progression turns out to be someone else's nightmare, which in its shivers starts to render that human dream of invulnerability into the uncanny insight of feeding through engaging with that fantasy humanity's own annihilation.

In contrast to this outlook of the Enlightenment, in thinking the ecological mesh, the act of appropriation becomes de-centered or reflected by the mesh, as we are no longer are able to separate that which appropriates and that which is appropriated. Thus, object-oriented learning undermines the traditional notion of agency in learning, as learning is aesthetic and related to a between objects. The sensible object is here influencing (causality) the learning of the object apprehending. The apprehending object is caught up in the aesthetics of objects, even those not yet apprehended. These objects arrest us in their zone of influence and disturb our sense of apprehension and ultimately sense of ourselves. An example of such an object that is holding us in its gaze is the climate. If we are to engage in object-oriented learning in the context of the Anthropocene, we increasingly find us caught up in the aesthetic sphere of influence of the hyperobject of the climate and will have to actively work with the apprehension of the climate. We have to acknowledge that we never "see" it as a whole, using either our own eyes or technological prosthesis; instead, we encounter a sheer infinity of qualities of climate as expressed in, for example, weird instances of weather that are measured or sensed. Object-oriented learning acknowledges on the one hand that climate is not knowable yet engages in how the climate can be seen to influence our understanding of ourselves as humans. We are starting to learn that what we thought we had learned to control and to appropriate was never controlled or appropriated and seemingly had a life of its own. The turning of a key did never only start the engine of the car, allowing us to move around in a more unrestricted manner, it turns out we created at the same time and as individuals acting as "species" another hyperobject, that of global warming (cf. Morton, 2016).

Object-oriented learning aims to dismantle the defense systems build around subjectivity that the notion of learner of the Enlightenment provided and that frame our understanding of learning as a form of appropriation. The first insight and step of dismantling the notion of an autonomous learning subject that the Anthropocene challenges us with is acknowledging how learning as appropriation is not an act of making one's own, but to understand and feel how this self/own is already dependent on and connected to something else. To think and feel this mesh in learning dismantles the notion of a learning subject by undermining the autonomy and sovereignty of that learning subject. No object is an island, meaning autonomous and sovereign. According to object-oriented learning, learning and education as a

whole cannot lead to a Brexit of the learner, that is, it does not lead to or aim for freedom and emancipation but instead strives for a declaration of interdependence which calls for a sensitization of relations to the enmeshment of the learner with other objects. Learning that is to be built on this declaration of interdependence engages with instead of turning away from the emotions that might arise when we become aware that there is no nature, no homey place of dwelling that is to be protected. Object-oriented learning engages with the uncanny feeling that what I am as a learner is also distributed to other objects. It calls for a form of intimacy with other objects in learning.

This notion of learning as a self encountering its dependence and deference to something else is interpreted as compatible with Levinas' *Autrui*, as that from which I cannot distinguish myself and that is arresting and paralyzing (Hofmeyr, 2009). Learning in this sense draws on Levinas' conception of radical passivity, where learning is not the active appropriation of the other, but, instead, the learner becomes subjected to alterity, as a necessity imposed from an outside or rather other objects (Hofmeyr, 2009, p. 18). In object-oriented learning, ecodidacticism points toward an inner experience of a partial absence of self, that is to say that my self is not fully present to me. As with, for example, Hegel's distinction between nothingness and being (Hegel, 1816), that absence of a self can be seen to be crucial for understanding the limit of myself. For example, when engaging with introspection in learning, the learner might encounter this absence of self. I might become aware that what I thought I am isn't so straightforward to answer. I get a feeling that I might be wrong and that what I am is not possible to be captured in a simple yes/no dualism. In contrast to a sense of nothingness, as in there being no self at all, I might encounter instead the emptiness of myself. By emptiness, I refer to a potential infinity of qualities of myself that are not present to me, or as Nishitani (1990, p. 180) puts it, "everything is possible in a person in whom the nature of emptiness arises."

The encounter of emptiness and object-oriented learning as a consequence defies a traditional rational approach to learning, at least one that is committed to the classical laws of identity. In order to engage with that intimacy of the learner with other objects, I need to abandon the law of noncontradiction. In order to rethink learning and to move away from a notion of learning as appropriation, it is necessary to undermine the idea of an autonomous unity of the learner. This can be done by engaging with the feeling that what I am is not fully present to myself refers to an absence that I cannot define in dualist terms. This absence is due to the mesh that connects the learner to other objects, some of which might not be present to the learner. Hence, in object-oriented learning, ecorhapsody engages with this thinking and feeling of the loss of self in the arresting and paralyzing presence of other objects. What ecorhapsody envisions to accomplish is the second step of the dismantling of the autonomy of the learner as subject. What ecorhapsody aims to accomplish is to burrow the distance between subject and object. This can be done by letting go of the feeling of a self as a subject that is distanced and distinct from objects. Thus what learning is contributing to is a feeling of something else already being me, something that I cannot cut out from me and view from a distance.

Hence, ecorhapsody is aiming for dislocated passion, or to be precise a *compassion* without object, which consequently renders object-oriented learning into a process of *unappropriation*. Object-oriented learning aims to allow for a feminine dislocated passion that I contrast to masculine appropriative passion that wants to own, command, and subdue from a distance. Irigaray (1977, p. 31) allows us to conceive of this feminine passion in terms of nearness, a "[n]earness so pronounced that it makes all discrimination of identity, and thus all forms of property, impossible." Thus, object-oriented learning as unappropriation is fostering nearness, a nearness that is too close to distinguish between subject and object. It is not a nearness to something that is or will become familiar, but a nearness that is too close and hence ruining the subject. Think, for example, of Carbon-14, a radioactive isotope, whose prevalence in the atmosphere radically increased given human testing of nuclear explosive devices. It is a hyperobject that we cannot think as distinct from a learning subject, it is in us as we breathe and eat it constantly. It subscends the learning subject; it does things to it, for example, altering our DNA, and as other radionuclides, it might as a consequence of being in me produce cancer.

I argue, the reversal of ecodidacticism's pointing gesture is closely related to ecorhapsody's call for the abandonment of the principle of sufficient reason as well a break with the law of noncontradiction. To put it differently, as the self pointed toward in the ecodidactic pointing gesture is partially absent and distributed, the nearness discussed above undermines the distinction between learning subject and object to be appropriated in learning. This is not to assume that we can flip into the other perspective of nature or the right perspective that we have abandoned, as environmental education often can be seen to argue. Rather, what ecodidacticism points to and ecorhapsody aims to articulate is a sheer infinity of strange worlds that are "here." Object-oriented learning as fostering unappropriation is undermining any notion of what is natural. Nature or that what is natural has, as I earlier stated, a particular pedagogical function. Nature is to provide the authoritative horizon of staged educative encounters, where the teacher is to create an environment in which particular learning situations become possible (Szkudlarek, 2016). Nature is here closely associated with the imperative to "grow up," to abandon one's childish proximity, and to maturely appreciate the view from a distance. Nature as authoritative horizon is in this sense authoritarian in the double meaning of the word, as referring to the enforcement of obedience and showing a lack of concern for the wishes or opinions of others. Thus, the pedagogical move to erase nature is envisioned to open up learning. It is to open up learning as to "childishly" explore what learning can become possible and what situations and environments can be created in respect of others opinions and wishes.

Hence, object-oriented learning that aims to open up the unity and to undermine the autonomy of the learner in the Enlightenment prepares for the third step and final assault on the learning subject, that of moving the essence of that learner toward an open future. This third step is an attack on the teleological notion of a learning that surfaces in the ideal of maturity. For object-oriented learning, learning is not linear progression. The learner is not a proto-version of the real deal to come. Instead, what learning is producing as part of unappropriation is contingent and open. Object-

oriented learning is feeling and thinking from the future that the learner is realizing in the present. For example, once I think this thought of being myself and not being oneself, I open up my feeling to not-my feeling. Object-oriented learning operates against the defense mechanisms of the subject that might kick in again when thinking and feeling this not myself that I am. Feeling and engaging with the feeling of nearness is an opening up that cannot be fully encapsulated by thinking that is shaped by the laws of identity. For example, I might feel guilty or disgusted by what I might encounter when engaging with the self. Yet, guilt and disgust are not close enough; they can be seen hinge on a distance between what I am and that what I not am. In the case of guilt, it would be in relation to something or an object in relation to which I should feel that guilt. Yet, moving closer I cannot feel guilt for myself. Object-oriented learning questions the pedagogical potential of feelings that feed on distance, for example, how productive an engagement with guilt or shame might be as a didactical emotive tool. Once, we have moved beyond the third step of deconstructing the learner of the Enlightenment, we might arrive at a learning that is attuning to other objects. The learner has lost a sense of self and attunes to an emotive resonance of objects too close. The learner encounters at this point an opening in the defense system called the subjective self and at the same time opens up toward a sensitization of nearness.

The feeling of sadness and anxiety might, hence, no longer remain *my* feeling but an attunement to the vibrations of other objects; it is a feeling of being in a community of loss. Hence, a proper emotive response to the Anthropocene might be that of sadness (cf. Morton, 2016), a sadness that is not relative to an object or subject done harm or in distress but an emotive response that reverberates. Feeling this sadness or anxiety is also a precondition for the possibility to engage with it. Yet, as I have deconstructed the idea of unity or autonomy of the learning subject, there is no longer a determinate imperative for how to move on. Engaging with sadness and anxiety is open; there is no longer a nature to guide us, to dictate how things ought to be. It becomes, literally, possible for things to happen again. Object-oriented learning that is taking place when things happen is no longer appropriating; it does not want to own the excessive surplus of experiences of things happening but wants to multiply it. A proper childish response would be to repeat and to share the enjoyment of repetition of that exciting thing happening with others. Hence, object-oriented learning sees itself as to contribute to a political project that aims to alter the economics of enjoyment (cf. Morton, 2017). This alternate economy of enjoyment is no longer based on the principle of a unified and autonomous subject appropriating that enjoyment but a learning that is com-passionate. It is fostering an economy that multiplies enjoyment without a loss.

Conclusion

In this chapter, I aimed to outline education without nature and object-oriented learning. I need here to acknowledge that the thoughts presented are a philosophy of education in the making, and hence I do emit certain answers and extensive

elaboration of consequences of certain presumptions. What I hope to have accomplished was to outline what an ecologically oriented educative perspective without an appeal to nature could look like. As I argue, the concept of nature in its variety of connotations and disguises might impede efforts to address ecological issues such as pollution or global warming in education. In particular, I wanted to show how the notion of nature as it emerges in the thought of the Enlightenment has framed and constricted educational thinking about the child as learner. Playing immaturity against maturity, education came to foster generations of learners encouraging to distance themselves from other objects and other peoples. The vision of education as a means for emancipation and freedom is rearticulated in diverse forms, even critical education. In contrast, my effort to contribute to this handbook aimed to explore how the childhoodnature relation could be reapproached by breaking with central tenets of educational thought with its traces in the Enlightenment.

In particular, I wanted to highlight what political educational outlook might become possible once we put some of these tenets on their head, embracing childish naiveté, female nearness, and compassion. OOO played a significant source of inspiration, and as I mentioned earlier, it is a source that is only in its early stages of influencing educational thought. I see OOO here to offer childhoodnature research alternative ontological perspectives, which as I tried to show might open up alternative vistas than, for example, Deleuzian-inspired assemblage theory or post-humanist theory. While these ontological positions can be seen to share a number of congruencies, I see them to also share a number of differences. I did actively not engage in criticizing or positioning a conception of education without nature or object-oriented learning against positions arguing for assemblage theoretical entrance points or post-humanist feminist thinking, rather I aimed to position this chapter against broader mainstream thinking. I acknowledge fully the viability of these alternate positions; yet, some theoretical as well as political tensions might become aware to the reader.

Yet, I did not want to engage in a war of position in this chapter; what I hoped to accomplish instead in this chapter to outline is an alternate outlook on learning that moves beyond rationalist and correlationist accounts of education. What might learning, education, and children's engagement with object look like, once they no longer the human transcendental subject, is the center of learning. I see here OOO to allow for education and learning to become magical again, to highlight that surplus active in childish fascination with the world full of things that we openly acknowledge we do not and cannot know everything about. To put a limit back into rationalism, I think, is crucial for both rehabilitating a child perspective in contemporary political debate on how to engage with global problems as well as trying to become a humble educator and researcher. What I see as crucial for further research, mine included, is to continue an effort to lower the status of educators and research as well as to raise the status of child and object in learning and education. This chapter aimed to do so by providing a philosophy of education without nature and a theory of object-oriented learning.

Cross-References

- ▶ Re-turning Childhoodnature: A Diffractive Account of the Past Tracings of Childhoodnature as a Series of Theoretical Turns
- ▶ The Mesh of Playing, Theorizing, and Researching in the Reality of Climate Change: Creating the Co-research Playspace

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The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment

8

Sarah Little and Victoria Derr

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Abstract

Amidst a growing social movement to connect children to nature, little is understood about how children actually attach to place or the role of nature in shaping place attachments. While place attachment is an undertheorized concept, human

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attachment is well understood. In the chapter, an exploration of human attachment provides clarity of the potential outcomes of place attachment.

Both forms of attachment focus on the strength of the attachment of an individual to an external entity, a caregiver, or a place in the physical environment. The secure base function of secure human attachment mirrors the home range function of place attachment. In both concepts, children venture away from the object of attachment only to return in times of stress. Secure human attachments also foster the development of an internal working model in which a child mentally organizes behavior to solicit a desired response. The strength of the model predicts the quality of future relationships. Currently no research links the development of an internal working model to place attachment. Secure human attachments also foster resilience in that children are better able to respond to and cope with stress. Secure place attachments are linked to the presence of nature, social bonding, and emotional and cognitive processes. This is consistent with emergent resilience research with children which suggests that nature can play an important role in fostering resilience. Nature thus may be a defining feature of place attachments that help build resilience.

Keywords
Place attachment · Human attachment · Resilience · Internal working model · Secure base · Home range · Nature · Childhood

Introduction

With his writing of *The Last Child in the Woods*, Richard Louv spawned a children and nature movement that has galvanized families, practitioners, and researchers across the United States (Jordan, Charles, & Cleary, 2017; Louv, 2008). The movement capitalized on existing place-based education (Smith & Sobel, 2014), as well as research in the role of nature in health promotion (Chawla, 2014, 2015; Faber Taylor & Kuo, 2006; McCormick, 2017; Wells, 2014) and cooperative play (Chawla, Keena, Pevec, & Stanley, 2014). This collective momentum positioned nature as a central player in shaping children's environmental attitudes and behaviors (Adams & Savahl, 2017; Chawla & Derr, 2012) and thus also has increased momentum for integration of nature into schoolyards and parks and as a focus for place-based learning (Anderson, 2017; Danks, 2010).

However, the movement to connect children to nature draws very little from our understanding of how children actually attach to place or the role of nature in shaping place attachments. Place attachment in children has been defined as phenomenon where "children are attached to a place when they show happiness at being in it and regret or distress at leaving it, and when they value it not only for the satisfaction of physical needs but for its own intrinsic qualities" (Chawla, 1992, p. 64). The phenomenon has been asserted to play an important role in childhood development in fostering places for security, social affiliation, and creative expression and exploration (Chawla, 1992). Place attachment has also been associated with

connections to nature (Chawla, 2015), with pro-environmental behaviors (Benson, 2009; Kudryavtsev, Krasny, & Stedman, 2012), and with resilience to disaster and climate change (Chawla, 2014; Scannell, Cox, Fletcher, & Heykoop, 2016). Yet despite the potential importance of this concept, it remains relatively undertheorized, particularly in relation to children's relationships to the natural world.

Most research focuses on the importance of nature for health and well-being benefits. In these studies, researchers have adopted the Kaplan and Kaplan (1989) definition of nature to include any outdoor space where natural elements are present. Far less research examines how or why meaningful childhood attachments to nature and place occur. Adams, Savahl, and Casas (2016) suggested that more research is needed to understand the true effects of nature on well-being across cultural and social contexts. While some research examines children's direct relationship with nature (see reviews by Adams & Savahl, 2017; Chawla, 2015), this research typically does not draw from or contribute to our understanding of place attachments. Recent research has begun to explore place attachments and the social context directly, with one study exploring how place attachments can foster civic engagement, social connections, and trust (Stefaniak, Bilewicz, & Lewicka, 2017). While some studies exist which investigate place attachment, research has only begun to scratch the surface of understanding the concept. A greater theorizing of place attachment is needed (Hernández, Hidalgo, & Ruiz, 2014; Lewicka, 2011).

In this chapter, we draw from existing research specifically focused on childhood place attachments to develop a working model for how children and nature relate through emerging place attachments. Drawing from human attachment theory, we build a model of place attachment outcomes and explore the role of nature, culture, and social relationships in exploring existing research about how the relationship between children and nature develops. We examine the processes for attachment, for without this understanding, we lose an important dimension in understanding children's relationships with nature, as places for exploration, connection, and care for the natural world. If attachments to places matter for children's development and for the development of caring relationships with nature (Benson, 2009; Chawla & Derr, 2012), we also need a greater articulation of the contexts in which these relationships develop and occur (Adams & Savahl, 2017).

Place Attachment

Place attachment theories emerged from phenomenological scholars writing in the 1950s and 1960s (e.g., Bachelard, 1964) and were later developed by humanistic geographers and environmental design scholars (e.g., Relph, 1976; Seamon, 1982; Tuan, 1990). The seminal volume *Place Attachment*, edited by Irwin Altman and Setha M. Low (1992), brought together scholars of varied disciplines to explore and advance the theory of place attachment. Place attachment has been defined as an "integrating" and "multidimensional" concept comprised of complex individual, group, and cultural phenomena and associations in which bonding between a person and a specific, meaningful place occurs (Hernández et al., 2014; Scannell & Gifford,

2010). At the individual level, place attachment reflects personal connections to a place, including memories and a sense of self-connection to place. Individual attachments may also develop from milestones and experiences of growth (Scannell & Gifford, 2010).

The most distinct feature of place attachment is the bonding or "attachment" aspect (Low & Altman, 1992), which suggests that feelings and emotions are integral to the concept. Bonds can be expressed through specific feelings associated with a place, place preferences, feelings of security or belonging, a sense of identity, or a sense of well-being (Low & Altman, 1992). However, in addition to affective dimensions, most constructions of place attachment also include cognition – knowledge, beliefs, and behaviors. For example, place attachments can motivate action for rituals, social gatherings in public spaces, place creation or change, and place protection (Low & Altman, 1992). In his framing of place attachment, Riley (1992) identified an "affective relationship between people and place *that goes beyond* cognition, preference, or judgement" (p. 13).

Attachments to places may be experienced and understood by individuals as well as cultural or affinity groups, and these attachments also may affect social relationships. Some scholars suggest that "the social relations a place signifies may be equally or more important to the attachment process than the place qua place" (Low & Altman, 1992, p. 7). Collective place attachments may be represented and reinforced through symbolic meanings of a place, through cultural practices associated with a place and through religious practices and pilgrimage (Hay, 1998; Low, 1992). Places for attachment may be small scale and intimate, such as a child's fort or a family home, to large scale, such as a neighborhood, city, sacred site, or national park. Finally, temporal aspects of place, as shaped by past, present, and future time, influence how people think about and experience place.

This complex mixing of time and place as experienced through individual, social, and cultural realms influences not only how and to what extent place attachments form but also the role place attachments play in people's lives and actions. Low and Altman (1992) reflected that "all of this makes for a rather complex concept, perhaps so complex that place attachment may not be a single phenomenon . . . but a variety of types of place attachments that differ in their aspects, origins, and purposes" (p. 12). More recent reviews have further unpacked varying types of place attachments by social, physical, and symbolic types, yet do little to advance place attachment theory to the next stage (Hernández et al., 2014; Lewicka, 2011).

These reviews identify both a proliferation of concepts and a lack of clarity as essential problems in articulating theory and empirical research in place attachment (Hernández et al., 2014; Lewicka, 2011). For example, Hernández and colleagues (2014) reviewed research in which place attachment is a multidimensional, superordinate construct, with two, three, or five factors and as a subordinate construct with other variables such as place identity and place dependence. Raymond and colleagues (2010) described place attachment as a multidimensional concept that influences place identity, place dependence, and bonding with nature, family, and friends. As a subordinate concept, place attachment is viewed as a dimension of sense of place or of place identification (Hernández et al., 2014). Scannell and

Gifford (2010) developed a tripartite model for place attachment that integrates various definitions and frameworks. This model includes the person who is attached; the psychological processes – affect, cognition, and behaviors – through which attachment is manifest; and the place itself, the object of attachment.

Childhood Place Attachment

Childhood place attachment has emerged as a potential type of place attachment, worthy of its own distinction and framing. Childhood is a unique period of time, with distinct stages of development and subsequent place relationships. Place attachments are thought to be a product of childhood experience with particular landscapes and places (Chawla, 1992; Riley, 1992). In particular, middle childhood (ages 6–11) has been identified as an important stage of childhood bonding with place (Chawla, 1992; Derr, 2001, 2006; Hart, 1979; Moore, 1986; Sobel, 1993). It is in this period that children's range expands from the familiar home and extends outward, though the extent of this range can vary widely based on environment and perceived and real safety constraints (Derr, 2006; Hart, 1979; Moore, 1986). In his review, Morgan (2010, p. 12) characterized "children's attitude towards place" as one in which children value physical environments for what you can do in them rather than for their social meanings; however, others have emphasized the importance of social relationships in facilitating place experiences and identity formation with place (Chawla, 1992; Derr, 2001, 2006; Gauci, 2016; Little, 2016). These latter discussions of childhood place attachments suggest that the social dimension is an integral part of early place experiences and activities. In fact, Chawla (1992) questioned whether place attachments should be seen as "merely secondary effects of social attachments, or whether they have an independent existence" (p. 63). Place may be important for inward and outward experiences, as well as those that support social affiliations and the development of self-identity (Chawla, 1992). Derr (2001) suggested that "place and nature seem to be significant to children when adults play a central role in shaping or encouraging experience. When parents, uncles, cousins, and especially grandparents were involved, it was much more likely that a cultural place was passed on" (p. 222).

Adult memories of childhood places have been the primary means of understanding childhood place attachments and the role of nature in shaping these bonds (Chawla, 1992; Cooper Marcus, 1992; Morgan, 2010). Cooper Marcus (1992) suggested that:

> We hold onto childhood memories of certain places as a kind of psychic anchor, reminding us of where we came from, of what we once were, or of how the environment nurtured us when family dynamics were strained . . . It is as though childhood is a temporal extension of the self. (p. 89)

In her research with design students' "fondly remembered" childhood places, Cooper Marcus identifies childhood places as "powerful images" that adults carry forward in their memories, dreams, and creative work. Across many nationalities and socioeconomic backgrounds, the majority of fond memories were of playing outside

and creating or finding special places for hiding. Cooper Marcus (1992) asserted that these places remained significant because "they were the settings of significant emotional experiences critical to the process of growing up" associated with human development in the middle years (ages 6–11) (p. 92).

Chawla (1992) asserted the importance of adult memories of childhood places because they "attest that lasting attachments have been formed" (p. 73). Through her study of environmental autobiographies, Chawla (1986) found that loved ones and family members were the most frequent sources of attachment to a childhood home. Chawla's (1992) childhood place attachment model describes place attachments as developing in memory in adolescence, between the ages of 12 and 17 years. She referenced Kevin Lynch's work with adolescents which found that "their attachment to their community, measured through pride in identification and a desire to continue to live there after growing up," was associated with adult views of youth as important members of the community (Chawla, 1992, p. 69). Dallago and colleagues (2009) provided further support that social capital played a significant role in place attachment for youth (age 15) across 13 countries with cultural and geographic differences. Social capital provided youth with a sense of safety and cohesion among neighbors (Dallago et al., 2009). They surmised that while future research is needed, place attachment across nations and cultures appears to develop through social ties which begin in childhood and which foster a sense of safety that allow place attachments to deepen as neighbors and friends develop in relation to place.

At this writing, few studies directly examine childhood place experiences and attachments together (Benson, 2009; Derr, 2001, 2002, 2006; Gauci, 2016). Geographic studies explore place experiences during middle childhood, but have provided less direct assessment of attachment. Both environmental memory research and children's environments research identify place as an important source of inward-focused emotional regulation as well as outward-focused exploration (Lim & Barton, 2010). These inward- and outward-focused experiences have been suggested as the means by which children develop attachments to place (see Fig. 1) (Chawla, 1992; Derr, 2006).

Special places, forts, and casitas represent a hybrid of natural and built environments and are linked to the development of place attachments (e.g., Derr, 2006). Special places may be important in providing spaces for emotional regulation, privacy, self-expression (Benson, 2009; Cooper Marcus, 1992; Derr, 2006; Korpela, Ylén, Tyrväinen, & Silvennoinen, 2008; Sobel, 1993), or a "fund of calm" (Chawla, 2014, p. 112). They are active sites for place-making and construction, as places for imagination and fantasy play, and as settings for social activities with other friends (Benson, 2009; Derr, 2001, 2006; Linzmayer & Halpenny, 2014; Moore, 1986; Sobel, 1993). The social and cultural context of special places can be particularly important for some (e.g., Derr, 2002). In contrast to special places, outward exploration is frequently spontaneous in which places are sought and found, and play is often transactional with the specific elements present in a place (Derr, 2001; Hart, 1979; Min & Lee, 2006; Moore, 1986).

Taken as a whole, children's place experiences – through place-making and exploration – facilitate attachments to place via the development of social

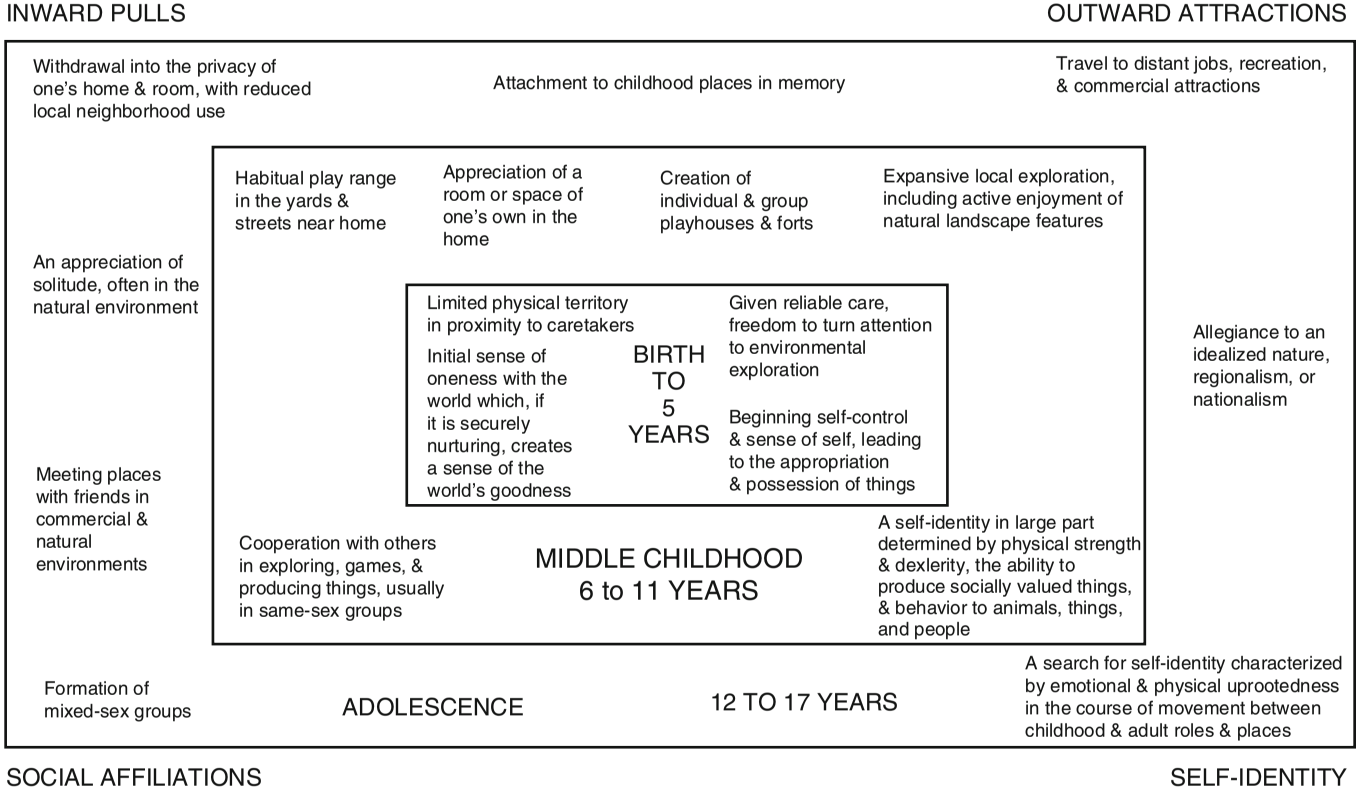

Fig. 1 "Sources of developing place attachments in early and middle childhood and adolescence" (Chawla, 1992, p. 67)

relationships, creative expression and self-identity, imagination, and the development of self-confidence through increased mastery and independence. Children seek out and potentially attach to places because of the specific qualities that a place provides (Benson, 2009; Derr, 2002, 2006; Hart, 1979; Lim & Barton, 2010; Min & Lee, 2006). Childhood place attachments may be a unique time of place bonding in that so many types of social interaction, imaginative play, emotional needs, and individual development appear to be associated with place.

The Influence of Nature on Place Attachment

Nature may be of particular importance in shaping childhood place attachments. Riley (1992) identified nature as a potentially "special" landscape type that for some, there is no substitute. Nature preferences have been documented in environmental psychology (Kaplan & Kaplan, 1989; Ulrich, 1979), and the health and social benefits of nature for children are increasingly documented (Chawla, 2014; Wells, 2014). When examining recollections of place, outdoor places "claimed attention in memory out of all proportion to the actual amount of time spent there" (Chawla, 1992, p. 76). The majority of these places were natural places or features, including fields, woods, but also city streets. These places were valued for the freedom, exploration, and physical manipulation of space they afforded. Korpela, Hartig, Kaiser, and Fuhrer (2001) interviewed university students about their favorite places in an effort to understand place attachment. Natural places represented the majority of responses for favorite places (48 responses of 101); only five responses of 98 mentioned natural places as unpleasant (Korpela et al., 2001).

Derr (2001) found that among 89 children across three communities in northern New Mexico, natural places ranked first as children's "favorite places" and "exploring places." The specific types of nature valued – a tree, a creek, or a specific mountain range – varied by gender and community, but nature was consistently favored across communities, from urban to rural.

When Sebba (1991) evaluated children's environmental preferences and adults' remembered experiences, she found that 96.5% of adults identified natural places as most important in their childhood, while 46% of children name an outdoor or natural place as most important. Derr (2001) similarly found a mix of places, both indoors and outdoors, that children identified as important for their emotional well-being and play preferences. In her research with Hawaiian preschool children, Gauci (2016) found that nature played a more significant role in children's place attachments when they experienced it often than for children who are not exposed to nature very often.

Morgan (2010) described the soothing, restorative qualities attributable to the natural environment (e.g., Kaplan & Kaplan, 1989) as analogous to the human caregiver. Evidence that nature serves this function in place attachments is given through Morgan's own research (2010, in which "Bluey was very clear that he used his time wandering the farm each weekend to recover from his negative experience of school and create a sense of calm self-belief" (p. 19).

Benson (2009) found that while special places in nature were most preferred among northern California children, they used a mix of places for emotional regulation. Children's rooms, special places, and nature each played a role in emotional regulation (Benson, 2009; Derr, 2001). Gauci (2016) found that while nature was important for some children in her research with Hawaiian preschoolers, in some contexts, children's interactions were shaped more by social interactions than by elements of nature: "family, social relations, and personal meaning are more important than physical features for children who are exposed to nature less than those who are around nature a lot" (p. 130). However, children's outdoor special places facilitated both place attachments and a sense of stewardship for nature.

It may be that place attachments become more salient in adulthood, and therefore so too does the role of nature in childhood. However, without additional research directly with children, particularly of children over time through longitudinal research, the importance of nature in place attachment could be overstated. This remains an empirical question yet to be addressed in childhood place attachment literature. This research is emerging, and Chawla (2014) provided growing evidence for the importance of nature in childhood experiences across many countries, cultures, and socioeconomic backgrounds. Research with children in a wide range of contexts similarly suggests that nature is an important quality of many place relations and the potential development of attachments (Benson, 2009; Chawla, 2014; Derr, 2001; Gauci, 2016; Hart, 1979; Hordyk, Dulude, & Shem, 2015; Sobel, 1993).

Human Attachment

One potential source of clarity in understanding the significance of place attachment in child development may come from attachment theory, referred to as human attachment in this chapter. Human attachment relationships refer to the proximity between caregiver and a child during times of stress to protect the child's welfare (Bowlby, 1982). Human attachment theory originated with John Bowlby's three seminal articles: "The Nature of the Child's Tie to His Mother" (1958), "Separation Anxiety" (1959), and "Grief and Mourning in Infancy and Early Childhood" (1960), which discussed attachment in terms of the bond between mother and child (Bretherton, 1995; Holmes, 1995). Bowlby theorized about the significant outcomes children experienced from a strong attachment to the mother: an internal working model which predicts the quality of future relationships based on that initial bond and resilience in the face of stress (Bretherton, 1995). Subsequent research expanded the scope of an attachment figure beyond the role of the mother to include caregivers, such as fathers, grandparents, and teachers (Holmes, 1995).

Strong attachment occurs when the caregiver is responsive to a child in distress in a way that the child perceives as consoling; thus, the child will seek out the caregiver during times of stress (Bowlby, 1982). Typical human attachment behaviors involve a child:

- Displaying positive behavior, e.g., vocalizing and smiling, to elicit a caregiver's attention
- Displaying negative behavior, e.g., crying, to elicit a caregiver's attention
- Actively locomoting, e.g., crawling or walking, toward the caregiver (Howe, Brandon, Hinings, & Schofield, 1999)

If the child believes that the caregiver reliably provides care and protection, then the child begins to understand their own self-worth through these interactions. The child develops an internal working model in which they model and organize these human attachment interactions in order to develop behavioral strategies for future interactions to ensure that their needs are continuing to be met (Howe et al., 1999). Through the internal working model, the quality of that initial bond predicts the quality of future relationships. Human attachment relationships also influence resilience. Children who are securely attached to a caregiver display resilience in the face of stress. The model of interpersonal relationships inherent in human attachment may provide a protective factor of resilience to stressful situations (Rutter, 1999).

Integrating Human Attachment and Place Attachment

Few works have attempted to integrate human attachment and place attachment. Chawla (2007) identified attachment figures within human attachment relationships as influencing the formation of pro-environmental behaviors in children. Zentella (2009) utilized human and place attachment models in understanding the loss of land in a Hispano community of New Mexico. Jack (2010) proposed that attachment to a special place may substitute for the lack of secure human attachment relationships in children living in foster care.

Giuliani (2003) and Morgan (2010) proposed a method to integrate human and place attachment through emotion. Giuliani (2003) identified behaviors within place attachment that mirror aspects of the affective bond of human attachment relationships. Giuliani approaches the task of integrating human and place attachment through emotion but spends little effort in examining the influence of the characteristics of the physical environment on place attachment which Morgan (2010) addresses.

Emotion is integral in human attachment in that an emotional response to the environment drives a child back to the caregiver to whom they are securely attached. "'There is no action and no thought that is not affectively motivated... Motivation underpins agency and motivation is always emotional' (Basch, 1988, pp. 68–69)" (Morgan, 2010, p. 14). Motivation may provide the link to combine human and place attachment since the place must inspire or motivate a child to venture from the caregiver. Morgan (2010) utilized Lichtenberg's theory of five motivational systems which influence human behavior and include physiological regulation, attachment/affiliation, exploratory/assertive, aversive, and sensual/sexual (Lichtenberg, Lachmann, & Fosshage, 2011). Morgan (2010) utilized the attachment/affiliation and exploration/assertion systems to link human and place

attachment. The attachment/affiliation system motivates children to seek out the attachment figure; the exploration/assertion system motivates a child to explore their surroundings which positively affects a child's sense of efficacy. However, characteristics of the place could inspire exploration/assertion. Motivation may not be internal only; external forces, such as place characteristics, may also motivate the child to explore. Morgan (2010) identified fascination, the involuntary attention paid to environments which are engaging as explained by Kaplan (1995), as an environmental quality which may motivate children to explore. A child motivated by the exploration/assertion system ventures from the attachment figure into the physical environment; the sense of efficacy motivates the child to engage with the physical environment instead of engaging only with the attachment figure (Morgan, 2010). In times of distress, the attachment/affiliation system is activated motivating the child to return to the attachment figure. In a secure attachment relationship, the attachment figure soothes the child, and the child is once again motivated by the exploration/assertion system to explore the physical environment (Morgan, 2010).

Home Range Mirrors the Secure Base

The motion that Morgan (2010) described in terms of the attachment/affiliation and exploration/assertion systems is also known as the secure base function of human attachment relationships. Caregivers to whom a child is securely attached become a secure base from which the child explores and returns to find physical and emotional support (Bowlby, 1988). The secure base function of place attachment is illuminated within the concept of home range. Home range refers to the range or distance from home in which children can travel autonomously. Home range is experienced as the secure base function of attachment relationships where parents determine boundaries of exploration which typically increase as children age. In three seminal studies of children and their environments, home range is referred to as parentally defined range (Hart, 1979), territorial range (Moore, 1986), and field of promoted action (Chawla, 2006).

Little (2016) documents the home range of a group of boys ($n = 5$; 3 children and 2 mothers) who played in a creek in Raleigh, NC, from 2002 to 2006. Most days after school, the boys played in the creek located between their elementary school and homes. With the autonomy granted and lack of extracurricular activities, the boys spent approximately 2 h every afternoon playing in the creek. Play activities included the formation of a tribal society, the creation of a currency system to barter and buy found objects collected along the creek, and the celebration of Creek Christmas where the boys dragged discarded Christmas trees from the curbs to decorate the creek (Little, 2016). As the boys aged, their home range expanded (see Fig. 2). At first, the boys' range from home was small; the initial area of their range, zone 1 on Fig. 2, included their homes, their school, and the creek. As the boys aged and were granted more autonomy, their home range expanded to a local cemetery in zone 2. Eventually, the boys roamed into zone 3 as they were lured by

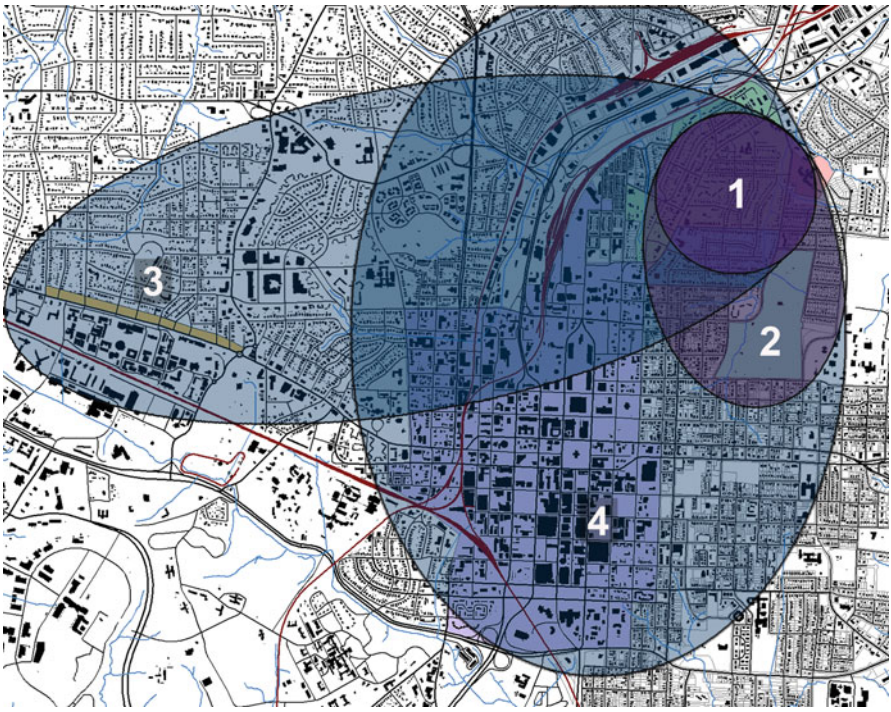

Fig. 2 Zone 1 is the initial area of the boys' home range which contains their homes, their school, and the creek. As they matured, their home range expanded. No matter how far they roamed, they returned to the creek. The orbit around the creek mirrors the secure base function of human attachment relationships where children orbit around their attachment figure (Little, 2016)

the cheap restaurants lining Hillsborough Street adjacent to the campus of North Carolina State University. As the boys became teenagers, they ventured into the bustling streets of Downtown Raleigh of zone 4. No matter how far they ventured from zone 1, the boys always returned to the creek.

Of interest to integrating human and place attachment is the boys' merging of the secure base function of human attachment with home range. First, the boys appear to be securely attached to their caregivers. From interview accounts, caregivers acted as the secure base for the boys in that caregivers were aware of the managed risks the boys encountered in nature in the urban environment which implied that the boys sought comfort from caregivers during times of stress (Little, 2016). However, the boys seemed to view the creek as a secure base as well. Mirroring the secure base function of human attachment relationships, the creek seemed to act as an attachment figure from which the boys drew comfort and returned during times of stress. Matt described the creek as, "It was just like a sanctuary we could go" (Little, 2016, p. 127). As the boys' home range expanded, the creek remained at the center of the home range. They continued to visit the creek after graduating from elementary school. No matter where their home range

expanded, they continued to visit the creek seeking comfort and remembering old times. David recalled:

> A lot of times it was kind of like trying to show [high school friends] our lifestyle to get them to understand, and it is funny bringing people to the creek and showing them around Raleigh and like 'That is what we used to do.' (Little, 2016, p. 127)

Nature may influence the extent and direction of the home range. The studies investigating home range (e.g., Chawla, 2006; Hart, 1979; Moore, 1986) acknowledge the importance of nature for children, but do not link the presence of nature to home range. However, Little (2016) documented that the progression of the boys' home range occurred along a spectrum of mostly natural places to mostly urban places. For example, the boys began their social and cooperative play at Cemetery Branch across from Conn ES. Although evidence of urban elements existed, e.g., Frank St. culvert, a sewer manhole, and homes, the creek was mostly natural. As the boys aged, home range expanded and the balance between natural and urban environments shifted. From the creek, the boys ventured to a cemetery where urban elements were more obvious with the presence of pathways and tombstones; however, the cemetery was still natural, only less than the creek. Eventually, the boys frequented Hillsborough Street. Although street trees occurred along both sides of Hillsborough Street, urban elements were starting to overpower nature. Finally, the boys discovered the joys of climbing the abandoned warehouses in Downtown Raleigh where, for the most part, nature was not present and urban elements were more dominant than nature.

While the boys moved away from nature, nature was still a very meaningful environment to them. Nature, e.g., the creek, continued to be a magnet for the boys. No matter how far their home range expanded, they always returned to nature, the creek.

The Influence of Autonomy

The influence of autonomy may provide further insight into integrating human and place attachment. In secure human attachment relationships, caregivers act as a secure base from which children venture to explore (Bowlby, 1988). Inherent in the secure base function is the provision of scaffolding opportunities which foster autonomy. For example, caregivers set a home range within which children are allowed to explore autonomously. As children age, home range increases. The scaffolding of home range distance supports greater autonomy. In secure human attachment relationships, caregivers encourage children to become more autonomous with age (Howe et al., 1999) thus leading to larger home ranges. To relate back to Morgan (2010), the distance from the caregiver created by the exploration/assertion system depends upon the level of autonomy granted.

While autonomy is encouraged in human attachment, it may be critical in the development of place attachment. The level of autonomy granted to the boys in the Little (2016) study greatly impacted their relationship to the creek. One

mother recalled, “There really wasn’t much close supervision at all, and we found that they usually did better if there wasn’t because they were much more creative” (Little, 2016, p. 82). Away from caregivers’ watchful eyes, the boys created a magical experience at the creek, a society completely separate from adults. Within “store fronts” created by tunneling into an overgrown *Elaeagnus* shrub, the boys displayed found objects that could be bartered or bought with the “creek currency” one of the boys created on his computer. After Christmas, the boys would drag discarded Christmas trees to the creek and celebrate Creek Christmas. Matt explains, “I think a lot of it was wanting to be unsupervised and have the freedom to like do whatever you want really and kind of go wild” (Little, 2016, p. 67).

Derr (2001) observed the influence of autonomy on place attachments among New Mexico children. While there was great variation in the extent of home range across communities, gender, and specific contexts of home, children with strong attachments to place generally were afforded a high degree of autonomy (Derr, 2001). As an example, two Dixon children lived just a few houses apart, and both had long, narrow properties. While both families valued a way of life tied to the land, Crystal was allowed freedom to explore and create places on her own, whereas Beverly was not allowed to leave the immediate yard outside the house without supervision. While both children participated in cultural activities associated with place, only Crystal illustrated strong place connections. These connections were created when she explored the overgrown ditch, the semi-managed orchards, and her own favorite willow tree. It was these places, which Crystal independently created on her own or with a cousin that repeatedly brought her out onto the land, where she bonded with her home. Cultural associations were important to both children, but it was the repeated and changing experiences Crystal described that came alive, and these experiences resulted from autonomous time outside.

Outcomes of Human Attachment and Connections to Place Attachment

Outcomes of human attachment can possibly lend clarity to potential outcomes of place attachment. Significant outcomes children experience from a secure attachment relationship to a caregiver are an internal working model that predicts the quality of future relationships based on that initial bond and resilience in the face of stress (Bretherton, 1995). These outcomes influence adult life as well. If human attachment and place attachment are related concepts, then an internal working model and resilience to stress may also be outcomes of place attachment.

Internal Working Model

In secure human attachment relationships, children develop an internal working model or mental representation of themselves, other people within their social

environment, and the relationship between themselves and others (Howe et al., 1999). The internal working model is based on the initial bond with the attachment figure and their ability to meet the child's needs and provide comfort and security (Siegler, DeLoache, & Eisenberg, 2011). The function of the internal working model is to mentally model different behavioral scenarios with the desired goal of having their needs satisfied (Howe et al., 1999). Eventually, these models facilitate the organization of behaviors and predict the quality of future relationships beyond the attachment figure.

Place attachment literature does not mention an internal working model as an outcome. Place may function in a similar capacity as the attachment figure in the development of an internal working model; however, the ultimate target of the model is unclear. In other words, does an internal working model from place attachment predict future relationships to other people or to other places? Studies of adults reflecting on their childhoods suggest that it may be both (Chawla, 1992; Cooper Marcus, 1992). Over many years of study with landscape architecture students, childhood special places played an important role in the types of places design students created (Cooper Marcus, 1992). Autobiographies similarly suggest that place plays a role in predicting future relationships, to other places and people (Chawla, 1992). Human geographers have long documented the ways immigrants migrate to new places that reflect some aspect of their previous homes. Derr's (2001) intergenerational research in New Mexico suggests that an internal working model influences both relationships to place as well as to people.

Place Attachment and Future Relationships with Other People

The internal working model within human attachment helps the child develop and organize interactions within human attachment in order to develop behavioral strategies for future interactions to ensure that their needs are continuing to be met (Howe et al., 1999). Through these initial interactions with the attachment figure, a child gains an understanding of their own self-worth (Howe et al., 1999). The belief of one's worth and the expectation of positive future interactions are key concepts of the internal working model's ability to model future relationships. Much like with human attachment, children gain a sense of their self-worth and self-identity from attachment to place (Proshansky & Fabian, 1987; Wilson, 1997). Does it follow that the feelings of self-worth from secure place attachment could indicate an internal working model which would predict the quality of future relationships with others?

Little (2016) found that secure place attachment resulted in the longevity of friendships in the study of the boys who played in the creek. Initially, the creek play was very physical, e.g., running around and climbing trees. Eventually, as the boys became more familiar with each other, the play became more imaginative. Playing with a consistent group of friends changed the nature of the creek play; the play evolved from physical to imaginative. The boys maintained their friendship while attending different middle and high schools and universities. While the "future relationships" in the Little (2016) study were the future iterations of relationships created at an early age, the place attachment of the boys to the creek cemented the continuation of these friendships.

Place Attachment and Future Relationships with Place

The internal working model within human attachment predicts future relationships with others; perhaps the internal working model within place attachment predicts future relationships with place. Little (2016) concluded that a possible outcome of the boys who autonomously explored a creek in Raleigh, NC was self-efficacy in judgment and decision-making. From the risks they managed autonomously as children exploring the creek, the boys began to develop confidence in their ability to judge a situation and decide upon the best course. David recalled an encounter with a rabid raccoon while walking along the creek:

> Like one time, a raccoon that obviously had rabies was like, you know trying to get us, kind of. I always remember, running just so far away, but like yeah I mean, that sort of thing, I guess makes your courage go up. (Little, 2016, p. 86)

Encountering the rabid raccoon presented the boy with an opportunity to judge the situation and decide how to proceed. The courage he mentioned in the quote represents the attainment of self-efficacy in judgment and decision-making.

The boys' potential internal working model of themselves within the creek environment predicted their future relationships with other places in emerging adulthood. During the summer of the interviews, the boys while on summer break from college had just returned from Peru. They traveled without the safety of a tour group unlike their college peers. David explained:

> I think that not that many people do that. Where they go with a group of their friends just to like explore. A lot of my friends are like peers at [college] for instance are going out of country but everyone that was going out of country was going through like a program or something. (Little, 2016, p. 143)

The safety of a tour group was not required because the boys had explored autonomously as children and knew that they could manage risks. While in Peru, the boys experienced difficult situations; however, their self-efficacy in judgment and decision-making facilitated successful navigation of these situations. David elaborated:

> We get in funny situations maybe but like we were always able just to like 'Haha, we'll get through it' and so, and I mean we always did too. But I feel like that upbringing made us more comfortable in that situation. (Little, 2016, p. 144)

Based on the strength of their initial relationship with the creek environment and their resulting self-efficacy, they knew that they could navigate successfully through unknown situations in other places.

In addition to other places, the internal working model may predict continued interactions with place over generations. Belief of one's worth was a central factor *as tied to land and community* expressed by many parents and grandparents in Derr's (2001) intergenerational research in New Mexico. In other words, their ownership of land and connectedness within a community potentially supported the development of an internal working model in which they derived a sense of self-worth. Tommy's

parents and grandparents developed an internal working model through their social and cultural engagement with place. Tommy's grandmother, Lupe, reflected on the tradition of community events that afforded the continuation of her attachment to place. Lupe spoke about the annual fiesta, where they visited a mountain cabin, built fires, and sang songs, and of more frequent barbeques under the trees beside their pasture.

While the community began to change, the internal working model predicted how Tommy's family continued to interact with place. Tommy's parents in the rural community of Mora reflected upon changes in their community, how new people were coming in, "and the old people are dying off." Tommy's mother reflected, "but I still hear the birds the way I remember when I was growing up" and Tommy's father added that they are still teaching "the 'old ways' of self-sufficiency":

> I take Tommy to go for wood because I want him to learn things. So he can feel the difference of heat [from wood], the peacefulness of a crackling fire. It's a heat that relaxes instead of making you tired. I do gardening with them so that they'll learn. I don't want him to be a bum. I want them to learn for themselves, to do things for themselves. I want them to know how to change the carburetor – that you don't have to depend on anyone for anything. (Derr, 2001, p. 91)

Lupe explained that they gave Tommy's parents a piece of their own property saying, "If we give you this property, will you stay?" (Derr, 2001, p. 92). Parents and grandparents with strong place attachments maintained these attachments through their ongoing relationships with place, community, and ritual and through the ways that they raised their children and passed on place-based values. The internal working model in these cases resulted in ongoing place relations passed on through generations.

Resilience to Stress

No other relationship is more significant than attachment relationships in regard to coping with stress (Grusec & Davidov, 2010; Mikulincer & Florian, 1998; Repetti, Taylor, & Seeman, 2002). "For the infant and young child, attachment relationships are the major environmental factors that shape brain development during its period of maximal growth" (Siegel, 2012, p. 113). Strong attachment in childhood creates an "inner resource" which is utilized by adults to cope with stress (Mikulincer & Florian, 1998, p. 144).

Masten (2001) described resilience processes as "ordinary magic" that is a common result of basic human adaptation: "If those systems are protected and in good working order, development is robust even in the face of severe adversity" (p. 227); however, if these systems are impaired and experience prolonged "environmental hazards," then the risk for developmental problems is much greater. Development psychologists define resilience as "good outcomes in spite of serious threats to adaptation or development" (Masten, 2001, p. 228). Fifty years of resilience research has found that protective factors are relatively consistent across populations and include a variety of individual traits, such as problem-solving skills,

self-control, and motivation to success, influences of family, and influences of the broader social environment (Masten, 2014; Wells, 2014). Most of these traits develop as an outcome of human attachments, including effective caregiving and supportive relationships with adults and effective schools and neighborhoods (Masten, 2014). Derr, Chawla, and Van Vliet (2017, p. 25) suggested that "resilience reflects an interactive process that occurs when children exhibit personal strengths by reaching out to find care and support, and people and places around them provide the resources that they need."

With a changing climate and increased natural disasters, urban planning and policy literatures have also explored resilience among communities. In this realm, resilience is facilitated by community agency and capacity, opportunities for self-organization, diverse forms of knowledge, and opportunities to learn about and steward natural systems (Derr et al., 2017; Magis, 2010). These frameworks recognize human agency as central to resilience: resilient cities are places where "everyone has a role, an idea, an insight and the ability to participate" (Pearson & Pearson, 2014, p. 247). Evidence also suggests that active stewardship and community gardening activities may also foster resilience (Chawla, 2014; Derr et al., 2017; Derr, Corona, & Gülgönen, 2017; Wells, 2014).

Resilience has been framed in many cities as an ability to withstand both acute shocks, such as natural disasters, and chronic stressors, such as poverty (Derr et al., 2017). In the context of chronic stressors, nature and social supports emerge as two consistent factors across cultures and environmental contexts (Chawla, 2014; Derr et al., 2017; Derr et al., 2017; Wells, 2014). In Derr's (2002) research with children in New Mexico, nature, cultural place, and strong social supports were all factors in coping with hardship. As Low (1992) suggested, these place attachments were strongly expressed when places were threatened in some way. Threats could come from a fear of losing a place, by growing up and moving away (Derr, 2002). However, threats could also come from the effects of poverty and adversity, where social relations break apart or family ties are strained, as in the cases of Marcos and Terésa (Derr, 2002), or for a child in northern California, from expansion of logging trails (Benson, 2009). These relationships raise the question as to whether strong place attachments foster resilience or if children turn to places for resilience when experiences chronic or acute stressors.

Billig, Kreitler, Zadernovsky, and Alkalay (2016) provided some insight into these questions through their examination of the relationship between place attachment, coping, and quality of life among 5392 Israeli children across 2 ethnicities, gender, and age (from elementary through secondary school). Place attachment and coping were each independently associated with quality of life. Coping mechanisms, such as specific activities and optimism, had a greater impact on quality of life than place attachments. However, their structural model also shows that "though place attachment and coping affect quality of life directly and independently, they are interrelated, which indicates that they may interact with and affect the other" (p. 27). In their research, girls were significantly different from boys in the association between coping and quality of life and in the behavioral and cognitive factors associated with place attachments. Boys scored higher than girls in quality of life

overall, but lower than girls in place attachment and coping factors. The relationship between place attachment and coping appeared to be highest among elementary school children.

Scannell and colleagues (2016) reviewed existing literature and theories to suggest that place attachment may play an important role in children and youth's response to disaster. Children and youth who have strong place attachments are better "prepared" for disasters because the place bonds provide a form of resilience. However, they assert that during a disaster and any resulting displacement, these same children and youth experience heightened emotional distress, at the loss or damage to places of attachment. Over time, these same young people are able to draw on their pre-existing and new place attachments in order to increase their recovery.

Nature and Its Relationship to Resilience

The natural quality of the "place" in place attachment may influence resilience. Chawla (2014) and Wells (2014) reviewed a range of literatures that suggest that natural environments, in particular, provide protective factors for strength and resilience in the face of extreme poverty, war, and natural disasters. Across these studies, "evidence indicates that nature can be a vital protective factor in children's lives, and a feasible dimension of programs for reconstruction and risk reduction" (Chawla, 2014, p. 121). The association between nature and resilience may be found in recent research that identifies nature as a significant source of mental and physical health (Chawla, 2015). Informal play in nature contributes to mental restoration (Wells, 2014), positive and creative social play (Chawla et al., 2014), satisfaction of intellectual curiosities, and development of individual capabilities (Chawla, 2014). Wells (2014) identified two prominent features in the children's psychological resilience literature that are particularly present in nature: experiences that foster positive social relationships and those that facilitate optimal intellectual function. In her review, Wells (2014) suggested that green spaces serve to facilitate increased positive social relationships, both between children and across generations:

> Green settings serve as a social magnet, drawing people together and fostering social interaction, the development of friendships, and the formation of neighborhood social ties. This literature provides a clearer understanding of one plausible mechanism that might link nature access to childhood resilience. (p. 101)

Exposure to nature may enhance executive functioning in the brain, including greater concentration and ability to withstand delayed gratification. Nature exposure has also led to improved cognitive functioning among children with attention-deficit hyperactivity disorder (Wells, 2014). Wells (2014) suggested that the growing body of evidence that nature supports cognitive functions in children may also provide support that natural environments contribute to children's resilience. As additional support, Chawla and colleagues (2014) found that nature was a source of restoration, a source of motivation and focused learning, and a place for positive social relationships across ages and types of experiences in green school grounds. They describe

children's experiences with nature as "deep engagement" in both the types of action facilitated and cooperative relationships formed. Environmental features that foster resilience may vary, but include special places in nature, natural surroundings, nature play, care for animals, and involvement in gardening (Benson, 2009; Chawla, 2014; Chawla et al., 2014; Derr et al., 2017).

Research with immigrant children links nature back to attachment theory by suggesting that nature served as a "holding" space in children's transition to a new city and nation (Hordyk et al., 2015). In this context, "holding" describes the role of a primary caregiver in holding an infant for an extended period of time. This holding promotes growth and fosters attachment. Hordyk and colleagues (2015) described the "sensory-embodied" experiences of children as a way of understanding their place meanings: "children appeared to relax emotionally and physically in both social and solitary activities in nature with nature appearing to serve as a buffer" (p. 577). They described children's relaxation in nature in which:

> Children sprawled themselves on the ground spending lengthy periods of time observing minute insects. They quieted themselves in response to slight movements in the weeds or branches. They took time planting their gardens, enjoying the sensation of soft, moist dirt. (p. 578)

In this context, Hordyk and colleagues observed relaxation among the children, with movements and muscles stilled. They also described nature as a "transitional object" (per Winnicott, 1953) in which children used nature to maintain caregiver attachments even when the caregiver was not present: "aspects of the natural environment appeared to function as transitional objects that maintained connectedness between children and the absent caregiver or country of origin, linking participants to places and people they hoped or expected to see again" (Hordyk et al., 2015, p. 580).

In resilience research among Bedouin children growing up in illegal villages of Israel, children drew elements of nature, especially flowers, sheep, and camels as supportive, along with social supports. The flowers were not present in the village, but were still "profusely drawn" by children as they described their villages (Huss & Alhaiga-Taz, 2013). Similarly, children in Mexico City, Mexico drew and described a vision of their "ideal city" as profusely natural. In contrast to the street, which children viewed as a hostile and dangerous place, Mexico City children's ideal place was consistently natural, with children composing a model city made of trees, grass, animals, flowers, shrubs, and many water features (Gülgönen & Corona, 2015). Such research suggests that children in challenging environments view nature as restorative, whether or not it is present in their physical surroundings. Chawla (2014) similarly describes children's desires for nature – trees for shade, food for gardens, and green refuges – to be woven into new places during participatory projects with children in forced resettlements in Johannesburg, South Africa, and Delhi, India.

While nature may be important in facilitating resilience among all children (Chawla, 2014; Wells, 2014), it appears to be particularly significant for children living in temporary or long-term hardship, such as those who experience chronic poverty, war, disaster, or resettlement (Chawla, 2014). In these contexts, positive

place relations associated with nature may facilitate attachments, especially when other attachment objects are disrupted (Hordyk et al., 2015).

A Working Model

This chapter proposes a model which links human attachment processes and outcomes with place attachment (see Fig. 3). This model is nascent. From current research, the secure base and home range suggest a connection between human attachment and place attachment. In human attachment, the attachment figure acts as a secure base from which the child ventures and returns for comfort (Bowlby, 1988). Within secure attachment relationships, the attachment figure encourages children to become more autonomous with age (Howe et al., 1999) which reinforces the attachment figure as the secure base. Morgan (2010) recognized the influence of nature in the form of fascination on the secure base function; in other words, an environment must inspire a child to leave the secure base. Morgan (2010) suggested that fascination, involuntary attention typically solicited by natural environments (Kaplan, 1995), could motivate the child. In place attachment, the secure base becomes a significant place from which

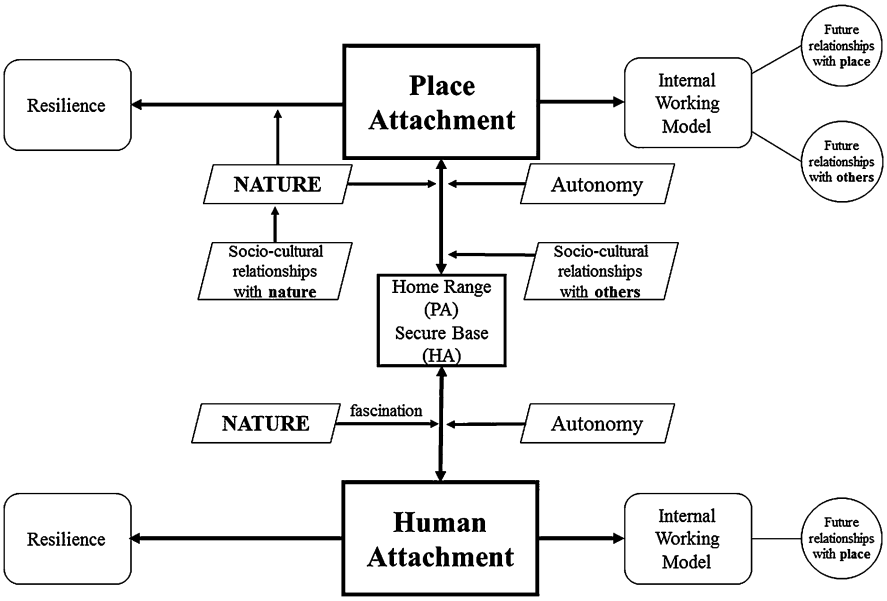

Fig. 3 A working model linking outcomes from human attachment and place attachment with similar outcomes of resilience and an internal working model. The secure base function of human attachment and the home range within place attachment are mirroring concepts. Nature motivates the child to venture from the attachment figure, and nature seems key in the formation of place attachment. The ways nature is understood and experienced is influenced by sociocultural relationships

the child ventures but returns: the home range. Like human attachment, the level of autonomy granted to children and the presence of nature influences home range and the formation of place attachment. Sociocultural relationships influence not only how individuals experience and interact with place but also the ways nature is understood and experienced (Linzmayer & Halpenny, 2014).

If human attachment and place attachment are related concepts, then outcomes of human attachment may be experienced through place attachment. In human attachment, children who are securely attached to a caregiver are resilient to stress and develop an effective internal working model which predicts the nature of future relationships. In place attachment, existing literature identifies resilience as a possible outcome of place attachment which is influenced by nature. Emerging research in resilience provides some suggestions that nature as a component of place, and social relationships within and with a place, may be significant factors in place attachments and resilience. If this is the case, then place attachments are potentially significant not only as an empirical realm of study but for influencing well-being of children into adulthood.

Currently, no research has explored the internal working model in regard to place attachment. If secure place attachment creates the potential of the development of an internal working model, then whether the prediction relates to future relationships to people, to place, or to both is unknown.

Discussion

While there are compelling linkages between human and place attachment, many questions remain: Is place attachment a separate construct or a part of human attachment? What factors cause children to attach to places? Which of these factors provide lasting effects? Are these effects in the form of an internal working model and resilience?

Morgan (2010), like Chawla (1992), suggested that place attachment, unlike human attachment, may not be a universal construct. In human attachment, the bonding figure is often consistent. In place attachment, the bonding figure may be place itself, which geographers have consistently described as a complex mixing of social, cultural, and physical attributes. Thus, exactly *what* children attach to can vary significantly: "the sophisticated intersubjective attunement underpinning human attachment has no obvious parallel in place attachment" (Morgan 2010, p. 11). Research with children suggests that place does play a significant role in shaping place relations and potential attachments, through the formation of a secure base/home range and through the development of an internal working model (Little, 2016). More research directly with children, over time, and different life stages would help to better understand these relations in place attachment. Similarly, more research with adults reflecting back on their childhood places, also with an eye toward understanding secure base and internal working models, would serve to further develop this model.

The relationship between place attachment and resilience in children is emerging. Empirical research found that place attachment may play a role in quality of life and be associated with coping (Billig et al., 2016). Reviews of place attachment literature suggest that place attachment may contribute to resilience in times of displacement and natural disaster (Chawla, 2014; Scannell et al., 2016). Resilience research with children has found nature and social supports as central factors to resilience (Derr et al., 2017; Derr et al., 2017). Positive place relations associated with nature may facilitate attachments, especially when other attachment objects are disrupted (Hordyk et al., 2015). Billig and colleagues' (2016) finding that place attachment varies by age and gender may also suggest potential variations in the role of place in fostering resilience. Further research to examine these factors and their association with place attachments would help us understand resilience as a potential outcome from place attachments.

This analysis, however, is not fully able to explain the social and cultural realms of place in shaping place attachments. If resilience is an outcome of place attachments, then research with children suggests that physical, social, and cultural aspects of place experience serve to develop these outcomes. More place attachment studies with children in a variety of social, cultural, and physical environments will develop a greater understanding of these relationships.

Conclusion

We began this chapter by identifying the importance of childhoodnature connections in a variety of domains, from those associated with health to those associated with the fostering of pro-environmental behaviors (e.g., Chawla 2014, 2015; Faber Taylor & Kuo, 2006; McCormick, 2017; Wells, 2014). We also identify that despite the abundance of place-based education, there still exists a relatively small body of research that directly seeks to understand childhood place attachments in relation to nature. To develop the theoretical underpinnings of this relationship further, we explored the idea that human attachment may provide some clarity to place attachment theory, particularly as it relates to the outcomes of place attachment and children's relationships with nature. In human attachments, the quality of the initial bond with a caregiver predicts the quality of future relationships, and children with secure attachments are more resilient in the face of stress. In childhood place attachments, bonds between children and place may form as a result of one or more of the following: the unique qualities of a place, the transactional relations with that place, and the social or cultural associations with a place (Derr, 2001; Hart, 1979; Min & Lee, 2006; Moore, 1986). Childhood place attachments may be a unique form of place bonding that includes social interaction, imaginative play, and attainment of emotional and developmental needs (Benson, 2009; Derr, 2001, 2006; Linzmayer & Halpenny, 2014; Moore, 1986; Sobel, 1993). Both human attachment and place attachment theory describe a process of moving outward from a secure base, and in so doing, gaining confidence and a sense of self. Nature appears to be an important attractor in that the qualities of a natural environment draw children

outward for exploration (Lim & Barton, 2010). At times, nature is also a place for comfort, security, and emotional regulation and thus may function as a secure base and provide support for resilience (e.g., Derr, 2002; Little, 2016). While our review identifies many questions for future research, the human attachment model provides a point of entry to deepen our understanding of the role of place attachments in psychological well-being and the role of nature in bringing about and supporting these attachments.

Cross-References

- ▶ Ara Mai He Tetekura: Māori Knowledge Systems That Enable Ecological and Sociolinguistic Survival in Aotearoa
- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Childhoodnature Alternatives: Adolescents in India, Nepal, and Bangladesh Explore Their Nature Connectedness
- ▶ Children's Imaginative Play Environments and Ecological Narrative Inquiry
- ▶ Conceptualizing Parent(ing) Childhoodnature Through Significant Life Experience
- ▶ Closing the Gap Through Rewilding, Interacting, and Overcoming
- ▶ Embodied Childhoodnature Experiences Through Sensory Tours
- ▶ Everyday, Local, Nearby, Healthy Childhoodnature Settings as Sites for Promoting Children's Health and Well-Being
- ▶ Exploring the Significant Life Experiences of Childhoodnature
- ▶ Exploring Space and Politics with Children: A Geosocial Methodological Approach to Studying Experiential Worlds
- ▶ Eye-to-eye with Otherness: A Childhoodnature Figuration
- ▶ Fostering an Ecological Worldview in Children: Rethinking Children and Nature in Early Childhood Education from a Japanese Perspective
- ▶ In Place(s): Dwelling on Culture, Materiality, and Affect
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Phenomenology with Children: My Salamander Brother
- ▶ Rachel Carson's Childhood Ecological Aesthetic and the Origin of *The Sense of Wonder*
- ▶ Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective
- ▶ Significant Life Experiences That Connect Children with Nature: A Research Review and Applications to a Family Nature Club
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In Place(s): Dwelling on Culture, Materiality, and Affect

9

Sue Waite and John Quay

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Abstract

(How) do places affect us? This chapter will explore how place is experienced by children, referencing empirical studies that reflect several forms of outdoor learning, both curricular and outside the classroom. Outdoor learning is undergoing a renaissance of interest and is widely seen as an effective means of connecting children *to* the natural world (Louv. Last child in the woods. Algonquin Books of Chapel Hill, New York, 2010). This common conceptualization will be challenged by recognizing the child *within* nature. In examining the

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question of the effect of places on young people (and vice versa), the paper will employ theories of cultural density (Waite. Cam J Edu 43(4):413–433, 2013; Waite. Culture clash and concord: supporting early learning outdoors in the UK. In: Prince H, Henderson K, Humberstone B (eds) International handbook of outdoor studies. Routledge, London, 2015) and cultureplace (Quay. Stud Philos Edu 36:463–476, 2017) in relation to how culture informs place and pedagogies within them. It will argue that the more-than-human world shapes possibilities for interaction but that these are mediated by individual, structural, and cultural influences, both acknowledged and tacit, in the enactment of outdoor learning within and across countries (Malone, Waite. Student outcomes and natural schooling: pathways from evidence to impact report. Plymouth University, Plymouth, 2016).

Interweaving multidisciplinary perspectives, the chapter considers implications for practice and suggests that feelings and affect may act as intrapersonal organizers of this complex interplay of cultural and material influences. It will argue that in rejecting human dominion over nature, place as "personal" is nonetheless a key contributor to the power of outdoor learning to transform lives.

Keywords
Culture · Place · Affect · Materiality · Cultureplace · Cultural density · Outdoor learning

Introduction

We suggest that all our experiences occur *in* place as emplaced and *in* culture as enculturated. To construct this argument, we will consider the concept of place and illustrate ways in which place is experienced by children and young people using examples from empirical studies that reflect several forms of outdoor learning, both curricular and informal. Drawing upon diverse theoretical frames as well as examples of children in particular places, we will discuss whether theories of cultural density (Waite, 2013) and cultureplace (Quay, 2017) may help to improve understanding of the affect of places. In conclusion, we will suggest some ways that careful thinking about cultureplaces and cultural density might help to shape responsive and responsible pedagogies which fully embrace the fact that living and learning is always in place.

In Place: Self and Social Space

A rich seam of thinking can be found which troubles the idea of place as defined by physical boundaries; clearly this chapter cannot cover it all. Tuan's thesis of place (see e.g., Tuan, 1977, 2001) stems from an understanding of ourselves as "being-in-the-world" and includes personal and social striving toward "a good life." His relational view of geography sees humanity as inside

the world, both physically and emotionally, famously defining place as space with meaning that is both affective and moral. Thus, place is constructed. Places become known through reflection and the attention paid to the way we live our lives (Tuan, 2001).

However, some commentators have argued that place significance is increasingly attenuated by globalization and technology, obscuring geographical and material differences. For example, in response to neoliberal threats to the environment, Escobar (1998:61) suggests that:

> Unlike modern constructions, with their strict separation between biophysical, human, and supernatural worlds, local models in many non-Western contexts are often predicated on links of continuity between the three spheres and embedded in social relations that cannot be reduced to modern, capitalist terms.

The suggestion is that critical and local social movements offer opportunities to resist homogenization of "nature" and cultures. Neoliberal redefinitions of space are also the target of Lefebvre's (2003) argument that geographical space is at heart social and therefore has several potential cultural meanings: *perceived space* as unremarked everyday surroundings, *conceived space* as intended and managed by those in positions of power, and *lived space* as transformed through personal and social meaning. This third space, he suggests, allows new ways of being through imagined alternatives. In a sense, self and space become merged in place through dwelling, and this meaningful grounding of space can offer resistance to the habitual or managed.

Moving beyond social construction, Thrift (1997) highlights the intended and unintended in places and emphasizes *embodied* knowledge, where feeling, being, and doing offer insight into place significance. Critical to how action unfolds, attention to place and its affordances are deemed essential to its understanding. Thrift (2004) draws attention to "a microbiopolitics of the subliminal, much of which operates in the half-second delay between action and cognition, a microbiopolitics which understands the kind of biological-cum-cultural gymnastics that takes place in this realm" (p. 71).

This view gives place a partnership role and material importance in shaping action. Nevertheless, Lewicka's (2011) review of place attachment literature over the last 40 years concludes that, of the three elements in Scannell and Gifford's (2010) model of place attachment, "person" has attracted disproportionately more attention than "place" and "process." In a similar vein, McKenzie (2008) considers places of pedagogy in intersubjective experience but emphasizes that the source of affect can often be mistakenly attributed. She writes:

> Williams (1977) suggests that a structure of feeling is "a social experience which is still in process, often indeed not yet recognised as social but taken to be private, idiosyncratic, and even isolating" (p. 132). Symptomatic of westernised cultural norms of individualisation and isolation, this also suggests the ways in which much grappling with cultural formation is experienced and attempted at the level of the "who of the subject." (Biesta 1999)

However, if place itself was conceived as a melding of person and world, then the dominance of discourses of individual difference and anthropocentrism might be disrupted. What if place is conceived as partner and agentic? In the following vignette from case study research reported in more detail by Goodenough, Waite, and Wright (submitted), we glimpse how affect and materiality together create attachment to a specific place.

> *Amy had been visiting Fort Apache for about a year. She visited the wooded adventure playground on the site of an old municipal tip primarily to "escape from being near my sisters" who woke her up at night. Amy enjoyed being with her friends, making dens, and getting warm by the fire. She made dens, "places you won't see or think of," in locations along boundaries that are heavily walked and played in by young people. Fort Apache's long woodland edge at the top of its slopes ends abruptly against a wire fence separating it from a grassed playing field. The fence supports bramble and ivy to spill over some shrubby hawthorn, field maple, and elder, forming natural cubby holes that were frequently occupied as ready-made dens; the ground underneath worn and plant-free through constant occupation. Amy, though acknowledging that she shared such spaces with others, was clear that she used them to remove herself and "privately" experience her emotional mood.*
>
> *That tree was there and you could sit down on it. And then you sit like if you were a bit upset and you went to Fort Apache you could just go sit in there quietly.... there's like loads of little trails that go along there, along the top. . .you know where that big bush is there?... There's like this little hole in there. . .You can fit in there and if you actually get across you can see right over. . .there's a little cubby hole and you can see the tree house. . .Up there, that little bush is part of my den as well; so that I can sit in there and have more quietness and if it rains it won't get me wet that much.*
>
> (Extract from Goodenough et al., submitted)

This extract may be interpreted to illustrate how the personal meanings for Amy are stimulated *in* place, are inseparable *from* place, and are *emplaced*. She is in discourse with place such that place seems to reach out to her while being simultaneously shaped by the uses and passage of many young bodies in and through its material presence. This physicality of sensations in place incorporates affective aspects that may be understood to transcend the sociocultural, highlighting the need for further theories which can accommodate this understanding.

In Place: Place-Based Education

Place is more commonly regarded as a partner when considered in the context of play (Fjørtoft, 2001; Gandini 2012; Maxwell, Mitchell and Evans, 2008). Yet play is but one way in which we learn, albeit the predominant mode in the early years. What then is the role of place in later forms of education? There is considerable debate about the extent to which contemporary schooling offers suitable preparation for the wider world. Much current Western formal education happens within institutions between the four walls of the classroom (Malone and Waite, 2016; Quay, 2015), thereby discounting place as a significant contributor to the content of learning and presenting the classroom as the privileged physical locus for schooling. In a similar vein, there is also commentary about how much outdoor education is individualist,

universal, and generalist, in effect place-blind (Brookes, 2004). As both Park (2006) and Stewart (2004) illustrate, a focus on a specific place may help to break down artificial boundaries between nature and culture in place-based education. They advocate active engagement with the landscape to support this focus.

For Tuan, the material world appears to be a necessary but subordinate part of experience in which the human is at the center. Tuan's experiential perspective on *place* sees place sensitivity as one route to self-knowledge, positioning "every person . . . at the center of his world" (1977:41). Kolb (1984: 31) similarly understood experiential *learning* as "describing the central process of human adaptation to the social and physical environment."

The term "experience" perhaps helps us to incorporate active relationship between human and nonhuman and materialize the idea of culture to help appreciate ways that place may suffuse learning. Elkjaer (2009: 80) argues that far from experience being something of the past, it is also continuously in the present and for the future, "Subjects are not passive spectators who look at the world from the outside but powerful and future-oriented participants in natural and social worlds." She also suggests that experience happens when "habitual action and thinking are disturbed and call for inquiry" (ibid.:86). This disturbance of the status quo foreshadows some creative possibilities of place.

Smith and Sobel (2010: viii) contend that place- and community-based education offers an antidote for children "caught in an interior and electronically mediated world, [who are] losing touch with both the society of flesh and blood humans and the delicate natural world that supports our species." The idea that the natural world supports our species, however, suggests an instrumental view of place as existing *for* human benefit (Davis, Rea and Waite, 2006), putting humankind in a position of dominance and privilege. This person-centered focus is particularly evident in literature associated with place attachment (Lewicka, 2011) such that place is often understood as "my place." Such centering around the individual may tend to privilege the human and personal over the nonhuman and social.

On the other hand, a sense of belonging and ownership can foster community and support social justice (Gruenewald, 2008), but "if place-based educators seek to connect place with self and community, they must identify and confront the ways that power works through places to limit the possibilities for human *and non-human others*" (ibid: 315, *emphasis added*). In order to develop pro-environmental attitudes, Kudryavtsev, Stedman, and Krasny (2012) suggest that a "sense of place – including place meaning and place attachment – is shaped mainly through direct experiences in places and indirect learning about places." In the following case study excerpt, this combined approach is taken.

> *The "Exmoor Curriculum," based in Dulverton Middle and Community School with support from the Exmoor National Park Authority and the Exmoor Society, builds upon the idea of situation-specific and place-sensitive pedagogy. Children from years 5 to 8 at Dulverton school engage in weekly 2-hour activities planned to offer progression in various educational themes connected to the local environment (Exmoor), including studies of habitats, map work, and water skills. The place-based program is deliberately set within the*

children's local environment, and the design of the curriculum is intended to provide repeated experiences over 4 years, building on developing knowledge and skills.

One group of four boys, including one with autism, shows very good cooperation. The Learning Support Assistant is very hands off, facilitating and letting them work out a way of working together. She explains: "They know what to do because they are farmer's sons." They eschew using scissors and unpick the thickly bound and knotted twine with nimble fingers. They cooperate with different jobs, except for one in school uniform who isn't allowed to the muddy area. There is always someone dismantling and others ferrying and sorting. Conversations are prompted by the task – different hay bales and the shapes and the function that these perform (the round ones in plastic are not watertight but can be unrolled like a toilet roll to get as much or as little as you need) (extract from field notes, shelter dismantling, DMS Y5).

Binder twine is both a real and symbolic tie to some students' home lives as children of farmers. Their knowledge about this was respected and valued by the adults supporting the observed activity of shelter dismantling. While carrying out the task, the students talked knowledgeably about aspects of their surroundings, prompted by the materials they were handling and at times the teacher/learner power relationship was more mutual.

(From Waite (2010))

In this vignette, we see how the current learning environment is connected to other significant places for the children and that this is expressed materially as well as through accumulated cultural practices. The study showed affective aspects such as enjoyment of physically active learning and pride in having a unique curriculum, as well as cognitive and emotionally enhanced awareness of their locality and its particular biotic and abiotic features. However, the study also showed that this sort of activity did not awaken sustainability attitudes to other places, which were deemed "exotic" by the children nor did it provide a strong base for their subsequent schooling in a larger community, where they were perceived by some as misfits and "inbreds" (Waite, 2010: 30 and 37). The dominant culture there differed.

In Place: Situated Learning

Communities of practice are evidently highly situated. Elkjaer (2009), in her review of Dewey's contribution to theory of learning and the role of space and place, draws attention to how practice is a key element and how this resonates in the work of Jean Lave and Etienne Wenger on situated learning (Lave and Wenger, 1991). Here learning is seen as induction into a community of practice. Learning is thus socially constructed in the spaces between those experienced participants occupying the center of the community and those with less experience at the periphery. This is a very different positioning to that discussed by Tuan where the person was at the center of their world, with attendant risks of individualist and anthropocentric thinking. However, as Elkjaer (2009) points out, this process of movement toward the expert seems reproductive of the norm and may not sit so easily with creativity and innovation. Nor, perhaps, does it adequately account for and interweave the material within places for learning; indeed, situated learning theory is widely used to describe online communities (Waite and Pratt, 2015).

Although Lave (1988:1) points out that "cognition observed in everyday practice is distributed – stretched over, not divided among – mind, body, activity and culturally organized settings (which include other actors)," materiality of body and place is often ignored. In contrast to this emphasis on the social situatedness of learning, Hinds and Sparks (2008, 2011) find distinct patterns of affective response concomitant with the kind of places encountered: woodland or park, mountain, or garden. These patterns indicate that place matters, supporting the idea that biophilic tendencies are reinforced by childhood experiences. Waite and Pratt (2017) discuss the usefulness of different lenses to think about learning, considering how the concept of "situated learning" describes learning that happens across a community of practice, a social perspective in which it is the nature of relationships between actors that matter and not where this activity occurs, and an emphasis on the social critiqued by Brown, Collins, and Duguid (1989) among others. But the roots of situated learning theory within particular communities have also spawned other theorizations such as activity theory or CHAT (cultural-historical activity theory) (Engeström, 1987; Seaman, 2007), as well as thinking that privileges place such as the notion of learning in situ or place-based education. The latter enable accounts for nonhuman participation and things as agentic but do not necessarily shift the focus from the individual in the way that "alternative" theoretical frameworks such as CHAT can help to illustrate how learning occurs as an indivisible part of continually changing physical and social conditions rather than as a phenomenon located "in the privacy of one's own head" (Horwood, 1989: 6). Such an individualist view of learning still predominates in mainstream schooling and is reflected in the assessment and performance measures that structure and regulate many educational systems worldwide (Waite, Rutter, Fowle and Edwards-Jones, 2017).

This focus on attainment was taken into account in the design of some recent research in the UK. The Natural Connections Demonstration Project worked with 125 schools to embed outdoor learning across the curriculum between 2012 and 2016 and was structured recognizing that most schools' top priority is to support children's nationally assessed educational achievement, meaning that teachers were supported in their work to address curriculum subjects but in local natural environments (Gilchrist, Passy, Waite and Cook, 2016). Ninety percent of responding schools found outdoor learning useful for curriculum delivery, and the opportunities they developed for learning in natural environments were particularly prevalent in science, math, and English teaching, so-called high-stakes subjects measured for school standards (Waite, Passy, Gilchrist, Hunt and Blackwell, 2016). According to participating school teachers, subjects were supported through enhanced experience and wonder, "I think it is hard to bring in the wonderment of science stuck in a science lab for the whole year, whereas if you get outside you can give some people a real 'Oh my gosh!'"; creativity, "I will do a lot of stories based in the woodland, using artefacts and natural objects. . .I've seen a real improvement in children's writing"; embodied learning of conceptual knowledge, "I know a lot of children would have really struggled with grasping the concept of perimeters, but being able to walk it out. . . made a lot more sense to them"; and making subjects authentic

through place-based enactments, "There is no way you could get the same sense of belonging to the past doing it in the classroom or the hall. . . it's just been amazing." This evidence clearly indicates the influence of affect and materiality of place on learning, even when the focus and content of that learning is concentrated predominately on attainment of curriculum objectives.

However, place does not necessarily map well to curriculum objectives or pedagogies of the classroom. In the following case study, taken from an Economic and Social Research Council (ESRC) study of the role of outdoor learning in the transition between early years and primary education, cultural belonging and material features of place appear to complicate pedagogical understanding of place. The study was funded by the ESRC over a period of 29 months. Its aim was to consider the opportunities afforded by outdoor spaces to smoothing the transition to the national curriculum.

> *Laura feels some trepidation in taking this Year 1 class outside. As a supply (i.e., substitute/cover) teacher, she does not know the children very well although certain characters have already been pointed out to her. The children gather around her on the carpet as she sets out the plans for the lesson on Forces, looking for examples of pulls and pushes in the play park. Nearly all the talking is done by the teacher. In fact, there are over 18 behavioral injunctions, principally about how they should* ***not*** *behave, and several of these remarks are targeted at the characters directly; seven teacher comments are about practical arrangements such as who will hold the clipboard and pencil; a mere six relate to the substantive topic of the activity, why they are going out to the play park and that they will need to put on their "science hats." The children are very excited about their trip.*
>
> *In the play park, the children are in their assigned groups with a leader (chosen by the teacher and indicated by possession of a clipboard), but they are pulled by the attractions of play in this context that they associate so much with freedom. They debate if play is allowed. One child says "we must be doing work, because I have a pencil." Others are not so sure and lark about, making the most of their surroundings. The leader adopts the teacher role while trying to get them to cooperate in compiling a group list of pushes and pulls in the environment. She herself has to be pushy to try to achieve this, but the interaction is very unidirectional, as it was in the classroom beforehand. "If I see any silly behavior!" she admonishes the boys throwing grass. Eventually, she calls on the teacher to reinforce behavioral control in this ambiguous area. "Right," says the teacher, "we're coming away from this* ***play*** *area because you're all* ***playing****." The child replies, "I'm not* ***playing****. I'm just looking." But the leader of the group rejoins, "You was* ***playing****."*
>
> (Extract from Waite and Pratt (2017:14))

The question arises about *whose place* this is? What was intended for this conceived space, and how do the place and people within it reconstitute its potential and meanings as lived space (Lefebvre, 2003)? The cultural import of the local play park for the teacher was very different to that for the children, and its features had affordances that were not shared; therefore intended learning was obstructed (Waite, 2015). Place exists not just as special landscapes like national parks but also in the scrubby Fort Apache woodland and a play park commandeered for schooling; children and place comingle in less romantic settings too (Wattchow and Brown, 2011).

In Place: Childhood

In the light of widespread current concerns about children's disconnection from nature (Louv, 2010) and the growing popularity of ways to bring children back into nature, it almost seems that babies are believed to be born outside of the wider ecological system (although clearly population growth is a significant factor in the balance of nature). Kellert's (2002) suggested nine values toward nature, which he argues emerge during children's development, attest to this belief that the beginning of a life is characterized by a separation from nature.

1. Between age 3 and 6 years:
   (a) *Dominionistic* – related to mastery of nature and physical control of it
   (b) *Negativistic* – experienced as fear and alienation from nature
   (c) *Utilitarian* – involving practical and material exploitation of nature
2. Between 7 and 12 years:
   (a) *Humanistic* – exhibiting a strong emotional attachment to nature
   (b) *Aesthetic* – appreciating the beauty of nature
   (c) *Symbolic* – using nature for language development
   (d) *Scientific* – systematic study of structure and functions of nature
3. Between 13 and 17 years:
   (a) *Moralistic* – inspiring spiritual reverence and ethical concern for nature
   (b) *Naturalistic* – direct experience and exploration of nature

Nevertheless, Davis et al. (2006) take issue with this framework, questioning the notion that children's engagement with nature only begins after the age of 3 and problematizing the kinds and sequence of values identified. Mouthing of objects in the material world is one of infants' very first actions in their sensory approach to make sense of the world. For example, eating soil is a very common pastime until repeated "Yuck! Dirty!" adult exclamations train children away from this form of "taking in" their world. Responses between 3 and 6 years are typified by a sense of wonder and the young child's attachment to familiar places and people. The values claimed by Kellert (2002) as framing children's initial engagement with nature rather than being an original response to the nonhuman world seem influenced by significant adults modelling attitudes toward nature as they grow (Taylor and Blaise, 2014). Contemporary Western society continues to exploit natural resources, and this attitude is more likely enculturated in children by our own example, rather than being an early response to the nonhuman world.

The developmental frame may tend to set humankind outside of the ecological world and deny our part in Earth's wider ecosystems. Studies of very young children point to an original sense of unity with the nonhuman world where boundaries of self and other are initially absent (Rochat, 2003). A similar experience is recaptured in moments of flow (Csikszentmihalyi, 1990) and the lived simple unity that Quay (2017) draws upon in his concept of cultureplace; but perhaps some aspects of this first simple unity are lost through subsequent learnt behaviors (Phenice and Griffore, 2003). Nonetheless, Rochat (2003) also argues that context causes us to oscillate

between different overall developmental stages of self/other awareness. In this way, particular place contexts are again influential in mediating our relationship with human and nonhuman other.

In Place: The Anthropocene

In the previous sections, we have looked at some of the ways in which place and learning in situ have been conceptualized. We have tried to draw attention to and critique some taken-for-granted assumptions that appear to underpin the theories discussed, including the continuing dominance of individualist, person-centered, and anthropocentric attitudes toward how human and nonhuman relate within the common world. From both psychological and sociological perspectives, the personal and social are dominant discourses, but Prout (2011), MacNaghton and Urry (1998), and Taylor and Giugni (2012), among others, have made considerable contributions to disrupting these hegemonies.

Prout (2011) calls for more interdisciplinary work to avoid oversimplification and bifurcation in thinking about what childhood is; for example, anthropology, philosophy, and accounts of children's geographies have all helped broaden psychological developmental understandings. As Prout argues, "different combinations of human and nonhuman elements can be treated as different partial, more or less stable, orderings of childhood that can both overlap with and sustain each other – or, indeed, that can come into conflict" (ibid.:10).

We mentioned earlier some disquiet about the idea of "my place"; this "my" has become a common marketing tool for the environment as well as retail sector in the UK in recognition of pervasive self-reference in contemporary society. Plumwood (2008:147) expresses a similar concern that personalization encourages privileging certain places at the potential expense of others, commenting "In the same way, in the place case, I think we may have to start the process of recognising denied places by owning multiplicity, envisioning a less monogamous ideal and more multiple relationship to place." This resonates with findings from the Exmoor Curriculum and ESRC studies in this chapter.

Mutual construction by human and nonhuman is part of the process of engagement with place, but Massey (2006: 46) notes that shifting the emphasis to the landscape or place and reflecting that elements that we see as constant are also in flux can help to redress uneven people-centered readings: "The reorientation stimulated by the conceptualization of the rocks as on the move leads even more clearly to an understanding of both place and landscape as events, as happenings, as moments that will be again dispersed." For Massey, the diminution of the human through temporal stretching to geological time helps to put humans in place as a small part of the whole.

However, despite our being only a small part of the whole, human impact on the world has been and continues to be disproportionate, and Earth is now considered to have entered a new geological epoch, referred to as the Anthropocene (Crutzen, 2002) to acknowledge humankind's effects on the planet, enacted over a much

shorter time than previous geological periods. Not only is twenty-first century society more rapidly changing and unpredictable, "nature" itself appears to have been accelerated by human action. Blundell (2017: 10), in discussing the effects of the Anthropocene on concepts of childhood, argues that:

> Through this coming together of Earth or natural time and human time the Anthropocene proposes that rigid and dualistically separated notions of nature and human culture are increasingly difficult, if not impossible, to sustain. Instead it invites a re-imagination of the relationship between them as one of complex entanglement; so that, following Latour (2004), it now makes sense to speak of the Earth system as comprising a diversity of nature-culture hybrids rather than a non-negotiable 'Nature' with all its implied fixity.

Taylor and colleagues (Taylor and Giugni, 2012; Taylor and Blaise, 2014; Taylor, Blaise and Giugni, 2013) further argue that it should prompt us to rethink relationships between childhood and nature, pointing to a diversity of childhoods globally combined with reified conceptualizations of nature. Homogenization of diversity is a risk that the concept of childhoodnature potentially runs. At the same time, this work has also highlighted intimate personal lived connections of children with the non-human world, other than through the romantic historical lenses widely promoted in popular Western literature. Their examples resonate with tacit and often visceral ways that people/nature/place merge as documented from other disciplinary vantage points, including notions of "being-in-place" (Tuan, 2001) and "becoming-speckled warbler" (Stewart, 2011). In this interpretation, the particularity of place(s) becomes more critical and entangled.

In Place: Cultureplace and Cultureplaces

It is clear that there have been many attempts to theorize how the more-than-human world shapes possibilities for interaction in places and that these possibilities are mediated by structural and cultural influences, whether recognized or hidden. Across these attempts there seems to be a move toward what Macnaghten and Urry (1998:167) describe as efforts to overcome "conventional distinctions between humans and nature and between mind and matter." Following Ingold (1993), they refer to such tacit embodiment as "dwelling." Dwelling also suggests a slowing of pace, giving pause to think about how these are entangled and mutually influencing. Dwelling, as Ingold (1993) acknowledges, is a phenomenological concept developed by Heidegger, whose philosophy is central to Quay's (2013, 2015) ontological perspective on education. In further work emanating from these phenomenological roots, Quay (2017) argues that it is the various ways in which the notion of *relation* is understood that confuses and therefore impedes the many attempts to theorize relations between humans and nature adequately and thus between culture and place.

Quay draws on Peirce's (1902) three forms of unity – synthetical, individual, and simple – to highlight three forms of relation. These need to be described and thought through carefully. *Synthetical unity* brings a myriad of things together as one in the

form of a totality or a universe, characterized relationally by interaction/transaction between these things. An *individual* unity is different to a synthesis in that it suggests a unity which is perceived as indivisible (the etymology of the word individual); hence there are no parts constituting this individual which may be considered as one individual among other individuals. A *simple* unity goes a step further in its sense of oneness and is phenomenological in character. Here there is no sense of synthesis or individuality, as there are no parts perceived at all, and thus relation is not relevant as it is assumed. A simple unity is a sense of wholeness that moves beyond the notion of one as there are no divisions: all is "one" without any awareness that there is any whole beyond this whole.

These three forms of unity and their corresponding forms of relation help with understanding human-nature relationships, which are a focus of theorizing in outdoor education (Martin, 2004; Martin and Thomas, 2000). Human-nature relationships embrace a synthetical unity: a totality of things held together in interaction/transaction, like an ecosystem. However, this formulation of the issue – as human in relation with nature and vice versa – is a specific type of synthesis as it approaches the issue from a high vantage point, a bird's eye view, in the sense that human and nature are very general concepts, in which are understood differently by scientific disciplines such as ecology and biology. Martin and Thomas attempt to overcome this distance by referring to human-nature relationships as a form of interpersonal relation. However, perhaps a better way to situate these relations – to socialize them and materialize them locally – is to refer to them as cultureplace relations. Cultureplace is also a synthetical unity but of a different type than human-nature because it is more situated.

But what of the other two understandings of unity: individual unity and simple unity? This requires taking a leap beyond a synthetical unity of things classified as human and/or nature. To express this, Quay (2017) uses the term "cultureplace" with no hyphen. We live, here and now, in cultureplace, as simple unity. In this simple unity, everything already makes sense: it is everydayness, ordinariness, and mundaneness – of the flavor, of the aesthetic, and of the particular cultureplace. However, we can also be aware, thinking reflectively about it, that this simple unity is an individual unity: it is one simple unity among others; it is one indivisible cultureplace among other indivisible cultureplaces. We can name such cultureplaces as *places*: classroom, train station, and park, but when we do so, we must also acknowledge that they are also *cultures* – student or teacher (classroom), commuter or conductor (train station), player or ranger (park), and swimmer or sunbaker (beach) – as examples. These cultures and places are together as cultureplaces. Student culture in a classroom place = studentclassroom = cultureplace. Thus, the truth of a cultureplace is experiential as lived simple unity. This is the phenomenological concept of dwelling.

Continuing with this example, these three forms of unity are accessible in thought: as *synthetical* unity (human-nature) from a high vantage point using reflective/abstract thinking and general concepts – such as classroom, student, and teacher – all meant in a general sense; as synthetical unity (cultureplace) at a more situated level using reflective/concrete thinking and more particular concepts, such

as classroom, student, and teacher, all meant in a specific sense as *this* school or *that* school, etc.; as an *individual* unity (cultureplace) such as the cultureplace of studentclassroom or teacherclassroom, such that we are aware studentclassroom is one among other versions of cultureplace and different to teacherclassroom; and also as a *simple* unity (cultureplace), in a phenomenological or affective way of thinking, which is the everydayness of the ongoing, present, but unnamed, living moment. This last form of unity is perhaps the most important to be aware of, as all the other forms depend on it. This is the living experience which we call on to experientially understand the other concepts. It is very difficult to fully capture in language, highlighting how terms such as studentclassroom are very much approximations as labels when applied to an individual indivisible cultureplace – while pointing to something much richer that requires more poetic language to convey.

It is the subtle distinction between cultureplace as an individual unity and cultureplace as a simple unity which contributes the most to understanding and analysis here. As an individual unity, different cultureplaces may be seen to inhabit the one space, coming into contact in various ways – such as conflicts between different users of a park. As we saw in the ESRC example, the park is a place, but the notion of cultureplace highlights how this place holds diverse possibilities for action amidst multiple, sometimes conflicting, meanings. It is actually a collection of different cultureplaces such as playerpark or teacherpark or birdwatcherpark or footballerpark. Alternatively, cultureplaces may be transportable from one particular spatial location to another. Playerpark might occur as an experience in a range of locations, which we would generally describe in place terms as parks.

In Place: Cultural Density

Waite (2013) accounts for this complexity of different cultureplaces and the power struggles that may occur between them in her theory of cultural density, based on Bourdieu's ideas about habitus (Bourdieu, 2002). Casey (2001:686) observes that a "given habitus is always enacted in a particular place and incorporates the features inherent in previous such places, all of which are linked by a habitudinal bond"; this is akin to Quay's simple unity. For Waite, "cultural density refers to the strength and composition of dispositions to practice and norms of behaviour embedded within places that mediate the possibilities for action of individuals within them" (Waite, 2013:414). Quay's multiple cultureplaces may coexist, but structural forces such as power, politics, and society constrain some and privilege others through cultural density restricting some participants' room for agency and the ways that cultureplace is lived. For this reason, awareness and examination through different vantage points of individual cultureplaces may be necessary to deconstruct the lived experience and critically examine how power works within these.

Cultural practices and concomitant place meanings lie at the heart of this concept, but these are seen as *thick* and structurally determining within some cultureplaces or unrecognized and *light* within others, although this lightness may well also be differentially perceived by individuals. The concept of differing "densities" – thicker

or lighter – provides a metaphorical correspondence that helps to convey this type of difference between cultureplaces. In this way when many cultureplaces coincide, denser cultureplaces push lighter cultureplaces to the margins to the extent that they may not be able to coexist. An example is the (broadly labelled) studentclassroom cultureplace of some children who do not connect with a mainstream vision of schooling and for whom school life presents a struggle as they navigate conflicts with a more mainstream and much denser studentclassroom cultureplace that is co-constructed and congruent with teacherclassroom. In another extension of this metaphor, the relational bonds that tie alternative cultureplaces to "schooling" can be described as *weak*. New contexts for learning outside the classroom may enable the development of new cultureplaces that do not rely on established relations. Density also alludes to the process of sedimentation, whereby practices in places are reproduced and cemented over time, as the pressure of "we have always done it/been this way" bears down. Bourdieu's concept of cultural reproduction of social inequalities underpins this sense of density. Furthermore, it signals a level of structural rigidity in effecting transformation of cultureplaces because there is little or no room for agency through new thinking or actions within such a dominant and dense cultureplace. Thus, cultural density in some cases might unhelpfully be equated with a sense of "destiny" or inevitability.

In linking cultureplace(s) and cultural density, emplaced habitus and normative practices become more open to attention. As place (as timespace) and its cultural density are moved toward the center, multiple cultureplaces can be considered in the light of how densely they occupy and shape possibilities for action and the power relations that determine the "given habitus . . . enacted in a particular place." Physical and material signifiers inform how places are interpreted as more or less dense by people within them. For example, the whiteboard at the front and chairs more or less oriented toward the teacher's usual seat reinforce the cultural density and power relationships of the classroom. More open-ended learning resources in woodland, in contrast, may facilitate greater diversity in childforest encounters.

If we think back to the play park vignette, that place was redolent with experiences of playing on the swings and seesaw for the local children; it was a culturally dense cultureplace in terms of their playful engagement with the material affordances of that environment. Conversely, the supply teacher was from outside the neighborhood, and for her, this particular play park held few previous connotations. Indeed, as a teacher she viewed the play park as not much more than a blank slate: it was culturally light, apparently available to be colonized. She brought the culturally dense cultureplace of teacherclassroom to bear on what for the children was a play park cultureplace. In her attempt to bend the place to the purposes of schooling in a lesson on forces with clipboards, we witnessed how the enmeshed child/culture/place resisted practice that contravened the cultural density of that cultureplace for them.

By shifting to consciousness of individual cultureplace unities and considering multiple cultureplaces and cultural density, the tensions between them can be recognized, and the potential to disrupt previously held values and beliefs or hegemonic practices may be enhanced. In this way, consideration of multiple

cultural densities associated with cultureplaces will enable their meanings and consequences to be made more visible and inform action. Cultural blindness leading to social injustices represents a clear danger if cultural densities and lived cultureplaces remain unexamined. Regarding conceptualization of childhoodnature, these theoretical approaches may help acknowledge and shift attention to children's particular affective, social, and material meanings in place(s).

In Cultureplaces with Cultural Densities: Implications for the Enactment of Outdoor Learning

The foregoing discussions combine to show that being "in place(s)" is a concept which has a long but rather complicated history. It seems a widespread, stubborn, and enduring foible that we privilege human-centric perspectives and pervasively cling to individualist (as an individual person) and developmental views in Western conceptualization and structures of childhood and schooling. In concluding this chapter, we consider some possible reasons and implications for this but also venture that feelings and affect, which appear to underpin a sense of flow and being in simple unity within cultureplace, may indeed act as useful intrapersonal organizers of this complex interplay of cultural and material influences.

Patently, people do transfer experiences of places and use these as ways to evaluate other places. Sue recalls on a road trip in New Zealand rounding a tight corner where a couple were taking a picture of a stunning landscape with a safety barrier in the foreground and commenting that their chosen view was "a bit rubbish," instantaneously comparing that view to the many extraordinarily beautiful views encountered while travelling through the country. Where did this dismissive comment come from? A lack of cultural density in the cultureplace in which these tourists dwelt at the time – a cultureplace that could be described as touristscenery – positioned the meaning of this particular landscape as not scenic. Yet for the couple taking the shot, it might have more meaning and affect. This illustrates how reflexes and feelings are important non-cognitive mediators even in culturally light encounters and how easily, without consideration of alternative cultureplaces and cultural densities, we may be dismissive and partial.

Affect also framed the way in which the 3-year Exmoor Curriculum was valued, making the children feel proud to have that unique opportunity, although positive feelings about it were not universally shared. Cultural density linked to that particular cultureplace clashed with needs in later stages of their lives. In another context, the emplaced joy and wonder noted by the children and teachers in the Natural Connections Demonstration Project were considered instrumental in making an impact on their attitudes toward learning. Creating new outdoor cultureplaces for learning had extended the possibilities for learning to a wider group of students that the cultural density of schooling had sometimes failed.

The reason that recognizing contingent affect and feelings is so important is partly because this underpins care for places though positive individual and communal experiences while enabling a more responsive alignment of place with educational

purposes and pedagogies. Taking into account what a space means to different parties as a place – lived as cultureplaces – helps to build upon previous experiences and funds of knowledge in a fruitful way, but it also provides a lens with which to consider afresh the needs and affordances of the place itself. What multiple cultureplaces occupy this physical space? Which create the greatest cultural density? How does their materiality shape this? How does power flow within and between cultureplaces within this place? This sort of multifaceted analysis requires that we put ourselves in other positions to better understand complex elements within the whole, thus "becoming cultureplace" by dwelling in other cultureplaces: *in place*. Furthermore, it is precisely this empathic ability that offers some hope for rejecting human dominion over nature (Davis et al., 2006; Taylor and Giugni, 2012; Goodenough et al., submitted), if we can recognize that materiality is implicit within cultural density and transformational "becoming cultureplace" must include the more-than-human.

Malone and Waite's (2016: 22) framework for desirable twenty-first century outcomes from outdoor learning includes empathy and care for the human world among five key themes. However, in recognition that educational policy still focuses on the child as the principal unit of analysis for success, this framework seeks to outline student outcomes that will address contemporary concerns. Although this breakdown delineating policy, research, and practice contexts represents a refinement of targeting and alignment in comparison to many previous outdoor learning and education models, further nuance about the detail of local cultureplaces is necessary to translate these themes into effective place-sensitive practices underpinned by appropriate theories of change. What practice contexts will look like and what places will offer appropriate cultural density or lightness to support educational aims will depend on sociocultural and material contingencies (Table 1).

Conclusion

In this chapter we have drawn together complex theorizations of place and childhood to reveal how two particular and complementary theories might be used to help us understand how children and nature are in relationship, with a particular focus on the implications for educational practice. The hope is that these theories may support a deeper engagement with the strategic questions that support planning outdoor learning through acknowledgment of these enmeshed influences – strategic questions that focus on purpose (what? why?), place (where?), pedagogy (how?), and people (who?), as set out in a recent chapter with O'Brien, Ambrose-Oji, Waite, Aronsson and Tighe-Clarke (2016: 54–55).

These strategic questions help to structure our thinking to include the personal, the process, and the place (Scannell and Gifford, 2010), holding them in unity as synthetic, individual, or simple whole (Quay, 2017) and coupling them with clarity about specific aims for taking learning outside the classroom. Concentration of attention on differing cultural densities (Waite, 2013) and the intrapersonal meanings of places for partners (Prout, 2011) within the whole opens up the creative

Table 1 A framework for student outcomes and natural schooling

The policy context What (themes /desired student outcomes)	The research context Why (evidence/research/ literature/theory)	The practice context How (outdoor learning form/ place/ pedagogies/people)
Theme 1: Encouraging healthy bodies and positive lifestyles desired student outcome: *a healthy and happy body and mind*	Role of green restorative theory/ADHD/anxiety/ depression Active bodies/motor skills/physical fitness/ skills development Healthy foods/gardening Outdoor living skills	Experiential learning in natural settings Outdoor education/ learning LOTC Vegetable gardens
Theme 2: Developing social, confident, and connected people Desired student outcome: *a sociable confident person*	Human social relations Independent and critical thinking skills Problem-solving Social development Resilience-building	Problem-based learning Project-based pedagogies Social learning Residential programs
Theme 3: Stimulating self-regulated and creative learning Desired student outcome: *a self-directed creative learner*	Taking responsibility for own learning Self-regulation/self-awareness Self-management, self-efficacy Curiosity/inquiry Creativity	Inquiry learning Self-directed learning "Adventurous" education Play pedagogies Wild free – Nature play Cross-curricular and interdisciplinary learning STEAM outside
Theme 4: Supporting effective contributions and collaboration Desired student outcome: *An effective contributor*	Team building Leadership skills, development Risk assessment/taking calculated risks Innovator/entrepreneur Responsible decision-making, social resilience, collaboration skills	Adventure education Residential programs Problem-based learning Team building Field trips Service learning
Theme 5: Underpinning care and action for others and the environment Desired student outcome: *An active global citizen*	Appreciation of national and natural heritage Understanding issues of globalization, cultural diversity, and sustainable futures Environmental stewardships Volunteerism Empathy/care for more-than-human world Active environmental citizenry Contributing to planetary issues	ESD/EE Geography and science field trips Global education Indigenous studies International studies Animal husbandry Place-based learning

possibilities of cultureplace(s). In this way affective, precognitive, emplaced, and material feelings can make a key contribution to the power of outdoor learning to transform lives.

Cross-References

► Childhoodnature Pedagogies and Place: An Overview and Analysis

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The Mesh of Playing, Theorizing, and Researching in the Reality of Climate Change: Creating the Co-research Playspace

10

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Abstract

This chapter develops the concept of the "co-research playspace" as a methodological figure for working with children as co-researchers and co-artists. This concept emerged through our collaborative research and artistic co-production with 135 children who participated in the Climate Change and Me project (2014–2017) in Northern NSW, Australia. Drawing on Winnicott's concepts of "transitional space" and "transitional objects" in relation to children's art and environmental play, we locate the co-research playspace within the mesh of

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children's playing, theorizing, and researching in the reality of climate change. In developing the concept of the co-research playspace, we specifically focus on the ways that iPads functioned as transitional objects within the Climate Change and Me project. This leads us to further analyze the ways that children used digital video as a "transitional medium" that allowed them to experiment with new forms of co-production and creative resistance. Through our analysis of films produced by children in the project, we outline a series of three political aesthetic modes of response to climate change that break with the predominant moralistic discourse surrounding the issue: (I) critical interventions in public space; (II) wild, absurd, and improvisational disruptions; and (III) the creation of thought experiments and alternative worlds. The chapter concludes with the consideration of "children as para-academic researchers," a concept that emphasizes children's abilities to invent their own modes of co-creation and critical inquiry that disrupt normative research protocols and associated adult expectations.

Keywords
Childhoodnature · Climate change · Climate change education · Children as researchers · Children as artists · Children as theorists · Children as philosophers · Co-Research playspace · Environmental play · Transitional object · Transitional space · Transitional phenomena · Good enough holding environment · Post-truth · Post-Anthropocene

Introduction

> We find ourselves currently facing a global climatic crisis due to each and every one of us, where each new thing is only admired only for a short time before we establish a new desire; a cycle which repeats continually. We must change our values and what we believe is important to us. This change mustn't only occur in a small minority of the population, but almost all seven billion of the humans whom inhabit Earth. (Nikki Whitehead, age 12, co-researcher in the Climate Change and Me project)

In this chapter, we consider an emerging mesh of interconnections between the reality of climate change, children as co-researchers/artists/theorists, and the affordances of environmental play. The above quote introduces our chapter with a critical and insightful series of comments made by a 12-year-old co-researcher from our project Climate Change and Me (Climate Change and Me, 2014–2017). Nikki's words cut to the heart of the argument that we make throughout this chapter, namely, that children and young people are capable of producing insightful and intellectually rigorous research outputs if given the opportunity to authentically initiate and develop their own critical and creative projects within what we call the "co-research playspace."

Our chapter begins with a discussion of the interpenetrating phenomena of climate change and child-framed research, highlighting the need for innovative and participatory approaches to climate change education that move beyond adult-centered narratives and onto-epistemologies. This leads to a discussion of D.W. Winnicott's (1971) book *Playing and Reality*, focusing on concepts of

"transitional space," the "transitional object," and the "good-enough holding environment." We use these concepts to develop a theoretical understanding of the relational oscillations that occur between children's interior and exterior worlds, focusing on children's play and experimentation as the crux or pivot point for environmental learning and dynamic co-development. We then turn to the Climate Change and Me Project, which involved working with 135 children and young people as co-researchers over a 3-year period in New South Wales (NSW), Australia. We specifically focus on the methodological innovations that emerged through children's improvisational use of iPads to create their own films in response to the issue of climate change. In theorizing the iPad as a transitional object and video as what we call a "transitional medium," we offer insights into children's use of mobile digital technologies as tools for creative experimentation and knowledge co-production. Through our analysis of films produced by children in the project, we outline a series of three political aesthetic modes of response to climate change that break with the predominant moralistic discourse surrounding the issue: (I) critical interventions in public space; (II) wild, absurd, and improvisational disruptions; and (III) the creation of thought experiments and alternative worlds. The chapter concludes with the consideration of "children as para-academic researchers," a concept that emphasizes children's abilities to invent their own modes of co-creation and critical inquiry that break with normative research protocols and associated adult expectations.

The Political Realities of Climate Change

> In my first Inaugural Address, I committed this country to the tireless task of combating climate change and protecting this planet for future generations.
>
> Two weeks ago, in Paris, I said before the world that we needed a strong global agreement to accomplish this goal – an enduring agreement that reduces global carbon pollution and sets the world on a course to a low-carbon future.
>
> A few hours ago, we succeeded. We came together around the strong agreement the world needed. We met the moment. (Obama, 2015, np)

In the above quote taken from Obama's (2015) speech on the Paris Climate Agreement, we note the assured sense of triumph, achievement, and consensus around an "enduring agreement" that will benefit not only the individual nations involved but the entire world. A decade ago, Kevin Rudd (a former Prime Minister of Australia) similarly described climate change as "the great moral challenge of our generation" (2007, np). The impetus for such political statements has been the irrefutable ratification of anthropogenic climate change and its associated impacts on Earth by distinguished scientists worldwide (Intergovernmental Panel on Climate Change, 2001, 2007, 2014). Notwithstanding, the political landscape shifted in 2016 with the election of Donald Trump as President of the United States of America. Trump is an overt climate change denier, and the current political climate has become saturated with Twitter comments such as:

Donald J. Trump @realDonaldTrump 29 Dec 2017 (Trump, 2017)
In the East, it could be the COLDEST New Year's Eve on record. Perhaps we could use a little bit of that good old Global Warming that our Country, but not other countries, was going to pay TRILLIONS OF DOLLARS to protect against. Bundle up!
137,498 replies 66,668 retweets 208,740 likes

Donald J. Trump @realDonaldTrump 6 Nov 2012 (Trump, 2010)
The concept of global warming was created by and for the Chinese in order make U.S. manufacturing non-competitive.
13,000 replies 105,014 retweets 67,673 likes

These radically disparate climate change messages have the potential to be confusing and derailing when they are projected onto the public sphere, causing climate change to take on an abstract quality as an amorphous, ideologically driven "issue" rather than a material "reality." With the rise of neoconservative populism and reactionary forms of nationalism in the United States, Australia, and Europe, citizens who feel dispossessed by the moral superiority of neoliberal politicians (such as Obama and Rudd) have been willing to vote and act against their own self-interests and, in the case of climate change, against the interests of the entire world. Indeed, these populist knee-jerk reactions against the identity politics and elitist moral discourses of the Democratic party in the United States have led to the seemingly inconceivable reality of Trump's election and, subsequently, his withdrawal of the United States from the Paris Climate agreement in 2017. Only 2 years after Obama's triumphant proclamation of the Agreement as a moral victory for the entire world, we see the political climate moving in an entirely opposite direction, as disenfranchised populations grasp desperately for any vestige of agency, belonging, and understanding in a "post-truth" world.

By turning climate change into a moral issue, the mass politicization of climate change has also served to overshadow and even negate the realities of those who are (and will be) most affected by environmental catastrophes. While the implication may be that *anyone* can have a moral position on climate change in a "post-truth" political climate, the reality is that only a very small group of privileged individuals actually gain public media attention for their views on the issue. Unfortunately, all of these political and so-called "moral" contortions of climate change have been occurring *at the same time* as the number of climate change refugees (human and more than human) and climate change disaster events have drastically increased. This means that children and young people, one third of the world's population, are grossly overlooked in the moral politicizing of climate change. Children and young people's ideas, beliefs, understandings, and experiences of climate change simply do not matter or count in a post-truth world in which anybody can have an opinion about anything, but only the opinions of the wealthy and powerful actually matter.

The reality is that the impact of the climate change turmoil being forced upon the world's children and young people is immeasurable. While research is inconclusive about children's climate change fears, an Australian study of 10–14-year-olds found that 50% of children were deeply concerned about climate change, while 25% of children were concerned that the world would end in their lifetimes (Tucci, Mitchell & Goddard, 2007). Cutter-Mackenzie, Payne, and Reid (2011) note that children and

young people appear to oscillate between a fear of ecology and an ecology of fear. It is thus widely acknowledged (Kagawa & Selby, 2009; Walker, 2017) that novel forms of climate change education are necessary for and by children and young people worldwide, who are already being forced to come to grips with the ambiguous realities of climate change. Climate change education, however, remains an emergent and under-theorized field that has only recently been considered independently from established fields such as environmental education, science education, and education for sustainable development (Blum, Nazir, Breiting, Goh, & Pedretti, 2013; Læssøe, Schnac, Breiting, & Rolls, 2009). In this chapter and as our body of research in climate change education is evidencing (Cutter-Mackenzie & Rousell, 2018; Rousell & Cutter-Mackenzie, 2015; Rousell, Cutter-Mackenzie, & Foster, 2017), climate change education presents a meaningful platform not only for youth voices but also for a genuine galvanization of children and young people's political agency in the public domain. We now turn to a discussion of children as researchers/theorists in climate change education, before discussing specific theoretical and methodological developments within the context of our research in this area.

Children as Researchers/Theorists

In our systematic review of climate change education research, we found that a very minor contingent of the literature has been orientated toward child-framed approaches to climate change education (Rousell & Cutter-Mackenzie, 2018). Only a small selection of papers could be found which drew on the unique perspectives and experiences of children and young people to inform new frameworks and methods for teaching and learning about climate change (see, e.g., Tanner, 2010; Lawler & Patel, 2012). While the idea of children as researchers or theorists is not necessarily a new concept, the methodological and theoretical potentials of the concept have yet to be thoroughly explored. The concept of "children as researchers" has its roots in participatory research methodologies and the new sociology of childhood movement promoting the active involvement of children and young people in research (Barratt Hacking, Cutter-Mackenzie, & Barrratt, 2013). The concept also coincides with the Convention on the Rights of the Child (UNICEF, 1989) which provoked a renewed consideration of children's rights, with 196 countries currently committed to the convention with the exception of the United States of America. However, it was not until the early 2000s that the extensive development of child-framed research methodologies began to emerge (Bell, 2008; Christensen & James, 2000; Kellett, 2005, 2010; Morrow, 2008; Skelton, 2008). A resounding tenet of child-framed research methodologies has been the positioning of the child as an agential subject rather than a passive object of research. Kellett (2005, p. 2) has argued that children and young people should be "acknowledged as experts on their own lives and if adults genuinely want to understand children and childhood, better ways to seek out child perspective and unlock child voice must be sought." Such calls have seen the development of pupil/student voice, photovoice, and videovoice

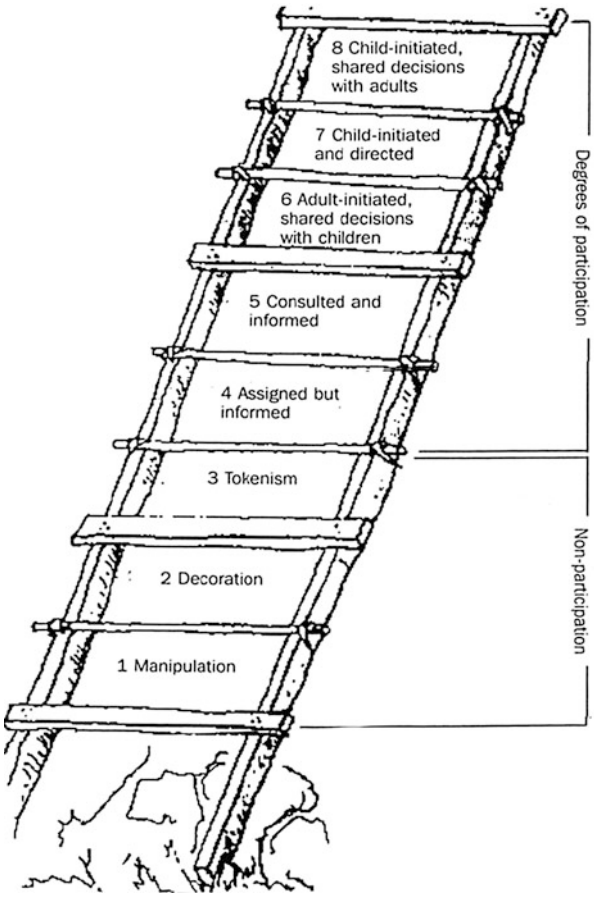
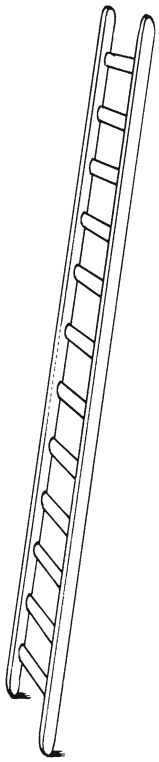


Fig. 1 Hart's ladder of participation (Hart, 1992, p. 8). Image reproduced with permission from the UNCIEF Innocenti Research Centre

as methods that foreground children's subjective positioning and agencies within the context of social research (Cook-Sather, 2006, 2007; Fielding, 2004).

While there has been a focus on child-framed research methodologies in educational and social research broadly, it has only been in the last decade that researchers working across childhood studies and nature (including environmental education) have actively worked with children as active researchers. For example, in the first international research handbook on environmental education, there were surprisingly few child-focused chapters and none that focused substantially on the arts and creativity. The chapter "Children as Active Researchers: The Potential of Environmental Education Research Involving Children" authored by two of the editors of this handbook (2013) was one of the few exceptions. Barratt Hacking et al. (2013) utilized Hart's (1997) ladder of participation (see Arnstein, 1969) as a way of illustrating varying forms of participation in child-framed research (see Fig. 1) in environmental education.

While we acknowledge the cultural limitations of the ladder of participation, at the time, this model was useful in distinguishing between various degrees of



Children as Active Researchers	*Young people-initiated, shared decisions with adults*	This happens when projects or programs are initiated by young people and decision-making is shared between young people and adults. These projects empower young people while at the same time enabling them to access and learn from the life experience and expertise of adults.
	Young people-initiated and directed	This step is when young people initiate and direct a project or program. Adults are involved only in a supportive role.
	Adult-initiated, shared decisions with young people	Occurs when projects or programs are initiated by adults but the decision-making is shared with the young people.
	Consulted and informed	Happens when young people give advice on projects or programs designed and run by adults. The young people are informed about how their input will be used and the outcomes of the decisions made by adults.
Children as Assigned Researchers	*Assigned but informed*	This is where young people are assigned a specific role and informed about how and why they are being involved.

Fig. 2 Child framed participatory research (Barratt Hacking, Cutter-Mackenzie & Barratt, 2013, p. 442). Image reproduced with permission from Routledge

children's nonparticipation (levels 1–3) and participation (levels 4–8). From levels 1–3, nonparticipation can be defined as manipulation (e.g., pretending research is done by children), decoration (e.g., children used to help strengthen a research agenda), and tokenism (e.g., children are given no or little choice in research). At the higher rungs of the ladder, children's participation gradually increases, with level 8 representing child-initiated participation and shared decision-making with adult researchers. Building on Hart's Ladder of participation, Barratt Hacking et al. (2013) outlined a methodology of "children as active researchers" that detailed further degrees of child participation in participatory research (see Fig. 2). Their focus on fostering children's capacities to initiate and develop their own research practices is a key movement forward in this regard.

Despite these advances, the vast majority of research described as "child-framed" research continues to be adult-initiated and determined predominantly by adult agendas and intellectual framings. With the drudgery of ethics approval processes and impoverished funding conditions, undertaking research that is authentically

child-initiated is inherently risky and incredibly complicated. However, as we discuss later in this chapter, authentically child-initiated research can be made possible through the development of a "co-research playspace" that supports the development of children's own research interests and creative methods of inquiry.

Irrespective of the development of the concept of children as researchers, the concept of children as theorists or children as philosophers has been much slower to develop in depth and rigor. While Soto (2005, p. 2) claims that children make the "best theorists," she/he presents or represents little evidence which demonstrates this claim. Rather there is a reliance on narrative inquiry and children's drawings as a means of interpreting theory (from an adult's perspective). That is not to say though that children cannot theorize – such a notion would be absurd. Rather the potential for children to become theorists has only barely been explored, with the assumption that adults are intellectually superior to children being the limiting factor. This is where play and creativity have the potential to open theoretical doors or windows into childhood, revealing alternative spaces in which children's theoretical acumen is acknowledged. Einstein is often misquoted as saying that "Play is the highest form of research." It was Scarfe (1962) who actually wrote that "The highest form of research is essentially play." What Einstein did say is that "combinatory or associative play seems to be the essential feature in productive thought" (Cited in Scarfe, 1962, p. 120). In the following section, we briefly track the development of children's play as a research focus before exploring Winnicott's theory of environmental play as an oscillation between children's interior and exterior worlds.

Playing, Reality, and Object Relations

Play theory and research are predominantly situated in early childhood education and developmental psychology. Play as a concept or theory has not readily crossed or transcended disciplinary boundaries in other areas of direct relevance, such as child-framed research methodologies and sociologies of childhood. Notwithstanding, Friedrich Froebel (1782–1852) is often portrayed as a seminal theorist in play and is widely known for coining the concept of the "kindergarten" (translation – children's garden). Froebel's ideas still firmly endure in early childhood education, and like other theorists of experiential education (Dewey, 1938, 1956; Vygotsky, 1986, 1997, 2004), Froebel placed deep importance on self-elected activities where adults seldom, yet delicately, intervene in children's play (Wood & Attfield, 2005). Froebel (1967, p. 83) writes that:

> Play is the highest level of child development. It is the spontaneous expression of thought and feeling – an express which his [sic] life requires. This is the meaning of the word play. It is the purest creation of the child's mind as it is also a pattern and copy of the natural life hidden in man [sic] and in all things.

Wood and Attfield (2005) position Froebel, Rousseau, and Dewey as seminal theorists in shifting views of early childhood education with play seen as critical to

children's learning and development. However, these theorists often position the child at the center of learning with the environment as a backdrop, prop, setting, or even a "third teacher" (Dodd-Nufrio, 2011). In backgrounding the environment as the passive context for children's social, physical, and mental development, they have not adequately considered the child and nature as interpenetrating and mutually entangled worlds, or what the editors of this handbook frame as childhoodnature.

To develop a more relational understanding of play that mutually implicates children with the environments they coinhabit with others, we turn to Winnicott's concepts of transitional space and transitional object as developed in his book *Playing and Reality* (1971). Winnicott initially based his theories on observations of infants as they separated from their mothers and began to experiment with the affordances and constraints of their physical environments. Transitional space, as Winnicott describes it, is a spatiotemporal process that puts inner realties and outer realities into relation through playful inquiry and creative experimentation (Ellsworth, 2005, p. 60). Play is central to the concept of transitional space, as it is only through play that the passages and movements between inner and outer worlds can be extended, explored, and sustained:

> Winnicott saw [transitional space] as a relation of an unknowable (to itself as well as to others) mind/brain and body 'interior' to an unknowable and radically other 'exterior', and this transit across the space of difference between inside and outside is transitional because encounters with the 'not me' that one finds there and the actions that we take in response to such encounters change both the inside of the self and the outside of the social environment. He saw the convergence of inner and outer events and qualities that inaugurates transitional space as a *transitional phenomenon* because it happens in time, not only in space. (Ellsworth, 2005, p. 60)

Winnicott (1971) also thought of transitional space as *potential space*, akin to what Deleuze and Guattari (1994) describe as the virtual plane of immanence on which new conceptual territories are formed, navigated, and sustained. The virtual is, in this sense, a dimension of emergence, creation, and potential that is "like a field of energies that have not yet been expended, or a reservoir of potentialities that have not yet been tapped" (Shaviro, 2009, p. 35). Massumi (2002) similarly describes transitional space as the relational *field of emergence* through which an event takes place in the actualization of its virtual potentialities. This brings the notion of transitional space into close proximity with the Spinozan concept of affect as the capacity or potential to affect and be affected, such that "the body coincides with its transitions and its transitioning with its potential" (p. 15).

While these theorists offer a range of different understandings and approaches to the concept of virtual or potential space, they also converge with Winnicott's proposition that transitional space requires some manner of participatory activation for its latent potential to be actualized. In this sense, transitional spaces and phenomena are always potential because "nothing makes them inherently or inevitably transitional" (Ellsworth, 2005, p. 60). While an artist's or a teacher's design may hold within it the possibilities for transitional spaces to emerge, it is only through imaginative, immersive, and playful engagement on the part of the participant that these spaces actually come into being. The pedagogical implication of this, as

Ellsworth (2005, p. 32) notes, is that transitional spaces can be designed *for* but not predetermined or forced into existence:

> [An environment] holds the potential to become transitional space when it provides opportunities for us to both act in the world and be acted upon by it - while at the same time offering us the flexible stability we need to risk allowing ourselves to be changed by this interaction.

The qualities and elements that are conducive to unlocking the potential of transitional space are described by Winnicott (1971) in terms of a *good-enough holding environment*, which combines the immersive sensation of being held as a child with the impetus to venture beyond this security and into the unknown. A quality learning environment or playspace is, in this sense, a space that effectively holds and fosters the possible conditions for transitional experiences to occur, often by surprise and improvisational play. There can be no template or blueprint for what a "good-enough holding environment" or "co-research playspace" should look like. Instead, Winnicott suggests "laying out desired qualities for the design of an environment that will not be complete or realised until and unless its users enter it and find their own uses for it" (Ellsworth, 2005, p. 61). The co-research playspace is thus constructed as a flexible architecture of engagement composed of various materials, ideas, media, technologies, tools, designs, and principles which children can then assemble into new and unforeseen configurations.

These flexible elements in the design of learning environments for transitional space are described by Winnicott (1971, p. 18) as *transitional objects*. Winnicott initially developed the concept to describe the ways that infants use comfort objects such as stuffed animals, blankets, or pacifiers as surrogates for the mother's presence, thus enabling their transitions into new states of becoming through environmental experimentation independent from the mother. The transitional object is also closely connected with Winnicott's concept of play, as he writes that the "immensely exciting. . .thing about playing is always the precariousness of the interplay of personal psychic reality and the experience of control of actual objects" (p. 55). The transitional object, in this sense, offers the affective and physical continuity, stability, and security needed to enter into an experimental, open-ended engagement with the unknown (p. 18). As Ellsworth (2005, p. 60) further explains, "we use transitional objects to imaginatively put ourselves in a transformative relation with the outside." Winnicott's (1971) work on transitional objects is particularly helpful in considering the oscillation between children's inner and outer worlds or realities:

> With his theory of the transitional object, Winnicott jolted all ponders on human nature into a realization of the never-ending oscillation between the *inner* and *outer* worlds. By implication, a state of dependency emerges as continuous in human life, and the environment therefore as continuously important. (Rodman, 2005, cited in Winnicott, 1971, p. xii)

Winnicott's predecessors such as Freud and Klein had overlooked the continuous relation between humans-nature, body-environment, and subject-object as

interpenetrating and mutually conditioning realities. Contemporary theory in early childhood education and childhood studies has only recently considered children's object relations, while social cultural theory (Brooker, Blaise, & Edwards, 2014) and cultural-historical theory (Colliver & Fleer, 2016; Fleer, 2010) continue to dominate minority Western thought on child development and learning. Winnicott's (1971) work is thus considered seminal in theorizing object relations, although Winnicott resisted disciplinary territories and boundaries. One of Winnicott's clearest explanations of object relations appears in the tailpiece of *Playing and Reality*:

> I am proposing that there is a stage in the development of human beings that comes before objectivity and perceptibility. At the theoretical beginning a baby can be said to live in a subjective or conceptual world. The change from the primary state to one in which objective perception is possible is not only a matter of inherent or inherited growth process; it needs in addition an environmental minimum. It belongs to the whole vast theme of the individual travelling from dependence towards independence. (p. 204)

For Winnicott, all humans begin their lives immersed in a subjective and conceptual world, with object-relating always occurring in oscillation with subjective experience as children move toward increased independence and capacitation. This means that the subjective experience of the individual child is not divorced from the objectivity of a shared external environment but, rather, develops through dynamic interactions between interpenetrating milieus of sensibility, objectivity, and subjective experience. Winnicott's relational and dynamic notion of the playspace as a developmental system suggests that all learning is predicated on transitions *through* the environment as a meshwork of relations that is the very condition for life itself. The playspace becomes a milieu that exists both inside and outside of the body as a relational field of emergence, a space of co-composition that is always already inhabited by multiple others.

This is where Winnicott's (1971) concept of the "creative impulse" in conjunction with play affords the children the "freedom" to creatively explore and learn through the environments they coinhabit with others. We would like to consider and problematize the concept of the "creative impulse" (p. 92) in the context of children's "co-research playspaces" in/as nature. Winnicott argued that learning takes place through creative modes of engagement and experimentation that put internal and external worlds into transformative relation. As Ellsworth (2005, p. 30) further explains, such transformations only become possible when children "dare to move into relation with the outside world of things, other people, environments, and events." This relational understanding of the learning process means that transitional spaces open up when children feel confident enough to creatively experiment with their environments independently from pre-existing authority figures and social structures. It is our contention that Winnicott's concepts can inform child-framed research by supporting the development of "co-research playspaces" which foster the development of children's potentials as researchers, artists, writers, and theorists. We now turn to the project Climate Change and Me where we placed the aforementioned theoretical concepts into practice.

Climate Change and Me

The Climate Change and Me (Climate Change and Me) project was funded by the NSW (New South Wales, Australia) Environmental Trust, which is an independent statutory body established by the NSW government to fund a broad range of organizations to undertake projects that enhance the environment of NSW. Working toward the NSW 2021 goals, the Climate Change and Me project aimed to strengthen local environments and communities by increasing opportunities for children and young people to be proactive in climate change education research. The core audience of the Climate Change and Me program were children and young people aged 9–14 in Northern regional NSW. This audience was selected because children are often targeted but rarely consulted as legitimate contributors to educational research and curriculum development (Kellett, 2005). The project was thus unique by providing an open platform for children and young people to engage directly in climate change debates and indeed their associated climate change education. The project specifically engaged children as co-researchers through a creative, socially engaged, and action-driven process of co-production. This process resulted in the development of an online social media platform and network; the Past Now Future community exhibitions in public spaces; an interdisciplinary Climate Change Curriculum; and the Climate Change Challenge, a community event which brought together local schools, climate scientists, environmental artists and writers, and members of the wider community to address the challenges of climate change (see Fig. 3).

Each of these research phases was contextualized within the overarching child-framed arts-based methodology developed by Cutter-Mackenzie and Rousell (2018). The Climate Change and Me project allowed for previous frameworks of child-framed research to be extended into the areas of arts-based research (Barone, 2006; Barone & Eisner, 2012) and research-creation (Manning & Massumi, 2014). Crucially, this extension of the methodology was driven by the children and young people themselves who participated as co-researchers and co-artists in the study. While the children were initially trained in ethnographic interview techniques and visual methods, we also supported them in extending their inquiries through creative practices of their own choosing. These extensions of the methodology through the children's poetry, fiction, drawing, and dramatic works were then brought back into the workshops to stimulate collective responses from the wider research cohort, thus forming the basis for the final bodies of work assembled for the Past Now Future exhibitions. The analytic and curatorial work undertaken for the exhibitions then laid the groundwork and offered key resources for the development of the *Climate Change and Me Curriculum*, which has since been piloted and evaluated in schools across NSW. Through this emergent process of co-production, we deliberately allowed for the creative practices and theorizations of the children to dynamically impact on the methodology itself as it was unfolding in real time.

A unique contribution of this research to the development of child-framed methodologies has been the construction of what we have termed the "co-research playspace" (Cutter-Mackenzie & Rousell, 2014), in which children and young people developed the skills, experience, and support needed to produce legitimate research

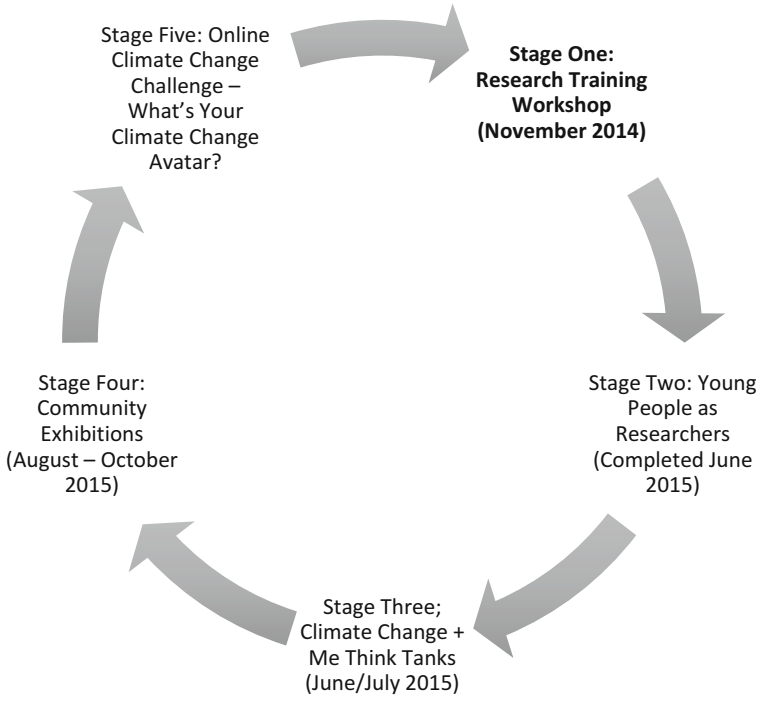


Fig. 3 Five key phases of Climate Change and Me (CC+Me) project

outputs to a rigorous standard of conceptualization and aesthetic quality. This notion directly informed our workshop, website, and exhibition designs as "co-research playspaces" which afforded the flexible stability the children needed to take risks in the development of their own research practices. In this way, the children were supported in developing their own approaches to the project that often exceeded or broke with our own expectations, and these emergent, child-driven practices were then allowed to impact on the overall methodological trajectory of the project itself. This was particularly evident in the curatorial analysis of the research data, as undertaken in collaboration with children and young people in the preparation of the Past Now Future exhibition. The following section focuses on the co-production of three video artworks and develops the concept of video as a "transitional medium" that opened up a co-researcher playspace for children and young people to develop performative, creative, and political aesthetic responses to climate change.

Video as Transitional Medium

The Past Now Future exhibition took place over a 3-month period in 2015 and was presented at eight public libraries in communities across Northern NSW. The exhibition was viewed by over 10,000 members of the public and was also

documented by local newspapers and on Australian Broadcasting Commission (ABC) National Radio through interviews with several of the young researchers. The exhibitions presented the culmination of 18 months of fieldwork by the 135 participating co-researchers. All aspects of the exhibitions were developed collaboratively with the children, including the curation, titling, artist statements, promotional materials, and installation design (Rousell & Cutter-Mackenzie, 2015). While we have discussed children's speculative fiction (Rousell et al., 2017) and photographic practices (Rousell & Cutter-Mackenzie, this Handbook) from the project elsewhere, we focus here on children's co-production of digital video works using iPads. These films were collectively analyzed and curated to form an interactive artwork entitled "Voices from the Anthropocene," a key component of the Past Now Future exhibition.

During the primary research stage of the project, children and young people used iPads as mobile recording devices to create their own responses to climate change in their schools, homes, and extended communities. A number of children chose to conduct interviews with their peers, parents, siblings, and teachers, many of which revealed a rich diversity of cultural responses and understandings of climate change in the children's local communities. Other co-researchers were inspired to use the iPads in more artistic and provocative ways, resulting in a wide variety of video works that included interviews with trees, improvisational forest romps, upside-down political discussions, an imaginary tea party, and a future world populated by digital avatars and virtual environments. We encouraged this playful "misuse" of the iPads for creative purposes that often broke with the traditional conventions of qualitative research and, in some cases, abandoned common appeals to rationality, discourse, and sensemaking. These odd video creations came to form a fascinating contrast with the more disciplined ethnographic interviews conducted by the children, generating a rich pattern of audiovisual textures and political aesthetic sensibilities. We found that these videos often revealed what children might think, say, or do when no adults were present to supervise them or interfere with their ideas and activities. In this sense, the iPad acted as a transitional object that enabled children to venture into new territories of thinking and action, creating both a mirror (opacity) and a window (transparency) into children's worlds at the same time. The children's use of the iPads gave us a window into their co-research imaginaries and playspaces, the results of which oscillated between what might be considered "childish and playful," "artistic," "inquisitive," "culturally revealing" and "deeply profound."

As we continue to think more about the ways that children were compelled to use the iPads as research devices, the concept of digital video as a "transitional medium" also comes to the fore. The iPad is a device that mobilizes the medium of video in a particular way, since the screen is large enough to create an immersive interface that co-implicates the body of the child with the surrounding environment. Children are able to see what is being filmed as they move and interact dynamically with the environment, thus allowing them to modulate the medium of video in ways that are performative, unpredictable, and impulsive. The screen becomes both the recording surface and the surface of projection for collective engagement through environmental play, bringing the "audience" of

the film into direct contact with the process of co-production. In other words, the film is being "produced" and "viewed" at the same time, adding a sense of hyper-awareness as well as a public intimacy that is specific to the medium being employed. The medium of digital video, as operationalized through the iPad, thus becomes transitional in its capacity to put children's creative impulses and dynamic social milieus into transformative relation with a shared environmental outside, as well as an "audience" that is immanent to the production of the film itself.

In many ways, the experimental videos produced by children in the Climate Change and Me project are more closely aligned with video art than the conventions of naturalistic observation and ethnographic documentary cinema. Children's experimental and playful usages of video as a transformative medium also break with the traditional conventions of video methodologies in qualitative educational research. As de Freitas (2016) notes, such conventions are tied to the history of scientific film and the vagaries of visual documentation as truthful and accurate representations of empirical phenomena. Rather than documenting and analyzing children in films as cultural representations or scientific evidence, we are interested in how *children actually produce films* by using video as a transitional medium that enables them to think and interact in novel ways. By focusing on children's co-productive engagement with video as a transitional medium, we acknowledge that *we still do not know what children can do*. What happens when we give kids iPads and ask them to go out and make films exploring the ways that climate change is affecting their lives? What happens when we bring those films back in, analyze them together, and ask kids to make different films in response to what other children have produced? These are the kinds of open-ended questions and experimental approaches that we pursued in the development of digital video as a transitional medium for climate change education research.

In the following vignettes, we discuss a series of three examples of experimental video works produced by children in the Climate Change and Me project. Each example provides a brief window into children's environmental thinking, imagination, and play in response to the question of how climate change is affecting their lives, communities, and environments. The first focuses on children's sense of invisibility and a dehumanizing lack of agency in relation to climate change; the second foregrounds the improvisational, animalistic, and often irrational nature of children's "wild" environmental play; and the third addresses children's experimental use of digital video to generate a dystopian virtual world.

Becoming Invisible

This film emerged from a discussion between three girls in a year 5 class regarding their feelings of invisibility, disconnection, and lack of political agency in relation to climate change (see Fig. 4). While they felt that children's experiences and perceptions of climate change were not being valued or acknowledge by adults, they also noted a sense of complicity in children's contribution to climate change. They began

Fig. 4 Becoming Invisible

to discuss children's lack of understanding and desire to know more about climate change, as well the need for children to actively change their own habitual practices and patterns of thought. As the girls were developing various ideas for creating a film

that would embody and articulate these discussions, they found a collection of gold and silver masks in the storage room adjoining the classroom. They decided to use the masks to conceal their faces and identities in the film, emphasizing the invisible and unknown qualities of children's voices. As they began to play with the possibilities of using the masks, they decided to create a series of written signs that could be used to articulate their questions about children's relationship to climate change. They devised a cascading series of questions, which began with the phrase "Climate Change and Children..." and then proceeded with "Do they know? Do they care? How can we teach them? How can we change ourselves?" These open-ended questions ended up forming a discursive structure for a performative and environmentally responsive series of actions which comprised the resulting film.

After inviting another student to serve as video operator, the three girls arranged themselves in a line facing the camera with a garden area behind them. As the film progresses, the girls take turns moving into the front position of the line as each piece of text is revealed sequentially. This movement begins sporadically but slowly takes on a peculiar and often uncomfortable rhythm, as the stops, starts, and misshapen notes of the school band's practice begin to infect the performative event taking shape. In the resulting film, the children appear faceless and dehumanized while their bodies and their questions move in and out of synch with a "found" soundtrack. These disjunctive spaces between the sounds and images embedded in the film produce a surreal quality, as the girls' original idea for the film as a social intervention becomes warped by the sound field of everyday school events occurring beyond the frame of the camera.

Wild Play

In this second example, a group of 3 year 5 girls take an iPad into a forested area of the school without any initial planning or preparation (see Fig. 5). The resulting film unfolds completely spontaneously, beginning with one girl running madly through the forest and crashing into another girl who ends up falling into the bushes and then scrambling on hands and knees along the ground. This initial scene of outright silliness sets the tone for a series of playful and often ridiculous interactions between the girls and the surrounding environment. There is an intoxicating quality to this series of behaviors, as the silliness is pushed to increasing degrees of intensity over the course of 2 minutes. There is also a consistent sense of wildness and animalistic behavior that infuses this film, as the girls continuously use their bodies to explore their relationships with climate change in strange and unexpected ways.

Following the opening sequence of playful encounter and excitation, the girls sit down on the ground and begin to develop a call-and-response chant, riffing off rhythmic variations of the phrase "what do ya think about climate change?" This chant is accompanied by a series of improvised dance moves, with each girl again responding to the other in a call-and-response formation. At a certain point in these choreographic interactions, one girl places her hand into a hole between the roots of a nearby tree. When she pulls her hand out, both girls are amazed to find that she has withdrawn a shard of glass that was hidden in this little hole. This piece of glass then

Fig. 5 Wild Play

becomes the impetus for a series of unusual performative gestures, including demonstrations of the shard's ability to leave visible scratch marks on the skin of one girl's arm. This is followed by another crude demonstration of what would happen if somebody sat on the shard of glass, complete with hand gestures suggesting the penetration of one object into another. Throughout this sequence, the girls display a range of intense and dramatically charged facial expressions which are often addressed directly to the camera, as well as to each other. After some loose discussion of the shard's relevance to the hidden dangers of climate change and humanity's impact on the Earth's geologic strata, the film finishes with a spasmodic

gesture in which one of the girls throws the shard directly toward the camera, narrowly missing the camera operator whose face suddenly appears in stark surprise. At this point, the girls collapse onto each other in compulsive fits of laughter and uncontrollable hilarity.

After Earth

Our third example is a film produced by two girls in year 7, who had previously produced a number of insightful and engaging films commenting on the effects of climate change on such mundane practices as doing homework, playing video games, and making dinner (see Fig. 6). With this film, they developed an innovative idea that involved the creation of a dystopian future world comprised of digital avatars and virtual environments. To produce this film, the girls negotiated access to a nearby section of rainforest during lunchtime, an area that students were not normally allowed to visit. Working from a basic sketch of possible camera shots and action sequences, the girls proceeded to experiment iteratively with the affordances of the digital video format. The initial opening sequence of the film involved placing fingers over the camera lens of the iPad to produce an orange-red effect that gradually resolves into a scene: the motionless figure of a girl standing at the top of a staircase with a vacant expression, as shot from below. This figure becomes the protagonist of the film, a girl who realizes that she exists as a digital avatar of her former self and that she inhabits a virtual environment that is disintegrating around her. Her doll-like expressions bring the figure to life without dialogue, as she appears unable to speak amidst the horrific discovery of her digitally encapsulated existence. By shooting into the afternoon sun, the girls used refractive light and lens flares to add a surreal quality to their shots. They also developed a special technique of wobbling the iPad in order to suggest the idea of a virtual environment that is malfunctioning and eventually shutting down.

One of the fascinating aspects of this film is the girls' ability to produce the feeling of an artificial world and virtual existence without any spoken words, dialogue, or prompts. The story is told entirely by the physical movements and expressions of the female protagonist, who becomes not so much a character (in the conventional sense of a human subject) as a *body* that suddenly finds itself inhabiting an environment that is both toxic and strange. Her movements and facial expressions also suggest the birth or awakening of an artificial intelligence, perhaps a digital version of her original personality, whose initial interactions with the surrounding environment lead to a destabilization of the system. Interestingly, we find the protagonist consistently peering directly into the camera's lens, as if searching the depths of the digital medium and indeed its implicit audience, for some sense of who (and where) she might be. The film concludes with her stricken expression of desperation as she falls to the ground and perishes, due to a virtual environment that is too unstable to support sentient life.

Fig. 6 After Earth

Conclusion: Children as Para-Academic Researchers

The three films described in the vignettes above reveal the ways that children used video as a transitional medium for creative experimentation and environmental play. In considering these films in relation to the "post-truth" political climate described in the chapter's opening section, we can see how each film provides an alternative response to climate change through aesthetic engagement rather than through moral discourse or personal opinion (or "doxa"). The three alternative responses developed by these children also link more broadly to three alternative political aesthetic projects. The first vignette entitled "Becoming Invisible" takes shape as a critical and discursive questioning of children's visibility, agency, and voice in relation to climate change. This film was planned and performed as a critical intervention into the everyday social practices of schooling, an approach that connects with critical art movements associated with political activism and social and environmental justice. The second vignette breaks significantly with the first, as "Wild Play" involves a series of absurd, playful, and animalistic impulses that are entirely improvised and not intended to be serious responses to the issue of climate change. The second vignette thus connects more clearly to comedic and performance art projects which employ shocking and/or absurd methods which abandon rational discourse and social critique in the face of an unsolvable problem. The third vignette, "After Earth," presents an entirely different alternative by engaging seriously with play as a multisensory thought experiment that doesn't rely on language. This vignette connects with the experimental use of art, film, digital media, and performance as modalities for creating alternative worlds that provoke viewers to sense, think, and feel the world differently.

In all three of the examples explored in this chapter, children's digital filmmaking practices are shown to operate through an aesthetic politics of experimentation which is very different from the moralistic, populist, and identity-driven politicization of climate change in today's post-truth world. In closing, we would like to suggest that such aesthetic-political practices become possible within a co-research playspace that affords the flexible stability that children need to take creative risks and break with adult expectations. Rather than training children to think and work like conventional "academic" researchers, we would like to propose a co-research playspace that fosters children's development as "para-academic researchers" who actively disrupt the conventions of academic research. With this proposition, we associate the term "para-academic" with the work of artists, filmmakers, performers, musicians, designers, and other critical and creative practitioners who generate collective thought experiments and develop alternative ways of thinking and making the world. In this sense, we see children becoming para-academic researchers when they refuse to comply with a normative research protocol and associated adult expectations and instead invent their own modes of co-creation and critical inquiry. When children break with adult expectations, they show us something that we would never have been able to experience or understand otherwise. It is in those moments of noncompliance that children show us how to think

and do things differently, reconfiguring concepts and practices in response to the critical crises and transformations of climate change. It is only through such imageries that we may begin to conceive of a post-Anthropocene world.

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Part II

Childhoodnature Research Methodologies

Post-critical Framing of Methodological Inquiry and Childhoodnature

11

Paul Hart

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Abstract

This section of the Handbook challenges the research communities of inquirers in areas of childhoodnature to critically engage what amounts to postqualitative, posthumanist re-imaginings of what counts within social science. We encourage authors to think and do research differently. This means re-engaging theories as we re-engage praxis. We looked for environmental educators grounded in rethinking humanist ontologies, as threats of climate change become immanent and threats to research quality demand deeper engagements with theory beyond levels of method and methodology. Each of the authors in this Section challenges environmental educators, particularly those in childhoodnature alignments, to rethink humanist ontology and humanist qualitative methodologies, to consider repositioning their conceptual/practical underpinnings, and to generate new questions in new ways, beyond the status quo. We believe, along with the authors of this Section, that opening up to posthumanisms that confront the everyday habits of traditional living and traditional scholarship is no longer optional if we expect young and old alike "to want to" see the world differently, however unsettling that may be for researchers who risk seeing themselves being seen.

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Introduction, Purposes, Processes, and Limits

(New) materialisms, realisms, empiricisms, posthumanisms, feminisms, indigeneities, rhizo- and schizoanalyses, diffractions, transgressive practices, and becomings abound in theory! Meanwhile, children's access to open spaces, experiences of outdoor environments, and "connections" with nature are declining as fast indoor "screen cultures" and slow exposure to numerous environmental toxifications and associated health problems are intensifying in childhood becomings!

Our call for proposals for this section of the *Research Handbook on Childhoodnature* challenged prospective authors to continue to open up their inquiries into methodology in respect of the concept and practices of the neologism "childhoodnature." We originally conceptualized the framing of "methodological inquiry" to include chapters drawn from across a spectrum of established perspectives in early years education (EYE) and environmental education (EE) research. However, recent trends in methodological thought in education and dramatic turns in Western theory and philosophy, coupled with accelerating environmental and social problems layered into children's everyday lives, demanded different perspectives of how to address emergent issues relevant to childhood studies and cultures *in*, or *of*, or *with*, or *and*, or *as "*nature" and its culturally derived and constructed environments.

We searched for authors whose previous works engaged with or crossed over different perspectives, descriptions, explanations, and discoveries in methodological development and critique and moved creatively to identifying authors already engaged in *post*-methodologies that challenge conventional research perspectives and practices in early childhood, environmental education, and ecological sustainability. The aim? To *reconceptualize*, reinvent, and *experiment* with our inquiry and critique of methodology, as well as our commitments and praxis where research must now focus on increasingly serious questions about the educative and pedagogical childhood "nature" of nature–environment and culture–human interactions, actions, and relations.

We set ourselves the impossible task of creating conditions for performing authors to work within highly contemporary but still nascent "assemblages" of methodological inquiries concerning the elusive, ambiguous, or contestable notion of childhood, its invention, and associated historical and cultural changes in selfhood (for example, Simms, 2008). Indeed, we were fully aware of the limits of what a dedicated section of a handbook could adequately convey about the challenges of methodological inquiry while recognizing the various limitations of what each chapter in this section of the handbook can say about "new" childhoodnature (Hart, 2013; Reid & Payne, 2013). We recognize that these challenges are exacerbated amidst an explosive "movement in (Western) 'thought'" following the belated acknowledgement of the planetary Anthropocene and how, now, it is locally and globally reshaping orthodox views of education, early years, and environmental/sustainability discourses. Methodologists, among curriculum theorists, policy

makers, reflective pedagogues, and committed practitioners, currently find themselves (re)searching within a tsunami of thought waves and theoretical "turns" generated by any number of global ecological crises currently visible in, for example, pandemics, ocean acidification, global heating and climate destabilization, food, and housing insecurities. Where does this crisis leave childhoodnatures and their environments and social ecologies of selfhoods and the family household, neighborhood, schools, and other relational organizers and arrangements?

To be sure, authors in this section illustrate how traditional research has recently been challenged in theory and in practice, how working theoretical concepts have changed, as are views of childhood and, even, its "posthuman" version (for example, Kennedy & Bahler, 2016). These numerous turns and twists in theory, and implications for research, and various educational practices can no longer be avoided in any research concerning childhoodnatures that seeks to interpret, explain, and challenge the status quo of education that, arguably, is complicit in the anthropogenic problems that now need to be confronted. Beyond the implosion of allegedly new theory, we confront the implied realities of never before experienced planetary issues in, for example, appropriate "interventions" in early childhood education and, consequently, the reconstruction of possible solutions to the unsustainable and accelerating environmental health problems of young children and their "development." "Thought" of in this "other" way, we searched for authors whose current research engaged the dual edged sword of engaging "new" theory turns, as well as "old" and everyday practical problems that collide here in the emergence of "new" or "post" methodological inquiry. Authors in this section are those whose recent work already contests the taken-for-granted and challenges established orthodoxies in children's/early years research.

In our introduction to their diverse yet similarly oriented research, we align with methodology section authors in recognizing that contemporary theory, practice, and methodological problems are, often, "out of step." Our conceptualizations of inquiry often "miss" some "real" problems confronting children's lives and, therefore, what we assume to be childhoodnature. Rarely considered, for example, are compelling questions of time and temporality in children's (and researchers') lives and the associated *timeliness* of methodological inquiry and critique into the (rapidly) changing "natures" of *body~time~space* relationalities in "fast," or Dromospherical childhoodnature in the Anthropocene (Payne, 2017). But time in the postmodern now/instant has different dimensions that once conceptualized in and with childhood might help open us to consider how methodological inquiries might deal critically with the passage from childhood to adulthood thus foregrounding how next generations will "inter" and "cross" generationally inherit the educational legacies of what today's researchers do, or don't do. Within the limitations of an "experimental" section of the handbook, therefore, our framing needed to be more deeply time-and-space alert to the embodied intergenerational question of "passed on" affectivities, ethics, and politics in research and methodological inquiry, reiterating how the rapidly accelerating "speed" of the Dromosphere penetrates children's lives that we now collectively share in driving the Anthropocene and responding to their powerful consequences.

"Turns" in theory? Practical (environmental and social) issues and problems embodied in the time-space ecologies of children's and researchers' lives? Methodological inquiry as an intergenerational critical reflexivity? The challenge of our task

can be found in the bewildering myriad of "post-anthropocene" turns that constitute major movements in (Western) thought in the face of the seeming complicity of "traditional" modern and postmodern thought habits and patterns in reconstituting the "intellectual" foundations of the problem of the Anthropocene/Dromosphere in, at least, early years education. So, we attempt here to create openings for new thinking in areas of speculative realism and empiricism, new materialism, critical realism, radical materialism, ecophenomenology, post-critical, ecohuman, feminist and eco-feminist, nonhuman, posthuman, corporeal, sensuous/affective, animal, interspecies, temporal–spatial, environmental history, ecoimaginations, and so on. Each turn in contemporary theory illustrated in the preceding section of the handbook has its own internal variations and differences, or "twists" that the astute methodologist now needs to identify and explore – a task well beyond what can be achieved here but, at least, glimpsed partially in the following chapters and in this introduction.

Given the impossibility of a comprehensive assemblage of crucial methodological controversies and issues, we looked for "moods" in methodological inquiry that seemed to be emerging from the current movement of Western thought and were suggestive of the potential for methodological inquiry to illuminate the vexed question of the concept of childhoodnature. We identified gaps that demand ongoing development. For example, it proved very difficult to track down a historian of methodological inquiry in early years education and/or childhood studies whose history incorporated the role and/or places of Nature. There remains a compelling need to historicize and map how early years/children's research has, or has not, successfully, conceptually, and/or empirically navigated the terrain of children's Nature-Culture relations, and how they are grounded existentially or empirically and/or conceptually in their human–environment actions, interactions, and agencies.

Alert to the silences, gaps, limits, and limitations of section "Positions" in particular, and the handbook more generally, in the early phases of framing this section and recruiting chapter authors, we also encouraged other section editors to be attentive to possible connections of theory and practice, and methodological outlines and issues, in the chapters and authors with whom those editors were working. In doing so, our aim was to foreground how more recent "reconceptualist" thinking and praxis might precipitate a greater breadth and scope of inquiry in the different contexts and purposes of each section of the handbook. Perhaps, given these caveats concerning the broader movement of "post" Anthropocene/Dromosphere thought, the childhoodnature focus of these accounts illustrate ways that methodological inquiry can continue to build needed conceptual and/or empirical bridges between "new" theoretical turns and practical problems/questions concerning children/hood *and, in, with, for, against* environments/nature.

Positions

Having outlined how we approached the framing of this part of the childhoodnature puzzle, we admit to viewing methodologies and inquiry into them somewhat skeptically and speculatively given their history in other fields of the social sciences, arts,

and humanities. We are far less ambivalent, however, about how researchers need to make clear how they "position" themselves as "subjects" in the closely associated "re"-positioning of their methodological inquiries. We anticipated, if not expected, that each contributor needed to address the researcher-researched, and subject-object relationships, represented in and by their chapter according to the elusive notion (and practices) of childhoodnature. We acknowledged how each researcher is engaged in widely variable contexts in which research, or pedagogy, or curriculum occurs. And we speculate that how we conceive and construct childhoodnature inevitably returns to methodological questions about the childcentrism and adultcentrism, or in-between, positioning of the situated inquirer/researcher across anthro- and ecocentrisms. *Repositioning* the researcher-researched knowingly, and unknowingly, in these and other "isms" is a formidable challenge for methodological inquirers and critical research, complicated by assumptions made about childhoodnature and the "nature" of the practical problems targeted.

Some cautions. There also can be no doubt that the "moves" afoot that "turn" and "twist" our thinking are simultaneously intriguing, exciting, seductive, daunting, and compelling – newer views and languages/namings of theory, methods, problems! – all gathering momentum and intensity in methodological inquiry. These movements raise perplexing questions about, for example, how the researcher positions her/himself in issues concerning subjectivity and objectivity, constructivism, and interpretivism, the (non)representational, the (non)correspondence, the (im)material, the (in)corporeal), and, even, the "new" idea of plurinatures. These questions for the methodologist, cum philosopher, cum practitioner, drill down on what is, or can be, *accessed* and *presenced* and *absenced*, or reassembled and bundled into a handbook section, a handbook, and more personally/professionally, a program of research via the methodological inquiries and critiques now available.

But maybe we move too fast here. Let's pause for a moment and, again, attempt the impossible. What does the post-anthropocene/dromosphere movement of thought turn our attention to? In different ways, in different languages, in different histories, in different contexts, with different purposes, new theory tends to converge around some "old" principles and practices. At the risk of simplifying the historically complex, methodological inquirers are confronted with deliberating about a new "politics" of the otherwise "old" quad in the social sciences of ontology, epistemology, axiology, and methodology. More precisely, we acknowledge the new problematic of the need for researchers and methodologists (and indeed practitioners) to "grapple" aesthetically, ethically, and politically with their messy interactions and relations. For example, does inquiry start with a practical problem of children, or childhoodnature? Or does it start with a clarification of the ontological presuppositions about both the subjects and objects of the research? Maybe the starting point is the epistemologies of the subject and/or the object? Or, just maybe, its being relatively clear headed about the tensions of ontology and epistemology, seen through the prisms of axiology before we get to the equally perplexing questions about methodological inquiry and deliberation. And, it seems to us in the position we adopt here, that the methodological inquirer also needs to grapple with how the aforementioned tensions of researcher-researched, and subject-object, and their

centering-decentring are engaged. All of the contributors to this section grapple in some way with these dilemmas – some openly, others are much harder to discern, and, hence, we recommend very careful reading to "flush" or "flesh" out how our authors are positioned in their methodological inquiry and how, subsequently, they position the research undertaken and represented. We return, again and again, to how much "new" theory returns us to the dilemma of how researchers methodologically *access* (partially) that which they do or do not seek to "re"present – historically, materially, really, and textually/symbolically.

Can we reposition? Maybe, do we need to? In early childhood education and its natures, we are working at a crucial time in the human construction of worldview and values that, once consolidated, become very difficult to change (Bronfenbrenner, 1979). Focusing on childhoodnature, in the currency of the now, signifies a process of evolution from taken-for-granted Western views of nature and the human, and self, and social, and ecological. This process, as far as we can tell in the still nascent responses to the post-Anthropocene/Dromosphere movement of thought is cautious of a somewhat premature privileging of the posthuman and new materialist lenses that might help us think of nature and culture as somehow mangled together as the realization of the agency of matter is intertwined with human agency (Hekman, 2010). But, we might ask of the positionings in methodological deliberations of both the researcher and researched, of what importance or relevance is the deconstruction of dualisms and collapsing of, or conflation, of nature and culture? Some of the following chapters are positioned to generate thinking that is critically aware of where we think we are going. For example, the now popular ideas of posthumanism, notwithstanding conceptual variations internal to that term and, therefore, carrying different practical implications for methodology, uses this perspective of thinking within, against, and beyond theory to inquire into young people's experiences without resorting to reified notions of nature. Elsewhere, in the related literature, Alaimo and Hekman (2008) use the term "bodily nature" to express these notions as materialities of nature/post-nature. Subsequently, authors like Quinn (2013) mangle nature-culture beyond the binary as a new philosophical approach – a philosophy of the outside (a worldview) – to ground studies and advance understanding of outdoor learning, particularly in early childhood education (ECE) where children's values are constructed.

On the "other" hand, in this section, there are critics of the posthuman turn while others encourage a "re"human positioning in methodological inquiry. Different theoretical orientations assert the need for a sort of re-humanization of a still de-centring researcher-researched relationship. Kirsi Kallio's critical materialist orientation emphasizes a geosocial and topologically inspired formulation of methodology. Her primary aim is to access the often muted question of the political and socio-ecological nature of children's everyday experiences and agencies. Kallio's methodological inquiry addresses debates in human geography about "scale" and relationality of scales regarding political subjectivity, topological polis, and the political status of subjectively experienced, socially shared, and spatially organized dimensions of children's and youth's lives.

Anna Vladimirova and Pauliina Rautio insist that their "more" adultcentric "curious methodology" (cased in a nature school) within an ethological and

semiotically inspired approach to ecological inquiry must be unplanned and escape preconceived research frameworks and the instrumental use of methods. Such preconceptions, they assert, effectively lead to a misrepresentation of the relational and dynamic nature of the re-centred agential relations between animated humans/children and non or more-than-humans beings and things.

Deborah Moore's research into children's environmental experience in nature extends Clandinin & Connelly's classical contributions to the methodology of narrative inquiry. Moore's epistemologically driven emphasis on children's "revisiting" and re-telling of stories about imaginative play spaces in nature and secretive experiences in local environments also returns the locus of methodological inquiry to the material settings and physical-symbolic unfolding of the (em)bodied time-space relationalities "felt" "phenomenologically" (and partially glimpsing of an ontology of the everyday) by children (and the empathic researcher, like Vladimirova & Rautio's curious methodology) grounding those ecological experiences, memorying, and their restorying.

In Diana Masny's chapter, methodology has been reconceptualized as a rhizomatic process that intentionally interrupts linear research processes of interpreting and coding that ascribe meaning. She asks how we might rethink reading in the early years – from a focus on meaning to what reading does, intensively and immanently. This involves letting go of our preconceptions about the dominant epistemologies of reading as we might shift focus from teacher caring to "affect" – playing with this newer concept as a working process. This is a conceptual shift for EC educators who think edu-care is how affect might deepen thinking ontologically, that is, in terms of teacher "becomings." What constitutes a text in reading or science or environmental education can be thought of in terms of discourse actualized as belief systems about how the world works. Becoming literate is a process by which environmental literacies are produced with complex assemblages of affects and resonances. In terms of early childhood educators, these ways of thinking research challenge EE discourse as multiple literacies theory.

We view Masny's chapter itself as a rhizome with several entry points and an invitation to inquire – to experiment within a relationality of affect that transforms the research assemblage by decentring the human as interpreter in favor of one who maps what is going on within assemblages. Masny's examples, which ground theory in practice, like Moore in children's secret outdoor play spaces, expose how concepts and lived experiences like affect have been silenced in conventional research practices as have children's bodies and environmental issues by economic and ideological forces. It is a refocusing of inquiry that centers on how people might live.

Effectively, this never ending list of questions bear directly and indirectly on how we come to construct research in terms of how we conceive and come to construct ourselves as researchers in relation to the researched – what we think and do in relation to the rest of the world, whether proximal or distant as a political problem of scale and relationalities (▶ Chap. 18, "Exploring Space and Politics with Children: A Geosocial Methodological Approach to Studying Experiential Worlds"). Given what appears to be a lack of progress in closely related fields of EE and its research

and related areas of early childhood environmental education, it is time to change the game plan.

Environmental educators might want to attend to early years-based speculative realists such as Anne Reintertsen who have written about creating new ontologisations of sustainable childhood(s) through writings as thought experiments with very practical implications. She views writing as a methodological rhizome, creating openings concerning possible childhoodnature becomings that translocate simplistic concepts of ECE. Within and out of the posthumanist moment of qualitative research, she draws attention to the multiplicities of words challenging limited visions and becoming accountable in the practicalities of our research – being/doing words and being/doing ontological work. Think of ways of breaking out of taken-for-granted research practices – ways of "unmolding ourselves – enter the unconscious activisms of Anne"s slam articlepoem, a speculative voice, an experiment in how to think nature and culture together amidst schizoid modes of becoming material/discursive to get out of taken-for-granted systems of meanings, really engaging ecological principles within early childhood settings – greenish pedagogies. Reinertsen writes as if what we have been doing in research and educational practices needs speculative jolting – "training our imaginations to go visiting" – maybe poetry can do that? She speculates on how to de-authorize knowledges and methodologies? Becomings in creativity? How to work on people slowly in surprising, perhaps powerful ways. . . how to become, again. Can we imagine, for example, in one of Masny's rhizomatic writings, research that is articulately full of contradictions, uncertainties, shifting landscapes, human/more-than-human – a new politics of educational practice where environment matters? Discursive↔materialistic? Transpersonal methodologies producing critique as diffractions as new possibilities for action – give peace a chance. . . work in different directions at the same time because we might be wrong (about plastics!). Read Reinertsen as an attempt at performing or activist methodologies that work to collapse nature/culture divides.

The chapter by ▶ Chap. 18, "Exploring Space and Politics with Children: A Geosocial Methodological Approach to Studying Experiential Worlds" conjures up images of difference between intensities experienced in actually "being there" at a powerful musical performance with interpretations of others. This difference has inspired post-qualitative researchers, empirical realists, and others to "want" qualitative research to move beyond representation. While each of the authors in this section has thought deeply about many aspects of this movement in respect of anthropocentric ontologies and methodological possibilities, Koro-Ljungberg et al. engage brut, fluid, and porous pathways to change in the ways we theorize and practice ECE inquiry. They illustrate how philosophy as method can create conceptual movements that disrupt taken-for-granted assumptions concerning what pedagogical performance is for young children. They reconceptualize children's performance as intra-active assemblages of more-than-human relationships and they trace their (non)methodological work back and deeper into worldview. As the authors say, method, born of ontology, is affected by ontology so that methods always presuppose (discursive/material-based) ontology. Critical of assumptions in traditional research concerning universal essences as well as stable and inert conceptions of material and ontological reality that ignore the relation

production of "being" a child within environments, they concentrate on movements towards relational/spatial re-makings of more-than-classroom environments. In many ways, they compel researchers to think more seriously about research methodologies and methods as they are implicated in conceiving and construction of children's ontologies at the most basic phenomenological levels. Methodologies-as-ontologies-as-pedagogies – disruptions are intentionally created in this chapter and this section of a research-oriented handbook. The power of affect is palpable in the intensities by which these authors propose experimenting with pre-positioning to interacting, to performing together in relational (fluid) processes and across childhoodnature.

Acknowledging the strategic position of ECE in "governing" children within dominant educational discourses, Holmes, Jones, and Osgood challenge EE researchers to rethink our common sense ways of thinking and knowing. Their particular challenge is interesting, because it connects critique with creation through illustrations of how this might be done theoretically and practically. They respond to the challenge to unmake our methodological habits, saturated in human-centeredness, in search of new ontological thinking that opens spaces for environmental educators to create inquiries differently, perhaps rhizomatically, affectively, generatively.

They posit research methodologies as performance and practice experiments that cause readers to refocus "zones of inventiveness" toward thinking and doing intensities that may actually have potential for onto-epistemic change and illustrate this shift practically – pushing readers beyond the "rules." They encourage us to "see" ourselves within our habits by opening our eyes differently, creating more openings, more becomings.

Repositioning the Reading

In this section, despite its limits, readers will witness the change – in the questions we ask as methodological inquirers (and critics), about the practical (environmental) problems and issues children (and researchers) live, in the theory-base that persuades us, in the language (e.g., concepts) we use, and, subsequently, in the broader framings of methodologies and methods that are our primary but not exclusive focus. We cannot deal with the wide array of practical problems and everyday issues, given the diverse readership of this handbook and its global reach, and reflection. This, we confess, is a limitation of this section, reiterating the skepticism needed about the value and efficacy of theory "trickle down" to educational practices – methodological, pedagogical, curriculum development, and policy formulation.

How are we to make some sense of, indeed exemplify, the shifts in (Western/Northern) thinking and research practice that now characterize evolving methodological problems and issues within the neoliberalized proliferation of educational research journals and books? By reading, says Elizabeth St. Pierre who uses her own past research as one base for change. Read examples such as those presented within this section, then read backwards into the theory bases that help us make speculative sense of the practical groundings of research for unsettling, disrupting, settling, and

reconceptualizing, for getting beyond inadequacies of our own thinking, our questions, and methods. Theory in this sense, according to Anyon (2009), potentially becomes an assemblage of interrelated concepts for questioning the way social-environmental discourse and systems work. Thinking with theory involves interrogating our (researcher) point of view (as an armature of concepts and ideas), reading enough to think critically about our allegiances and blind trust in traditional methods, and engaging in thoughtful debate about our research framings and how we came to frame our research questions and methods (onto-epistemologically) (see also Jackson & Mazzei, 2012). In this work, we may begin to see parts of our worldview in the concepts we choose to work with and therefore rethink sourcings, or underpinnings, even uncritical or ahistorical assumptions and commitments in our methodological choices. But, at the same time, we need to be reflexively alert to how we potentially (mis)recognize our selves, and our readings, interpretations, and senses of agential relations and collegiality within the performative, outcome-driven, individualized, audit culture of the postmodern corporate university, including its "turn" to online technopedagogies and "new" globalizing imperialisms of, for example, MOOCS (Cooper, 2002; James & McQueen-Thomson, 2002).

The underlying challenge in many of the chapters, therefore, is in learning how authors may connect to and re-imagine various dialects of theory as a means, perhaps, to perform differently or better ground why we chose one direction over another. For us, it is in reconceptualizing ECE-EE research designs and methods that social-environmental theories become implicated in changes to social structures. Theory-based concepts, then, can potentially be an epistemological force of de-territorialization and repositioning. To illustrate, Lenz Taguchi (2007) describes how the new focus works toward trangressive practices, that is, toward transgression of the modernist theory-practice binary, to work beyond interpretive text that includes sensual, emotional, and affective experience. Whatmore (2006) summarizes these theoretical insights in terms of shifts of directions: from discourses to practices, from meanings to affects, from human to more-than-human modes of inquiry and from politics of identity to politics of knowledge-practice (in performance).

Each of the authors in this section illustrates their own challenges with new conceptual possibilities that help us work our way out of the old language traps. For example, what Reinertsen (2017) calls grammatical liberation or immanent critique practices shifts meaning and questions of interpretation and representation. What Manning (2015) calls "research-creation" involves application of these shifts to existing pedagogical issues. Taylor and Giugni (2012) reconceptualize early childhood communities using a "common worlds" conceptual framework. The idea in each of these cases is to take account of children's relations (i.e., relation ways of knowing-being) with all others including more-than-human others – the ethics and politics of multispecies vulnerability (see Taylor & Pacini-Ketchabaw, 2015) and of living together. Like these researchers working with their own concepts or others, we view these concepts as generative of their own working ideas. Qualitative-postqualitative inquiries are on the interpretive move and the authors of this section provide numerous openings for more creative conditions for your own ideas (see Reinertsen, 2016).

Some of us may be less familiar with this particular kind of research and style of writing – questioning what we mean when we question terms such as "data" or "analysis" or "interview" and why "concept as method" is used to disrupt traditional methods of qualitative inquiry. Post-qualitative work is challenging – the grounding is in new theory as well as different conceptualizations of what counts as data, as event. However, the real challenge we see is in moving theory beyond constructivist discourses. We believe that we need to "turn" beyond old epistemologies and their uncritically presumed ontologies that many still assume are needed for educational change to keep pace with the Dromospherical speed of environmental and social change associated with the consequences of the Anthropocene and how that shapes children, their lives, and ecologies of everyday things and scales. And we believe that working with ideas from authors in this section provides some useful openings for this work.

In the following chapters, you will read how traditional conceptualizations of methodologies and methods are challenged, as stimuli for emergent conversations and as provocations for critical ecological change relevant to childhood. Think of these chapters as enticements to explore the evolution of early childhood education, as well as environmental educational research. The idea is to (re)search for ways to create conditions to "see" research differently so we can begin to "see" differently and "to see ourselves being seen" (Hoffer, 2012). The stories of experience are narrated not as interpretations and representations of others so much as exposing the discourses that drive people to discover themselves in examining their performances.

This section of the *Handbook* asks what can be done within methodological terrains of research in childhood education in relation to nature. It problematizes the concept of childhoodnature from different perspectives, as must occur. In our minds, research can reveal and conceal. For example, in the "new" of new theory, it can reveal the politics of humanization, ecohumanization, and posthumanization in various "re"humanizations as well as conceal possibilities for dehumanization, desocialization, displacement, and agential alienation. It can raise fundamental questions about concepts, often taken-for-granted in traditional research, that may (or may not) reveal relationships between language and materialities in lived experiences and realities in the world. It can presence or absence ways of knowing and being/becoming explored as onto-epistemic flattening where many new ways of seeing are made possible or impossible.

In a methodological sense, research can be directed (in theory and practice) within a variety of cultural, physical, bodied, mental, and political practices, some of which require shifting taken-for-granted traditions, ideologies, power states, discourses, relationships as intra-actions with matter and thought. Or put simply, as ontology and abstraction, the tension of which has massive implications for methodological inquiry, critique, and research practice. Methodology can sanction routines tried and tested within particular framings as well as intersectional assemblages which can disrupt taken-for-granted assumptions and practices. Research can open or close bodies/minds in relation to how images, interpretations, representations, inter(and intra)actions are immersed in ongoing negotiations, as (re)cyclings of de/re/de-centring, de/re-territorializing our research processes. Now you see it, now you don't!

Through chapter authors, we propose to engage readers in self-reflections and conversations that critically invite dis- and re-identification of research readings on influencing, perhaps, determining or inscribing our positionings and conceptual re-engagement with the theory-into-practice of EE-focused research in early childhood education. We are inclined to *want* to believe that EE/ECE-based researchers are ready to engage in transforming themselves and becoming inquirers with an enhanced sense of their own ecological ontology. But, a pause and silence can we/they find the time to read slowly and engage deeply enough to trouble their own inquiry-based thinking (porous, fluid, brut – see Koro-Ljungberg, et al., this volume) about how young people might come to know? Their engagement with methodologies and methods in EE and ECE may change for good reason. And, thinking conceptually about newer strategic concepts such as embodied memory, diffraction, rhizome, haecceity/assemblage affect, nomad, but also critiques of these new metaphors/signs… in directing field-work methods beyond a methodic series of steps, we are inclined to think that they might find pathways to partially, and possibly selectively, "access" and reveal the "nature" of the changing and contingent ontologies of the world. As Davies (2014) says, in making evident the ontology of becoming and knowing, that is, when something comes to really matter, when it actively changes the way things are perceived to be, both the ontology of our bodies and the meanings of what happens (in research and in life) are affected and effected. And if analysis amounts to a set of encounters among meaning, matter, and ethics, those "close" encounters are always already affecting or being affected, as a means of getting closer to the fundamental constituents that make up the world (Barad, 2007, p. 72).

The turn to posthumanism, as one currently popular turn in Northern/Western thought, but like others now available, seemingly plays into environmentalism, childhoodnature, and EE, as some of our performers in this section indicate but also admonishes us to question both its authority and our thinking habits, as some also address. Posthumanism and new materialisms attract increasing numbers of ECE researchers and many others and illustrates a missing dimension in many environmental researchers' thinking and practice, among other turns that dialectically/dialogically need to be "read" into ongoing methodological inquiry and related debates. We think that we have partially opened up that dialogue for many early years and environmental educators within the limits of section "Positions." Post-humanist theorizing, for example, proposes research bases that create conditions for complexity in thinking and practice in reconceptualizing ontology beyond the centers of humans, that is, with nonhuman and more/other-than-human bodies. But so too do other new theories and philosophies listed earlier, in different and othered ways, such as the speculative empiricism of experiencing plurinatures (Debaise, 2017); the incorporealism of the subsistence of the ideal in the material, and the material in the ideal of an onto-ethics (Grosz, 2017), the immaterialism counter turn of speculative realism (Harman, 2016), or the post-phenomenology of ecophenomenologies (for example, Toadvine, 2009), eco-anthropologies (for example, Ingold, 2011; Kohn, 2013), and environmental criticisms/ecohumanities (Buell, 2005). This extended assemblage, we sense, is less about words than affect, embodiment, and enlarging predispositions and boundaries of our research processes –

thinking theory into how to find out, where humanisms intersect more than humanisms – Reinertsen's (2017) "eco-chaos-ophy" (possibilizing childhood/s as a matrix of becoming).

In sum, the notion of "re-reading" methodological inquiry as critique and change grounded in different theories and turns, as well as material, real, and symbolic everyday practices (of children) opens up research spaces, beyond normalized practice and dominant research discourses, to intricacies of interrelations between human and more-than-humans as expanding philosophical (re)positionings of particular interest in early years and environmental education of/for, the pluralization of childhoodnatures.

This section on methodology could serve as introduction to what is unevenly emerging in early childhood education and care (ECEC) research. Following scholars such as Lenz Taguchi (2010, 2016), Jones and Holmes (2014), Otterstad and Waterhouse (2015), and Osgood, Scarlet, and Giugni (2015), and many feminist materialists, authors in this section put new conceptual spaces to work as examples of theory-praxis in post-qualitative (non)methodology. We see multiple and complex ways of thinking beyond but perhaps within traditional qualitative methodologies such as ethnography or narrative inquiry, new ways of performing inquiry such as speculative realism where fluidity trumps conformity or rigidity in moving away from interpretation, representation, and the inadequacies of language. Flattened ontology in post-qualitative work attempts to overcome the labels syndrome as they mark onto-epistemic reference points used to legitimize scholarship of particular kinds. For Koro-Ljungberg (2016), disrupting normative signifiers in which we include childhoodnature is crucial for conceptual movement and creativity.

What is generated in these chapters are more questions about research as genuine inquiry with no fixed answers, methodologies, or methods. Along with St. Pierre (2016) and Fairchild (2016), we too suspect methodology as we have come to know it is now often unthinkable within the new empiricisms of this multiturn in ontology and epistemology. While research has indeed become less settled and has moved beyond inevitability and prescribed methods, it has also become closer to the lived experiences of the "opera" or stand-up comedy than a person's uncritical representations of their textualized experience. Working within, against, and beyond the status quo where researchers "become" within the process of rich theory to de/re/decentre and unsettle thinking/praxis seems exactly what fields such as EE/ESD/EfS require to reconceptualize what can count as inquiry, knowledge and an ontology of becoming. How else could we begin to seriously re-consider knowledge-attitudes-behavior research as "flows of affect" within research contexts? The chapters in this section provide clues to reading within ephemeralities of methodological spaces as fluid places/spaces to begin (to think differently about how affect and bodies can influence conceptualizations of method). How interesting could this be for EE/ECE researchers to learn how to push affective relations with methodology to inquiry into the affective flows between human/nonhuman/more-than-human (see Fairchild, 2016)?

So, this section of the *Handbook* opens up to reading and seeing research differently, to complexity, to changing social/environmental imaginaries. We open

up to visions of active and activist methodologically reflexive researchers who, mostly within EE-ECE domains of inquiry, like to start their thinking with theory in multilayered ways, to expose themselves and participants to their own partly visible, emerging preconceptions and perspectives, to openly engage in rethinking/redoing their framings and methods. We think that because we believe that when we learn to "see" differently (become more conscious of our own worldviews or onto-epistemic assumptions), there is greater possibility that a shifting of values sets in (in researchers and their participants). We think that a shifting of worldview, and indeed a "de-centring" of unbridled subjectivity "towards" the "eco" of childhoodnatures is fundamental for EE research and EE practice and that it is necessary to shake complacency out of EE research. We see evidence that certain ECE researchers may feel this way as well and urge us to engage real biopolitical and bioethical issues of pressing socio-ethico-political-environmental concern. By implication, this suggests the relative failure or epistemological and methodological limits of "seeing" socio-environmental issues and EE research to fundamentally make a difference. Through chapter authors, we hope to generate critical self-reflection and conversations that concern re-identification of researcher readings, seeings, and positionings in EE and ECE that open up questions of worldview at all levels. We reiterate the limits of this section in dealing with the everyday practices, problems, and issues of children and research in vastly different geo-cultural-epistemological settings and scales. The compendium to this handbook will reveal some of those concerns.

Our advice – read the chapters in this section slowly and read closely the onto-epistemologies that ground our old hubristically humanist projects in order to understand new ontologies and theories (Pedersen & Pini, 2017). Read these chapters as a collective exercise in thinking about and in critiquing ECE- or EE-related educational ontologies/epistemologies. We are adamant that many researchers pay little attention to how the ontological assumptions or predispositions they "work with" are in some sort of tango well before methodological deliberation. That dance needs to be examined and partially choreographed notwithstanding the spontaneity of the music, movements, and audience participation.

In this section, you may find emerging ideas, theories, methodologies and methods, new concepts and processes that work against or beyond familiar categories and take on a life beyond the singular chapters included here. Our intention in selecting these chapter writers was to bring focus to deeper issues and shifts in orientation of thought that are ultimately ontogeneric, that can spark our creativity enough to let go of routines and open ourselves to other ways of seeing, thinking, and doing research. Posthumanism or ecophenemonology, or speculative empiricism, or plurinatures, as a "turning" and (de/re)assembling conversation opens ontological-epistemological-axiological and methodological positionings that may allow us to play with our worldviews. Acknowledging that relational humans existing in different scales, confronting the Anthropocene/Dromosphere and its planetary-bodied everyday consequences, intergenerational and cross-cultural implications may render us more capable of listening and seeing research differently beyond the heavy legacy of humanist assumptions and disciplining tendencies of traditional scholarship. It may be the kind of

research that got us here in the first instance, but it can't seem to imagine anything different. The chapters here collectively pursue a post-critical type project of breaking away from uncritically preconceived humanist/anthropocentric thought. They ask us to "de-center" and re-read/see/think methodological inquiry in diverse and unsettling ways, to reposition critically the things that ground our existing projects as "seen" through new ontological-epistemological eyes – as Snaza and Weaver (2015) say against our fetishization of research methods.

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Becoming Childhoodnature: Experimenting a Research Assemblage

12

Diana Masny

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Abstract

This chapter focuses on research methodologies, that is, an inquiry into research that experiments with the rhizome, an innovative way of doing childhoodnature research. Educational studies in an Anthropocene era have often positioned "childhoodnature" research in the more familiar humanist perspective according

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prominence to the centered subject, representation, and interpretation. This approach to research has been the source of criticism for not responding to the challenges of the times. This chapter is situated within that critique by adopting a rhizomatic perspective to childhoodnature research informed by Deleuze and Guattari's geophilosophy. Geophilosophy ruptures the received view of qualitative research and creates concepts in relation to the problem and questions that emerge from a research assemblage. A rupture also provides an opening for the conceptualization of childhoodnature as it emerges through the lens of rhizoanalysis and a theory on becoming that consists of reading the world and self.

The chapter is a rhizome with multiple entries: situating the research assemblage and an ontology linked to geophilosophy. A presentation on the rhizome, rhizoanalysis, and the concept of assemblage follows. Then, they come together with Multiple Literacies Theory as contributing elements in reading a research assemblage. Next three rhizomatic studies constitute examples of research assemblages and how they might function. Finally, the intermezzo, the movement in between de- and reterritorialization according to Deleuze and Guattari's geophilosophy, is one of becoming and establishes a movement for research yet-to-come. It provides potentially new directions for thinking about research as it unfolds with childhoodnature.

Keywords
Reading · Multiple-Literacies-Theory · Deleuze · Guattari · Becoming · Geophilosophy · Rhizoanalysis · Anthropocene

Introduction

This chapter contributes to the handbook's section on research methodologies, that is, an inquiry into research that experiments with innovative and nonrepresentational ways of doing research.

Situating A Research Assemblage

The chapter is a rhizome with multiple entries. It becomes an invitation for readers to plug into the different entries and concepts that may be familiar and unfamiliar as each entry takes readers in unpredictable (no pre-given) directions. Moreover, the chapter emerges out of what might be considered an ever-growing concern regarding sustainability of the planet at a time when the human species makes its heavily-felt impact on the planet. Climate change (Malone and Truong, 2017), nuclear power, and genetically altered food (Colebrook, 2014) are examples. This era carries the name, Anthropocene (Crutzen, 2002). Concern for the planet earth resulting from innovations through science and technology to name a few has led many scientists to focus on the earth's resolve to sustain the planet and be sustained by it for the future.

Might the latter be a call for sustainability through childhoodnature in conjunction with a globalized and digitalized environment, ever-changing and mutating along untimely pathways?

The backdrop to this chapter unfolds in the middle of problematizing the concept of childhoodnature and becoming through the lens of Deleuze and Guattari's (1994) geophilosophy. The chapter invites childhoodnature to experiment with territorialization and becoming through reading the world and self. They contribute to a research assemblage as they join elements of expression, content (bodies), and de- and reterritorialization. The purpose is to create a different path of research inquiry in the process of becoming. This path grew in opposition to conventional educational research (St. Pierre, 1997, 2004). Conventional research known as post positivism and humanism have dictated how scientific research is conducted by centering the human subject. The boundaries (categories) of conventional representational research are being challenged, and different directions to research are now emerging (Clarke & McPhie, 2015; Fox and Alldred, 2015). This chapter focuses on doing poststructural research with childhoodnature through the lens of rhizoanalysis and a reading of the world and self (Millei & Rautio, 2017). This research approach is an important direction in working with the complexity, messiness, and unpredictability in conceptualizing childhoodnature, rhizome, and reading. Multiple Literacies Theory (Masny, 2014a) consists of a counter-response to the arborescent/silo development of reading. It does not promote various presentations of literacies such as emotional literacies and financial literacies. Rather, literacies are characterized by their singularity that happens differently each time because of the setting in which they emerge (e.g., literacies in the context of family relationships, Bastien, 2017; Mozere, 2007; Riddle, 2014). Moreover, the concept of analysis deployed in this chapter has no connection with the humanist forms of analysis that rely on coding and categorization.

The writings of Deleuze and Guattari on geophilosophy Bonta & Protevi (2005) cast a gaze on the importance of ontology (May, 2005) in which earth and territory are closely linked. Geophilosophy has disrupted a conventional humanist perspective on knowledge, representation, thinking, binary logic, and the centered subject also known as the received view.

Thinking does not take place in the realm between subject and object; rather it takes place in the "relationship of territory to earth" and the "earth constantly carries out a movement of deterritorialization on the spot, by which it goes beyond any territory." Territory and earth are two components with two zones of indiscernibility – deterritorialization (from territory to earth) and reterritorialization (from earth to territory) (Deleuze and Guattari, 1994, pp. 85–86).

The humanist perspective in Deleuzian-Guattarian terms has been deterritorialized. Absolute deterritorializing refers to virtual movements moving through relative deterritorializing movements that are in the process of actualization (Parr, 2012). The movement from deterritorialization to reterritorialization calls upon the establishment of a territory once more but not the same as the previous territory. It actualizes differently. De- and re- territorialization participate in a potential

creation of a concept in an assemblage. Might childhoodnature emerge from such an assemblage? The French term, *agencement*, has been inserted because there are variations in translation (Bangou, 2013).

In this setting, there are questions: What is childhoodnature? How does it function? What does it produce in becoming? These questions provide potential experimenting with rhizoanalysis (Masny, 2013) and Multiple Literacies Theory (Masny, 2014a). More details are presented later on. Multiple Literacies Theory invites animal, human, and vegetal readings of the world and self in a research assemblage. It paves a path to becoming with the world. Children are nature and are inseparable from nature (nd.). Might it emerge that childhoodnature are-as-one and enable a becoming with the world?

Deleuze writes the following: "if children were able to make their protests heard in pre-school or simply their questions would be sufficient to derail the entire educational system" (Deleuze in an interview with Foucault, 2004, p. 291). What might these protests and questions be about? Several responses might emerge. One response that this chapter calls upon is creativity in open systems. In other words, the approach in conducting research is couched in terms of problems, questions, and concept creation of childhoodnature (Masny 2016).

How has educational childhood research transformed at/with the Anthropocene? Perhaps a comment from the Economist (2011) might be an indication. "Welcome to Anthropocene: Humans have changed the way the world works. Now they have to change the way they think about it, too." This change questions the role of the human in relation to nature and has led to experimentation embedded within what might be considered post qualitative research. Drawing from Deleuze and Guattari (1987), might the latter consist of a decentered subject and a rejection of representation and interpretation?

This chapter is interested in pursuing a twofold goal regarding the conductivity of childhoodnature research. The first is conceptual, that is, to trouble conventional research which consistently calls upon the researcher to interpret the results of a study. The second involves experimentation with the research(er/ed), by moving away from representation and interpretation and engaging with rhizoanalysis and its accompanying processes as well as practical oriented Multiple Literacies Theory (Waterhouse & Arnott, 2016). Might these goals take into account how the processes of the rhizome/rhizomic machine, rhizoanalysis, and multiple literacies function?

Rhizome, Rhizoanalysis, and Assemblage

The next entries speak exclusively to the concepts of the rhizome/rhizomic machine, rhizoanalysis, and assemblage. Later on, in the entry entitled "reading a research assemblage," we will see how they function. Through geophilosophy, earth and territory produce problems from life, and concept creation becomes along rhizomatic lines a response to problems in the world (Masny, 2014b).

Rhizome

What is a rhizome/rhizomic machine? how does it function?

> It[a machine] has no subjectivity or organising centre; it is nothing more than the connections and productions it makes; it is what it does. It therefore has no home or ground; it is a constant process of deterritorialisation, or becoming other. (Colebrook, 2002, p. 57)

It is an orientation toward research that adheres to an ontology that brings together geophilosophy and becoming, a rejection of representation, interpretation, and linearity. A rhizome is characterized by multiplicity, connectivity, heterogeneity, asignifying rupture, and mapping (Deleuze & Guattari, 1987).

An asignifying rupture, for example, refers to a rhizomic machine always in motion, traveling along lines. Its movements along horizontal lines are nonhierarchical and non-arborescent (Deleuze and Guattari, 1987). In a society, lines might be molar (rigid, institutions), molecular (supple, i.e., pivots toward molar or lines of flight), and lines of flight (creativity). "A rhizome may be broken, shattered at a given spot, but it will start up again on one of its old lines, or on new lines" (Deleuze & Guattari, 1987, p. 9). Lines break, and rupture, and flee, but the rhizome simply starts up again in the middle on a new line or along an old one (Deleuze & Guattari, cited in Bastien, 2017, p. 20). Deleuze and Guattari have proposed that lines of flight describe best a society. Through rhizoanalysis, lines enter into a relation with another. The relationality is one of affect, that is, becoming in the process of mapping connections of lines molar (rigid), molecular (supple), and lines of light.

Rhizoanalysis

The arborescent nature of conventional research attempts to predict (to fix, pin down) what research observations and interviews mean through representation and interpretation. With rhizoanalysis, a different way of doing research emerges (Clarke & McPhie, 2015). What is rhizoanalysis? How does it function? What does it produce in becoming? Rhizoanalysis is not a method. There is no one way to do rhizoanalysis. Its analytic orientation to research is based on the rhizome (multiplicity, connectivity, heterogeneity, asignifying rupture, and mapping). When there is an unpredictable rupture in conventional research, it might emit a line of flight whereby rhizoanalysis might create new connections of becoming. What was a particular form of doing research might be no longer. It is different. It is difference that allows for creation and invention to happen continuously (Dufresne, 2006).

Assemblage

The function of an assemblage is indicative of the societal perspective that Deleuze and Guattari privileged in their writings. For example, becomings do not happen in

isolation. Moreover, in an assemblage, there is no "I" (Deleuze & Guattari, 1987). An assemblage functions to decenter the subject be it human, animal, or vegetal. An assemblage consists of content (human, animal, and vegetal bodies) and expression (collective assemblages of enunciation, order words) and de- and reterritorialization. Content refers to the relationship between bodies (e.g., human, animal, and social body) and expression in an assemblage that takes into account that we never know in advance how a body will respond in the process of deterritorialization and reterritorialization (cf. assemblage, Masny, 2014b, p. 100). Expression refers to collective assemblages of enunciation (e.g., order words) that are subject to deterritorialize and then reterritorialize. Deleuze and Guattari maintain that language is social and not individual as utterances reflect a dominant social order. The deterritorializing process opens up potentialities for extending experience in an assemblage by reconfiguring the assemblage differently based on a relationality of the elements through affect. They are comprised of material matter which might be, for example, linguistic, social, cultural, and economic. In an assemblage, the elements are constituted nonlinearly and nonhierarchically and not pre-given similar to a rhizome that activates and disrupts (deterritorialize) the elements within content and expression and reconfigure the assemblage.

Multiple Literacies Theory

Multiple Literacies Theory is connected to rhizoanalysis. Multiple Literacies (Masny, 2014a) consist of words, gestures, and sounds, that is, human, animal, and vegetal ways of relating in reading the world and self and ways of becoming in the world. Reading self refers to a relationality of elements in an assemblage in the process of becoming (through affect).

Reading with Multiple Literacies Theory is a process and does not involve end points (reading and writing printed materials). What might be going on during reading in Multiple Literacies Theory brings us to ask: Reading what? Reading how? Art is an example. Conventionally we see/visualize art. In most cases, we do not hear art. Multiple Literacies Theory, however, favors reading art because reading art might be more than seeing. Reading can happen through the eyes and through the ears. Through reading, might there be tasting art, smelling art? The concept of reading is encompassing. Moreover, Multiple Literacies Theory rejects representation and interpretation. Through the lens of Multiple Literacies Theory, might hearing the art of Francis Bacon, for example (Deleuze, 2005), be blurring the boundaries of representational art? Reading art does not happen in isolation. The elements in content and expression in the assemblage relate to each other, and art is an element in the assemblage. Reading art in the process of becoming creates pathways of becoming previously not given, creating and connecting to other pathways that emerge and relate to each other through affect. In a certain way and as mentioned earlier, creating the concept of childhoodnature-as-one invites a reading of blurred boundaries of childhood and nature but also unpredictability, complexity, and messiness.

Reading Intensively and Reading Immanently

Conventional reading is involved in interpretation when asking what a text means. Rhizoanalysis and Multiple Literacies Theory are not interested in a question of interpretation. Rather, the interest lies in what reading does and how a text functions.

Multiple Literacies Theory is interested in reading intensively and immanently.

Reading intensively relates to an untimely disruption that creates a rupture and potentially emits a line of flight. This is a process of deterritorialization that simultaneously gives rise to reading immanently which consists of what might happen (potentiality) in reading, reading the world and self. Reading intensively and immanently, for example, the relationality of elements in an assemblage, deterritorialize and reterritorialize content (bodies relating to one another) and expression (social nature of language). Through the power of affect/becoming, the elements in the assemblage reconfigure only to engage in a continuous process of de- and reterritorialization. Moreover, once reading happens in untimely ways, there is no prediction about how reading is taken up.

Reading the World and Self

In Multiple Literacies Theory, reading the world and self is intricately intertwined but distinct, composite, and irreducible. Reading the world and self in an assemblage is reading the relationality of the elements (including self) in an assemblage. Reading the world is the point at which expression and the world meet and sense actualize in situ (Masny, 2016).

Reading and Text

Multiple Literacies Theory refers to texts, broadly speaking (e.g., in the context of mating rituals, music, visual arts, physics, mathematics, and digital remixes). Each text is a machinic assemblage (cf. previous quote on machine by Colebrook). In deterritorialization, texts are pre-personal, asignifying machines. Text reterritorializes through an assemblage of heterogeneous forces that come together in a particular time and place. Text is a sense event. Texts might be visual, oral, written, tactile, olfactory, and in multimodal digital (reading text, cf. Cutcher, Rousell, and Cutter-Mackenzie, 2015).

Theory-Practice

A question that might arise regarding the conceptualization of Multiple Literacies Theory concerns the word theory. It is used but has no connection to the humanist perspective as a perceived dichotomy between theory and practice. Theory works differently with Deleuze:

> A theory is exactly like a box of tools . . . It must be useful. It must function (Deleuze, 2004, p. 208). A theory is something that we must construct as a response to a problem, and if it ceases to be useful, then we have no choice but to construct others.

This approach to theory is inherently practical, although Deleuze distinguishes between theoretical and practical activities. Unlike a conventional approach to the relationship between theory and practice, theory does not represent or "speak for" practice, any more than practice "applies" theory: "there's only action – theoretical and practical action" – connected in networks and relays (Baugh, 2012). Foucault puts it in the following way: "Theory does not express, translate, or serve to apply practice."

In other words, the Deleuzian relationship between theory and practice does not deal with the conventional approach of theory and practice. Instead, a relationship is reconfigured as theory and practice to experiment. What are the implications of this relationship, theory and practice, for childhoodnature? Might childhoodnature be process-oriented? Might theory and practice come together as a sense event?

The toolbox is a concept that emerged out of discussions between Foucault and Deleuze (Deleuze, 2004). Deleuze likens a theory to a toolbox: "It has to be used, it has to work" (p. 208). Its practicality consists of thinking creation of new not pre-given concepts as a response to a problem. "Thinking is never just a theoretical matter; it has to do with vital problems" (Deleuze, 1995, p. 105). How are concepts practical? A concept becomes, "this power to move beyond what we know and experience to think how experience might be extended" (Colebrook, 2002, p. 17). Accordingly, Multiple Literacies Theory is interested in praxis, the ability to do, to practice when asking questions emerging out of problematization. The toolbox also has applications with rhizoanalysis.

Reading a Research Assemblage

From a Deleuzian perspective, the ontology that connects with Multiple Literacies Theory and rhizoanalysis is nonrepresentational. In this chapter, it involves an ontology commensurate with, in this case, geophilosophy. In addition, a research assemblage does not address data production in a conventional empirical way. Representation and interpretation deterritorialize and reterritorialize as non-representation and *interpretosis* (the sickness of interpretation) (Deleuze & Guattari, 1987). Moreover, reading a research assemblage happens through the lens of rhizoanalysis. There is no one way to do rhizoanalysis. Therefore, the readers will note that this rhizoanalytic approach to research is one not solely created by the author. Rhizoanalysis does not apply narrowly to vignettes (formerly data). It applies to all the elements (including the researcher) as contributors to a research assemblage of content and expression that de- and reterritorialize. The process then reconfigures the assemblage based on the relationship of affect among the elements in the assemblage. The research assemblage is not limited to what a researcher generates by way of interpretation based on the data before her. In this particular rhizoanalytic

approach, interpretation is deterritorialized and reterritorialized as purposeful questioning of statements in opposition to affirming the contents of a statement (please refer to three research studies below regarding the use of the question structure). It is a way to address the issue of interpretation. Interpretation focuses on data. In this rhizoanalysis, data is deterritorialized, and a different concept emerges, vignettes.

What might the assemblage consist of? Observations and interviews deterritorialize, reterritorialize, and conceptualize as vignettes. In this particular setting, they contribute to a research assemblage (researcher, research assistant, participants, computers, books, etc.). Vignettes are not subject to analysis according to codings. Codes classify and fix data. How are vignettes selected? Intense affective passages in bold (see vignette below) disrupt as connections happen in the mind of the researcher and produce thought. In other words, the selected vignette is based on its power to affect the assemblage and be affected by the assemblage. Vignettes rupture, deterritorialize, and take off in unpredictable rhizomatic ways. They also plug into a conceptual toolbox pre-personal and not pre-given (immanent). How? The plugging-in process (Deleuze & Guattari, 1987) enables reading intensively and immanently the relationality of elements in the assemblage that deterritorializes and reterritorializes content and expression (interviews, transcript, video, participants, computer). Vignettes deterritorialize and reterritorialize creating new territories (e.g., concepts, childhoodnature). In so doing, "we move away from the anthropocentric view which places humans at the center of analysis" (Martín-Bylund, 2017, p. 79).

The following vignettes come from three different studies. They might be instances of the untimely happening of an autistic child in class with teacher's aids (Boldt & Valente, 2014), Cristelle's choice of her favorite part of the school program (Masny, 2015), and the last study on bilingualism that "emphasizes and challenges standardized language models. … If one has learned the standard version of a language, then one who wants to call her/him self an expert needs to continuously seek to become" (Martín-Bylund, 2018, p. 17). The interactions deterritorialize as connections happen in the mind and produce thought untimely. Conceptualizing childhoodnature-as-one entails blurring boundaries from which mutations might emerge highlighting the complexity and the untimeliness of childhoodnature.

Boldt and Valente (2014)

In this study, Boldt and Valente (2014) filmed a student participant using a video ethnographic method (Tobin et al. cited in Boldt & Valente, 2014). They instructed their graduate students to film routines in a classroom which included the integration of an autistic child.

While debriefing, for example, with research assistants and researchers who filmed observations (Masny, 2015), the mind is not responsible for selecting video vignettes even though the experience of connectivity takes place in the mind. The different elements in an assemblage come together to produce thought in the mind of the current researcher as an element within the research assemblage. It is within the

research assemblage, including reading observations that rhizomatic ruptures happen and with the power of affect flowing through the relationality of elements in the assemblage, the concept video vignettes emerges. From the toolbox, a concept, pre-personal and not pre-given (immanent), emerges. There is a practical aspect for it is a response to a problem (undoing conventional qualitative research). Filmed observations becoming video vignettes plug into the potentiality of literacies as processes by extending experiences of what is to what might be. In the course of the filming:

> Children changed spaces, groups and teachers constantly. . .. Somehow capturing the constant movement of teachers, children, materials, and waves and bursts of affective tensions and energies happening among and within spaces began to seem more important than following the arc of a given event. In fact many of the things the children were doing did not have discernable beginnings, middles and ends, but seemed, in the language of Deleuze and Guattari (1987), to be all middles.

In other words:

> You never know what a body will do what it can do, in other words, what its affects are, how they can or cannot enter into composition with other affects, with the affects of another body, either to destroy that body or to be destroyed by it, either to exchange actions and passions with it or to join with it in composing a more powerful body. (Deleuze & Guattari, 1987, p. 257)

The human body is just one example of a body. There are others: animal body, body of work, and social body. A body, according to Baugh (2012), is defined "by the relations of its parts (relations of relative motion and rest, speed and slowness), and by its actions and reactions with respect both to its environment or milieu and to its internal milieu." In an assemblage, there are affects/becomings that enter into a composition with affects of another body and deterritorialize. From filmed observations emerges the power of affect, becoming that transforms filmed observations into vignettes and the basis for connecting video vignettes to the interviews. The vignette selected for the study is part of the current research assemblage. The relationality of affect among the elements produced a bold passage that signifies a reconfiguration of the assemblage and the potential for concepts to emerge. The bold parts in the vignette might affect and disrupt the research assemblage. The direction that the assemblage will take in its reconfiguration is unpredictable. The combination of disruption and affect or reading intensively and immanently is a rhizomatic process that creates a line of deterritorialization and becoming. "What transpires is, that is, an ability of the vignette and affect to bring forth the virtual thought of what might happen in an analysis. It is a process in which there is investment in reading the world and self" (Masny, 2013, p. 343).

In short, to read observations in a research assemblage that includes childhoodnature is also according to Multiple Literacies Theory to read vignettes intensively which deterritorialize and immanently (the virtual thought of what might happen when material elements connect to other material elements in the research

assemblage). While the experience of connectivity takes place in the mind, the mind is not responsible for emerging vignettes. Rather it is the reading intensively and immanently of observations for rhizomatic ruptures happening in the research assemblage.

Masny (2015)

In this vignette, Cristelle (pseudonym) had completed a language arts activity in class. As part of the research assemblage, there were research questions, graduate students as research assistants, physical spaces to film in the classroom, physical space to interview, the equipment, and material bodies connecting. Participation in debriefing sessions that consisted of questions flowing from problematization underscores the potentiality for concept creation in relation to the research assemblage and its reconfiguration.

Vignette: from poem . . .. C: Cristelle; D: researcher

In the introduction, the researcher asks about a poem they had done in class:

(D) Was it one you created?
(C) **No it was copied off the board**.
(D) Do you know what a poem is?
(C) Yes, it rhymes.
(D) do you write poems?
(C) I do them only at school when there is a celebration/birthday and I copy them off the board.
(D) **Why not write one on your own?**
(C) we need to write what's on the board when it's a proper poem.
(D) Could you write one?
(C) I do not know how to write a poem.
(D) What do you need to do to write one? ideas?
(C) ideas? **I don't have ideas**.
(D) what do you need to do to have ideas?
(C) think
(D) then you can think about ideas. Do you have any ideas?
(C) not really
. . . **to Gameboy, gym, recess and lunch**
(D) then what would you like to think about
(C) my Gameboy; I enjoy playing my Gameboy a lot when Dad is watching TV or mom is getting ready for bed.
(D) You don't need ideas for game boy?
(C) you need to concentrate, o go on to the next level, to win the game. I play with my friends. No electronics at school.
(D) **when at school then, what do you like the most?**
(C) gym, recess, lunch. At the gym, I play kinball.

How do the elements in this research assemblage engage in de- and reterritorialization of expression (collective assemblages of enunciation) and content (material bodies: human, animal, and vegetal)? How are vignettes selected? Intense affective passages in bold disrupt as connections happen in the mind of the researcher and

thought is produced. The vignette was selected by its power to affect the assemblage and be affected by the assemblage. Vignettes rupture, deterritorialize, and take off in unpredictable rhizomatic ways and create concepts. It is a process in which there is an investment in reading the world and self. Instead of considering interpretation and what a text means, the questions are what vignettes do and how they function. For instance, what might the assemblage produce in becoming of different pathways for childhoodnature? In the context of Multiple Literacies Theory, how does deterritorialization happen in reading the world and self? How is language molarized? Might it involve over-coding institutional practices of doing poetry (possibly school normativity at work)? How might language de- and reterritorialize and in the process undo normativity? While there is no response about ideas for writing a poem from Cristelle, there are ideas about Gameboy as Cristelle explains what the videogame does. Is this a moment of deterritorialization? And a potential reterritorialization where the gym, recess, and lunch have become the best of curriculum and moments of creativity in relation to Gameboy? In the interview, in her response, there might have been excitement in her voice when talking about Gameboy. From reading the world to reading self/reading the relationality of affect among the elements of collective assemblages of enunciation and material bodies, the assemblages reconfigure. In these configurations, Cristelle is an assemblage as well.

From this vignette, content in the assemblage provides movements involving various body formations/relations: Gameboy, recess, lunch, food, and connections of researcher body and child body. A vignette emerges as text stemming from the relationality of the elements in the assemblage. In other words, it is asignifying only to emerge signifying according to a particular setting. Reading and reading the world and self through text influence the text one continually becomes (Zhang & Gao, 2017).

Martín-Bylund (2018)

This particular study called the sand day moment takes place in Sweden in a bilingual preschool setting (50% Swedish and 50% Spanish). It is after lunch, and the teacher announced to the children in Spanish: “hay un pedacito de melón” (there is a piece of melon) for each one. According to Martín-Bylund (2018, p. 14):

> The children around the table immediately pick up the fruit expression, creating a rhythmic chant “de me-lón, nam namnam, de me-lón, nam nam nam, de me-lón,” at the same moving their bodies in time with the same rhythm. . . Using Swedish words, the children come up with two suggestions: “vattenmelon” (watermelon) and “honungsmelon” (honeydew). Teacher responds: “No, es solamente melón” (No, it’s only melon) the teacher answers in Spanish. “No hay sandía” (There is no watermelon). When the children insist on knowing whether or not it is honeydew, the teacher shrugs her shoulders and says it might be. She stands up and leaves the room to go and get the melon. While the teacher is away getting the melon, the children start exaggerating the Swedish pronunciation by calling it meloon, meloon. . ..

The children are enthusiastic about getting melon for dessert, but what sort of melon is it? Using Swedish words, the children come up with two different suggestions: "vattenmelon" (watermelon) and "honungsmelon" (honeydew). "No, es solamente melón" (No, it's only melon) the teacher answers in Spanish. "No hay sandía" (There is no watermelon). When the children insist on knowing whether or not it is honeydew, the teacher shrugs her shoulders and says it might be. She stands up and leaves the room to get the melon.

> During this time, the children discuss the pronunciation of the word melon, exaggerating the Swedish pronunciation by calling it "melOOOn, melOOOn." So how did the teacher say it? One of the children says she heard "vattenmelón melón," with the Spanish pronunciation in the ending... .In Spanish, it (watermelon) is called sandía, the teacher says when she comes back. "Det är nästan som sand" (It's almost like sand) she says in Swedish. The teacher insists that, that today there is only melon. But a third child continues focusing on new possibilities of this word. Do you know what sandía means? he asks his mates in Swedish. That it is "sand dag" [sand day]. Other children agree **and the first child, the one who earlier was appalled by the word, stands up and leans out of the window, calmly reaffirming that yes, today is sand day**.

What is happening when the child sticks his/her head out the window and affirms that today is sand day? The child is an assemblage as well as the sand setting. What reading of self and the world happened? Was the reading connected to seeing? Was there a visual reading, an audio reading? Was it an olfactory reading? Hear? Feel? Taste? Was it the wind in a relational connection of affect with the child?

How does the research assemblage function and what does it produce? Youbell's examples of the elements (social, cultural, political, etc.) are not pre-given instances of elements that might contribute to a research assemblage. The elements emerge in situ. These elements might relate to expression (the social nature of language folded into collective assemblages of enunciation in an institutional system such as school). Content might refer to bodies (human, animal, vegetal, social, body of writing). The instance given by Martín-Bylund (2018):

> At the beginning of the moment, the children immediately attach their bodies to the expression "melón" in the teacher's announcement. They connect to expression, rhythmically, but they also associate to its content, affirmatively yum-yumming with the same rhythm. (p. 17)

The sandía's pathway is interesting. From the teacher's utterance in Spanish sandía to a conversion to Swedish as sand day by one of the children to another child who leans out the window and utters that yes, it is sand day. From the perspective of Multiple Literacies Theory, what reading might have gone on? Would it relate perhaps to a windy cloudy formation? Might the sand element have reconfigured the assemblage. Were there sensations that live on independently of whoever experiences them and affects/becomings that spill over beyond whoever lives through them (Deleuze, 1995, p. 137)? A not seen fruit takes on multiple heterogeneous moments – from this unknown element going back and forth deterritorializing from one language to another: "The sense event of a sand day subsides in the word, but it happens to the present bodies, producing disgust, questions, interest, movement and contemplation" (Martín-Bylund, 2018 p. 15).

Intermezzo

The purpose of an intermezzo presents potentiality for research with childhoodnature by problematizing, questioning, and engaging in concepts of inquiry that Multiple Literacies Theory and rhizoanalysis deploy in a research assemblage. Through the lens of researcher-researched, Multiple Literacies Theory and rhizoanalysis propose to push experience of life within childhoodnature to its limits and beyond and to engage the process in between deterritorialization and reterritorialization. Through the rhizome, problematization becomes multiple. Rhizomatic shoots proliferate: from filmed observations to becoming-observation-vignettes and from transcribed interviews to becoming-analytical-vignettes. In other words, concepts of inquiry have through reading the world and self intensively and immanently emerged from a toolbox that is seen to work and produce new conceptualizations of research inquiry. Recall that the toolbox consists of creating concepts for the practical purpose of thinking differently about research and childhoodnature.

In conventional research, the familiar approach is to state the problem at the beginning of a research project followed by research questions. Questions are formulated with the aim of finding solutions. In rhizoanalysis conventional coding, problem-seeking-solutions and research questions deterritorialize and reterritorialize focusing on problematization and questions formulated to become responses in order to disengage from interpretation (interpretosis) and encourage concept creation (Cumming, 2015). Taken-for-granted assumptions of humanist research tools merit problematizing. Deleuze (1994) made problematization a significant aspect of experimentation and doing research. He proposed pedagogic experiments to allow young children "to participate in the fabrication of problems" (159). In multiple ways of reading and rhizomatic forces, Cristelle, through observations and interviews in the research assemblage, contributed to problematizing qualitative research. While Deleuze recognized that problems are important, problems are not merely "provisional movements destined to disappear in the formation of knowledge. . .." Problems must be considered as "possessing their own sufficiency" (p. 159).

In other words, problems are asignifying in becoming. In reterritorialization, a problem is effected and deploys literacies and rhizoanalysis with their non-hierarchical and nonlinear pathways of experimentation. Might what produces in becoming are new directions for thinking: problematizing? Multiple Literacies Theory and rhizoanalysis become an unfamiliar encounter to provoke thinking differently in postqualitative educational research (Wang, 2016).

Might Martín-Bylund's implications for bilingualism also have implications for Multiple Literacies Theory, rhizoanalysis, and early childhood? The argument here is not to restrict but to extend the possibilities of working with language and literacies in early childhood:

> . . .perhaps the bilingual situation both emphasizes and challenges standardized language models. Might this be an opportunity that includes the run-away character of the child and the stranger inherent in every word and in every moment. If one has learned the standard version of a language, then one who wants to call her/him self an expert needs to continuously seek to become. (Martín-Bylund 2018, p. 17)

What Martin-Bylund has proposed can be extended to encounters with the unknown, in other words, to affect and be affected in a rhizomatic assemblage engaged in reading the world and self intensively and immanently. Might seeking to become continuously in an assemblage also entail movements of various body formations (learner, apprentice, expert) in experimenting the researcher-researched connection? No body formation is fixed. Rhizoanalysis, through its multiple, heterogeneous, nonlinear, and nonhierarchical pathways, undoes the binary relationship and opens up a potentiality of what might happen through the lens of Multiple Literacies Theory. The centered subject has dissipated in a research assemblage.

The issues of Anthropocene and sustainability presented in the introduction has brought us to a space and time of decentering the subject. Reading through the lens of Multiple Literacies Theory and rhizoanalysis has challenged widely held conventional views of reading and qualitative research. The relationality of affect takes on considerable importance within a research assemblage. Based on an invitation to experiment, Multiple Literacies Theory and rhizoanalysis have globalized potentially in light of their goal to be practical and to address issues of sustainability that are worldwide connected.

Reading and childhood are well-known concepts to educators. However, in this chapter, reading, childhood, and nature have deterritorialized, and different concepts have emerged: might this concept of reading consist of reading the world and self intensively and immanently in an assemblage? Might childhoodnature come together as one and yet not irreducible? What might be happening? Herein lies perhaps an important concept to educators: to the researcher-researched relation always interchangeable, the expert continuously becomes. Moreover, this coming together of rhizoanalysis (assemblage) and reading through the lens of Multiple Literacies Theory might conceptualize differently childhoodnature.

Finally, Deleuze and Guattari have created a singular perspective on reality, an ontology through a societal lens, the network/assemblage, and lines of movement (molar, molecular, lines of flight). In the current climate when education promotes collaboration, networking, and communities of practice, it would seem that the writings of Deleuze and Guattari offer remarkable insight into teaching and learning. It requires different ways of thinking about education and childhoodnature.

The complexity and the challenges of problematization are evoked in Blaise's sentiment (2013):

> Deleuze ontology is not a resting place; it is not a zone of comfort; it is not an answer that allows us to abandon our seeking; it is the opposite. An ontology of difference/is a challenge. (May cited in Blaise, 2013, p. 183)
>
> The answer is not a given. Therefore, we cannot abandon our seeking because providing an answer would give way to interpretation. This is a hard pill to swallow in the educational field because teaching and learning are tied to outcomes. We navigate constantly through molar lines in striated spaces and time. While normativity can almost be equated to molarisation, under this umbrella [comfort zone], there is little risk in an encounter with the unknown. what can we learn? How might we then rupture/disrupt the concept of outcomes and experiment with different concepts? (p. 184)

Conclusion

An intermezzo is an open asymmetrical system preferred by Deleuze and Guattari that expresses a movement from de- to reterritorialization with spaces in between.

Cross-References

- ▶ Childhoodnature in Motion: The Ground for Learning
- ▶ Children in the Anthropocene: How Are They Implicated?
- ▶ In Place(s): Dwelling on Culture, Materiality, and Affect
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Porous, Fluid, and Brut Methodologies in (Post)qualitative Childhoodnature Inquiry
- ▶ The Nature of Childhood in Childhoodnature
- ▶ Toward a Pedagogy for Nature-Based Play in Early Childhood Educational Settings

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Mundane Habits, Ordinary Affects, and Methodological Creations

13

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Abstract

The aim of this chapter is to rethink "thought" in qualitative inquiry. We attend to possibilities that open up when we turn our attention to habits, ordinary affects, and methodological creations that are integral to the ways in which we think. The challenge of putting new materialism and post-humanism to work requires significant ontological and epistemological shifts. Nevertheless, it is only by shifting the ground on which specific knowledge claims are made that we can potentiate a different logic which in turn can alter both thinking and, importantly, early years practice. Thus this chapter will resolutely refute general ideas or models of what constitute familiar objects in early childhood settings, for example, "the cardboard box" or "the snowman" [sic]. Instead, such models, in

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situating them within a "zone of indeterminacy" (Massumi 1993, p. 99), are, as a consequence, freed from habitual assumptions – assumptions that, in our view, delimit the possibilities of what is possible. The chapter works with objects and processes, deliberately avoiding foregrounding the child, to leave the uncertainty and ambiguity of which things are in play, alive in the text. Through experimental methods the chapter will draw on two early years projects: *2-Curious* (a program of continued professional development for early years practitioners in Manchester, UK) and *Knotknowing Diversity in Early Childhood* (a research project reexamining "multicultural education" in an early years setting in London, UK), as generative examples of the potential of the entanglements observed during ethnographic research that take matter and materiality as their starting place.

Keywords
Habit · Affect matter · Process ontology

Introduction

The aim of this chapter is to rethink "thought" in qualitative inquiry. As we shall outline throughout this chapter, there is a pressing need for us to rethink the habits that surround, circumscribe, and limit what it means to think and what it means to know. As academic researchers much of our work is located within the terrain of childhood and early years education. As Peter Moss (2014) points out, early childhood education has globally assumed importance among what he describes as the "movers and shakers of contemporary life" (2014, p. 3) or, in plain speak, policy-makers. Like Moss we have fought, and we will continue to fight for children to have access to early years education. But like all education, early years education can and does have the potential "for governing children and adults alike, for reproducing the already known, for inculcating beliefs in necessity and essentialism, and for fostering the values and subjectivities required by a rapacious, technocratic and harmful economic regime" (Moss, 2014, p. 3).

Early years education is then a tricky terrain where certain global narratives including those associated with progress, development, and economics work at (re)producing ideological configurations of the child, childhood, and education, where children are perceived and understood as human capital who will procure economic salvation and social stability. However, while this discourse is clearly dominant, it can be challenged. But, as we shall go on to argue, it is a challenge that demands dislocating, displacing, and dislodging habits including habits of thought. While recognizing the importance of contributing to debates that politicize relations between the child, culture, and nature, we continue to wrestle with the term "childhoodnature" (Malone 2016; Taylor 2013). Acknowledging the need to queer habits of thought that fall into easy associations and can leave neologisms impoverished, we deliberately refrain from making a direct reference to this term in this chapter.

In our efforts to challenge our habitual practices, we have found it timely to remind ourselves of the etymology of "research." "Research" stems from *recerche* and *recercher* – a mix of Old and Middle French (which are historical divisions of the French language that include the period prior to the fourteenth and up to the early seventeenth century) where each means "to seek out and to search closely." The addition of "re" is also interesting where it expresses or denotes an intensive force in relation to the seeking and the searching. In the subsequent sections of this chapter, our efforts are directed at bringing these intensive forces to the fore because, in our view, it is these which can challenge habitual ways of thinking and habitual ways of claiming knowledge. In evolving this chapter, our efforts are directed at bringing new materialism and post-humanism into play so as to undertake both an ontological and epistemological shift. This is because both "enforce the necessity to think again and to think harder about the status of human subjectivity, ethical relations, norms and values" (Braidotti, 2013, p. 186).

Patterns of (Habitual) Thought

While we want to critique some of the mundane practices that attend our habitual ways of thinking, we also recognize that critique by itself is an insufficient antidote. As Latour (2004) forewarns, critique on its own has "run out of steam," while Braidotti (2006) argues that there has to be an "intimate connection between critique and creation" (p. 6). Deleuze and Guattari (1994) map out how this connection between critique and creativity might be evolved:

> To criticize is only to establish that a concept vanishes when it is thrust into a new milieu, losing some of its components, or acquiring others that transform it. But those who criticize without creating, those who are content to defend the vanished concept without being able to give it the forces it needs to return to life, are the plague of philosophy. (Deleuze & Guattari, 1994, p. 108)

We argue that it is by wrangling and plundering this "connection" that we are enabled to imagine alternatives, ones that allow for an ethics of (re)affirmation. Through experimental and uncertain methods, the chapter will draw on two early years projects: *2-Curious* (a program of continued professional development for early years practitioners working with 2-year-olds in Manchester, UK) and *Knotknowing Diversity in Early Childhood* (a research project reexamining "multicultural education" in an early years setting in London, UK). Both are examples of a new materialist process ontology that allows for "an open, relational self-other entity framed by . . . affectivity, embodiment, empathy and desire" (Braidotti, 2013, p. 26). As a consequence, both examples look to rhizomatic dynamics of repetition and difference (Deleuze, 1994; Williams, 2013) rather than social constructivist binary oppositions. As Bennett suggests such binaries can result in a "partitioning of the sensible" (Bennett, 2010; Rancière, 2001) where, as an example, we divide the "the world into dull matter (it, things) and vibrant life (us, beings)" (Bennett, 2010, p. 8).

It is within this habit that "power snaps into place," where "structures grow entrenched. Identities take place. Ways of knowing become habitual at the drop of a hat" (Stewart, 2007, p. 15). Our argument is that such habits of thinking and doing research are saturated in a human-centeredness that is sustained by the tendency to cling to what Braidotti describes as the "reassuring familiarity of common sense" (2013, p. 1) where narratives of rationality, normality, progress, and mastery are secured.

We would argue that there is an enormous price to pay for persistently seeing the human as unique. It requires that we continue to ignore what is habitually and "typically cast into the shadows" where we are, as a consequence, prevented from "detecting (seeing, hearing smelling, tasting, feeling) a fuller range of nonhuman powers circulating around and within human bodies" (Bennett, 2010, p. xi). If we continue to see matter as dead, we will continue to cheat matter out of the fullness of its capacities. As Braidotti (2013) argues, we already live and inhabit social reality in ways that surpass tradition where technological innovations including advanced prosthetics, reproductive technologies, and genetically modified food are all such familiar facets that distinctions between human and nonhuman become non-tenable. Yet, paradoxically, despite the complexities of a world, "where people… knowledge, values and ideas travel, cross national borders and encounter each other" (Olsson, Dahlberg, & Theorell, 2015, p. 717), education – especially early years education – continues to favor reductionist thought (Cannella, Pérez, & Lee, 2015; Dahlberg, Moss, & Pence, 1999/2013; Holmes & Jones, 2016; Moss, 2016).

Following Law (2004) we ask: Can we "unmake our methodological habits"? Can we live without the desire for certainty? Can we "unmake our desire and expectation for security" (Law, 2004, p. 9)? If, as both Ravaisson (2008) and Deleuze (1994) argue, habits are what render the subject coherent to itself where they serve as ontological anchoring points to "the ongoing flow of experience" (Lapworth, 2015, p. 5), can we and should we be implicated in intra-actions that might overwhelm such coherency? If, as Massumi suggests "habit is the body's defence against shocks of expression" (Massumi, 2002, p. 28), is it ethical to disturb such defenses? In attempting to answer these questions, we look to both Ravaisson (2008) and Deleuze (1994) who both similarly note that it is within the turmoil of overwhelming movements that there become possibilities for "cleaving open a conduit for action and response" (Lapworth, 2015, p. 5), thus positioning habits as sites for making change possible.

The following section of the chapter focuses on ways to tilt our mundane methodological and thinking habits. Resisting the habitual parsing of dull matter and vibrant life worlds, we try to rethink our thoughts as we get caught up with the movements and processes of ordinary affects.

Conduits for Action and Response: Ordinary Affects

Work emerging from the "affective turn" (Bennett, 2010; Clough, 2007; Deleuze & Guattari, 1987; Massumi, 2002, 2015) relates to bodies, but as Guillaume and Hughes (2011) point out, the *human* body is not the focus of thinking here, as a concept, nor as a context. "Bodies" are Spinozist configurations.

> . . . not defined by form, rather it is the potential of motion and rest and the effects of the body's motion and rest in relation to other 'bodies'. In this case, a body is considered to be an 'infinite arrangement of particles', (Deleuze, 1992). . . which could be anything; an animal, an idea a collection of things or people. (p. 24). . . (Wood, 2014, p. 24)

So, for example, the power of bodies (the particles, odors, shape, surface textures, and concept that constitute a cardboard box) to affect other bodies (the biological, physiological, sensorial, emotional, and cognitive apparatus of the human) includes a "corresponding and inseparable" capacity simultaneously to be affected (Bennett, 2010, p. 21). This means that the boundaries that might traditionally prescribe subject or object, life or matter, dull or vibrant are confused, even eradicated to produce a series of intra-active, fluid relations. Importantly, this notion of correspondence and inseparability is not about identity and fixity but about motion and rest and being in processes. As Deleuze and Guattari write:

> We know nothing about a body until we know what it can do. . . what its affects are, how they can or cannot enter into composition with other affects, with the affects of another body, either to destroy that body or to be destroyed by it, either to exchange actions and passions with it or to join with it in composing a more powerful body. (Deleuze & Guattari, 1987, p. 257)

Key writers in this field consider affect as something pre-individual, coming from "outside" bodies (Massumi, 2002; Thrift, 2008), yet passing over and through bodies, becoming constituted in feeling and eventually hitting "the cognitive apparatus" (Knudsen & Stage, 2015, p. 4). Along with many others (Ahmed, 2004; Blackman, 2012; Brennan, 2004; Knudsen & Stage, 2015; Thrift, 2008), we are interested in the potential of "affect" to erode our anthropocentric habits, transforming the way we think about and approach empirical work, particularly the traditional colonial relationship between the vibrant human "interpreter" and the dull or dead "interpreted" material.

For Knudsen and Stage (2015), the relationship between affect and research lies in researchers being able to generate agendas and ask questions relating to affective processes, collect or produce embodied data, and make sense of the data in the production of academic knowledge. Our interest lies in rethinking how affect pushes us toward a "zone of inventiveness" (Knudsen & Stage, 2015, p. 3) or methodological creation, by becoming attentive to "data" in new ways, generating new types of empirical materials, and, as Knudsen and Stage suggest, "collect[ing] material that has previously been perceived as banal or unsophisticated" (Knudsen & Stage, 2015, p. 3) and mundane or ordinary. We are interested in the affective powers of particular material relations (Svirsky, 2015, p. 50).

Mindful that when working creatively we need to develop better understandings of affective methodologies, there appears to be an urgent need to work through what bodies of movement, rest, and affect might *do* to each other and to all participating entities. In what way might thinking is this way be useful methodologically? What are the implications ontologically and epistemologically? We need to grapple with generating affect both in terms of its generative potential and in terms of its capacity to trouble us. Where the objective is to *register* affect in research, there is then an

investment in entering an event/situation/encounter with the goals of becoming-with, entanglement, presentpresence, attending to the microscopic, observation, and documenting processes. Research methodologies such as performances and practice experiments intended to *generate* affect might include being performative, orchestrated, choreographed, deliberately provocative, and expansive.

Hickey-Moody (2016) claims that practice as research remakes/remaps/reconfigures how a given subject is constituted. This is because affective methodologies designed to generate affect change subjects. We argue, therefore, that research must be transversal, that is, able to follow or sense the multifarious connections and intensities that coalesce in events. It must also be oriented toward eventualities that cannot be foreseen and avoid privileging human agency. Yet degrees of caution are necessary given that there are clearly ethical implications surrounding the effects of the affects. That is, we have an ethical responsibility in terms of what we do and what that does.

Methodological Creations

This next section of the chapter moves across two research projects to potentiate/illustrate our creative methodological movements. Firstly, we turn to *2-Curious* (2013–15), a Manchester-based continued professional development (CPD) program developed by researchers and academics from Manchester Metropolitan University in partnership with four early years settings, in Greater Manchester. Secondly, we turn to *Knotknowing Diversity in Early Childhood* (2016–ongoing), in a London-based early years setting with educators and children aged 8 months to 5 years.

The *2-Curious* CPD program was prompted by the UK Government's initiative "Two year old early education entitlement" (DfE, 2011, 2015) that allows eligible children to receive free early education and care. As a policy it seeks to "improve outcomes for identified two year olds who would benefit from access to high quality early years and childcare provision" (DfE, 2015). In terms of "eligibility," this is based on economic factors (e.g., receiving benefits such as income support or tax credits where there is an annual income of under £16,190 before tax) as well as factors associated with risk and vulnerability (e.g., a child who is being looked after by a local authority or a child who is receiving a disability allowance). This policy initiative follows a global pattern of many other programs that are targeted at disadvantaged young people where the idea of "improving outcomes" infers that, first, these have been predetermined, and second that professional knowledge production and application will be concerned with and based on the certainty of the results (Biesta, 2007; Cannella & Soto, 2010). Educational settings, including mainstream primary schools, which offer the 2 -year-old entitlement, have, almost inevitably, become embroiled in what Dahlberg and Moss (2005) describe as "seeking the best methods and procedures to delivering predetermined outcomes" (cited in Olsson, 2009, p. 81). It is this mundane "inevitability" that our research sought to destabilize, interfere with, and, at times, disrupt. Wallins graphically captures much of what we sought to interfere with:

> Regulated like zoo animals, teachers and students trace a deep rut at the threshold of their cages, habitually drawn back upon a course of life set out in advance. That is to say the curriculum-as-plan constitutes a ready made territory that always already marks a threshold for what should be thought or produced pedagogically. (Wallin, 2013, p. 198)

At its simplest, the 2-Curious research project is characterized by the Deleuzian concept, of "always becoming" where intra-actions between bodies, affect, matter, materials, practices, politics, objects, discourses, and theories simultaneously work with old habits while potentiating different habitual manifestations. The CPD sessions that were developed were understood as "points of affective openness to the strangeness of life itself" (Mitchell, 2010, p. 89). The aim therefore was to plan, implement, observe, and analyze six experimental sessions that would unsettle the habits, practices, and assumptions of those working with "disadvantaged" or "funded" 2-year-olds.

At this point, we plunge into the middle of one of the 2-Curious CPD sessions because, following Deleuze (1994) to push, sink, and flounder in the middle potentiates degrees of strangeness. MacLure elaborates further when she writes, "The middle can be a depthless and directionless (non-)place where subjects and objects no longer behave themselves or take up the places allotted to them by the rules of theory, methodology, or institutional discourses" (MacLure, cited in Cannella, Pérez, & Pasque, 2016, p. 107). It is the middle that we momentarily find ourselves working with(in) thought and ordinary affects, trying to tilt our own methodological habits.

In this particular CPD session, various agents including cardboard boxes of various sizes, together with practitioners, researchers, space, and other physical and physiological bodies, activated various intensities, unpredictable mobile fault lines, and energetic currents.

Video stills from 2-Curious CPD Project 2013

"*Close your eyes… can you feel*
the box with other parts of your body other than your hands?"
"Does your box have any taste?" (Session leader, 2014)

The particles, forces, and odors of well-worn cardboard boxes renegotiated the boundaries and sensations through intra-actions between bodily flesh and matter. Lines of flight traveled unpredictably provoking resonances that moved across and within bodies. Intimacy traversed between prosthetics where the diluted, dissolving boundary between box/body produced and procured sudden impulses. Strange encounters interrupted and fractured the familiarity of a hug. Movement was released and given permission to unfold in unexpected ways, ways that were neither dependent on nor attached to predetermined outcomes. Bodies were allowed to speak in the subjunctive "what if?" rather than tied to habit.

As an object the cardboard box is deeply familiar in early years settings. Children climb and hide in them. They are useful containers for practitioners to pack and store resources. Such a habitual relationship insists that the box being is constituted and characterized as dull or dead matter where the human body has vibrancy, life, and agency. Within this well-trodden furrow, the box is no more than ". . .'dumb matter' to be molded or informed by human interpretation or inspiration (Massumi, 2002, p. 173)" (MacLure, 2013, p. 228). The CPD session sought to undermine such an impoverished encounter between human and nonhuman bodies. The session (and us as researchers) struggled to think about what might emerge from Bennett's "corresponding and inseparable" capacity of different bodies to be affected by and simultaneously affect each other (2010). How could we think about unravelling the body's organization and unmaking "our thousands of component habits" (Deleuze, cited in Hroch, 2015, p. 61)? Mitchell posits such work as an affective event:

> . . . it does not begin with the attributes of the 'object' in order to define it as if it were something static that can be described and understood. . .. The 'object' on its own is not sufficient; it is also necessary to include its affects . . .. (2010, p. 28)

Bissell suggests that our habits of thought are open to transformation both through "subtle alteration and gradual, incremental change" (Bissell, 2012, n.p.) as well as "more sudden irruptions in the tissue of experience brought about by the shock of an encounter" (Lapworth 2015, p. 3). Provocations of shock and discomfort that were prompted by the unexpected imbibed the (extra)ordinary cardboard box with "surging capacities to affect and to be affected." Set within the assemblage, something was released, where a continual motion of relations, scenes, contingencies, and emergences unfold. Impulses were triggered. Sensations, expectations, daydreams, encounters, and habits were set in circulation. Non-hierarchical attachments formed where different bodily allegiances were constituted. "Something that feels like something" happened (Stewart, 2007, p. 4). For one actor this "something" was articulated as *acute discomfort*, made more so when *my eyes were closed*.

There are two significant points we want to make at this juncture. The first centers on Barad's "practices of diffraction, of reading diffractively for patterns of

differences that make a difference" (Barad, p. 49, cited in Dolphijn & van der Tuin, 2012). We want to suggest that in the cardboard box CPD session, where multiple entanglements occurred, various and varied irritations happen. These allow for careful readings "for differences that matter in their fine details," together with the recognition that "intrinsic to this analysis is an ethics that is not predicated on externality but rather entanglement" which, as Barad argues, are "respectful, detailed, ethical engagements." In brief, "diffractive readings bring inventive provocations; they are good to think with" (cited in Dolphijn & van der Tuin, 2012, p. 49).

"Acute discomfort" as a practice of diffraction calls into question what is ordinarily and customarily expected from continuing professional practice where typically the focus is on consolidating and extending individuals' strengths. As Stewart points out:

> The ordinary can turn on you. Lodged in habits . . . it can flip into something else altogether. One thing leads to another. An expectation is dashed or fulfilled. An ordinary floating state of things goes sour or takes off into something amazing and good. Either way, things turn out to be not what you thought they were. . . The ordinary is a thing that has to be imagined and inhabited. (2007, p. 105).

In these encounters, matters of fact, including those relating to boxes and humans, intra-acted with matters of concern and matters of care which emanated into resonances and dissonances. It is these that "make up diffraction patterns that make the entanglements visible" (Barad, 2003). Kirby follows a similar trajectory when she writes, "matter appears as something that is not only spoken about or spoken with, but rather as itself simply *speaking*. Nature and culture, word and flesh are "all emergent *within* a force field of differentiations that has no exteriority in any final sense" (Kirby, 1997, pp. 126–127, original emphasis). Perhaps, it is "beneath the generalities of habit in moral life we rediscover singular processes of learning" (Deleuze, 1994, p. 28).

The second point relates to the question of seeing, where having one's eyes closed exacerbated feelings of discomfort. Deleuze and Guattari (1987) urge us to use our eyes differently.

> *I felt uncomfortable closing my eyes. . . it made me feel vulnerable*. (participant, 2-Curious, 2014)

Deleuze and Guattari intimate that the habits of the eyes, as organizing forces, render things already known, legible, and over-coded. A body's organizational habits dictate that seeing is a function of the eyes, breathing is a function of the lungs, and thinking is a function of the brain, yet "My eyes are useless, for they render back only the image of the known. My whole body must become a constant beam of light. . ." (Deleuze & Guattari, 1987, p. 190). In the data above, the methodological idea of *closing my eyes* is interesting in relation to opening up the body to different encounters where without the principle of organization, bodies are

afforded new kinds of existence. What work does this action do to habits *of* the body, *of* sensations? What might happen if we were to close our eyes and "see" otherwise?

> Is it really so sad and dangerous to be fed up with seeing with your eyes, breathing with your lungs, swallowing with your mouth, talking with your tongue, thinking with your brain, having an anus, a larynx, head and legs? Why not walk on your head, sing with your sinuses, see through your skin, breathe with your belly… Where psychoanalysis says, 'Stop, find yourself again,' we should say instead, 'Let's go further still, we haven't found our BwO yet, we haven't sufficiently dismantled our self. (Deleuze & Guattari, 1987, p. 51)

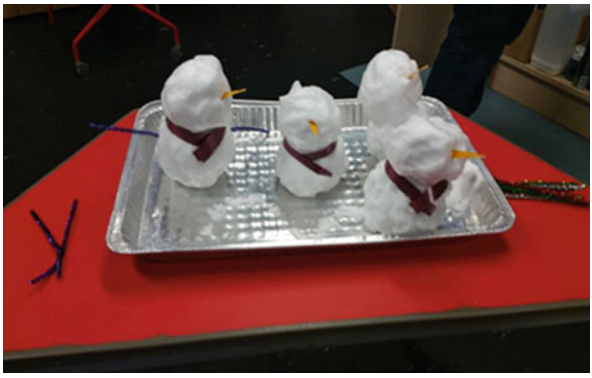
In the event of *closing my eyes*, the participant was returned to the "thingness" of the box, evoking a sensation of vulnerability and performing a process of dismantling the habits of looking, seeing, coding, and interpreting. Dismantling some of the habitual functions of the face means no longer looking with her eyes "…but to swim through them, to close your eyes, to close your own eyes, and make your body a beam of light moving at ever-increasing speed" (Deleuze & Guattari, 1987, p. 187). The box and that which is ordinarily and habitually attached to a box took on another form where its textures, edges, sound, and tastes were entangled with parts other than the eyes. Both as a concept and as an object, the box began to shift, where it was encountered as "sensation." As with Picasso's figurative paintings that overturn the rules of appearance, "so that form could pass directly from the eye to the stomach without going through the brain" (Francis Bacon cited in Deleuze, 2013, p. 38) so too did the box. We suggest that in moments when eyes were closed, encounters with the form of the box passed directly from the hands, or mouth, or cheek to the stomach, as sensations, which as Massumi notes, "…call habit to eventful attention. They impinge with force. They impact. They arrive, and insist …" (1998, p. 155). We would argue that the sensations of becoming *uncomfortable* and *vulnerable* are produced as part of a process of mutual constitution of the body (subject) and cardboard box (object), two entities that, after *closing my eyes*, only became relationally distinct and no longer seemed to exist as separate individual elements.

Continuing to take ordinary, mundane matter and practices found within early childhood landscapes, the chapter moves to the Ladybird Room, in London, at Christmastime. The Ladybird Room is "the toddler room," but it is also a space occupied by nonhuman and other-than-human agents. It is a familiar environment, looking remarkably like many other "toddler rooms" in nurseries up and down the UK. But in many senses, the Ladybird Room in its mundane, familiarity is extraordinary; it holds the potential to generate fresh understandings about "multiculturalism" in early childhood when attention is paid to entanglements and the material-semiotic-discursive processes through which diversity manifests in unexpected ways.

Like 2-Curious, this study demanded a sense of researcher as non-expert be embraced and to take up Haraway's (2016) invitation to "Stay with the Trouble" so that habitual practices of gathering, recording, coding, and interpreting might be dismantled and so generate other ways to encounter and sense cultural diversity. Working to rethink habitual practices in research urges a focus on the small stuff, the intra-actions between researcher, spaces, place, matter, and sensations. Allowing ourselves to get caught up in movements and processes, sensing the multiple intensities that coalesce in events – but all the while retaining the political imperatives underpinning research in and for early childhood.

Rethinking, refeeling, and refolding ideas about diversity in early childhood involve attention to micro-events, ordinary routines, and mundane situations, sensing intensities and what MacLure (2015) terms "glow" moments, to be open to what else might be there and to reconfigure and stretch ideas about diversity and difference and how it is produced through everyday, seemingly unremarkable events and intra-active processes. Without clear intent, the research sought to register the messy entanglements of matter, affect, and bodily expression during "events," celebrations, and festivals (e.g., Christmas) to reimagine how cultural diversity and difference play out, are embodied, and are expressed in early childhood contexts.

Guiding the study was the goal to generate multiple and experimental ways of (not) knowing and so avoid getting stuck in familiar ways of thinking and doing. Reconfiguring diversity in early childhood contexts involved multiple processes of charting the terrain and experimenting and resisting the comforts of recognition, reflection, and identification.



I am immediately hailed by a congelation of shaving foam snowmen [sic]; carefully crafted, uniform in size, some adorned with scarves and noses, left for future play/work– for now, neglected snowmen sit expectantly. A line of empty shaving foam cans by the sink suggest snowmen are a regular, habitual feature of the pedagogical practices within Ladybird Room.

What does shaving foam make possible?

Near-empty cans of shaving foam invite a trio of boys. Squirting, spluttering, hissing, ceasing to offer smooth balls of foam, noisy spray, laughter, mess. Two girls become entangled, shavingfoamsnow sprayed over the carefully prepared and expectant snowmen: "It's a blizzard, look it's snowing, we've made a blizzard". Animated laughter, slowly, painfully slowly, the can empties; entranced by/through chaos, mess, noise. In mock horror: 'What's happened to my snowmen!?!'

A vocal undertone suggestive of displeasure, frustration, deflation. Handfuls of 'snow' squeezed through fingers, passed from hand to hand; delving back into the blizzard mound for fresh handfuls, laughter, joy, concentration, pleasure. A sheet of boggly eyes – no use to the buried snowmen. Children becoming snowmen –boggly eyes stuck to cheeks, cut-out carrot noses stuck to faces with blobs of shaving foam – hilarity –jumping – up-down-up-down-flapping-circling – jumping eyes that boggle. Soon all the children, and the researcher are jumping high to make the extra eyes boggle. Raucous laughter, frenetic energy – still the snowmen remain buried and neglected. . ..

Meanwhile a lone girl with a slight frame sits quietly at the next table, deeply engrossed, crafting Christmassy shapes from Play-doh (green with red glitter mixed in). Methodically rolling and cutting the dough with Christmas shape cutters. Completely divorced from the shaving-foam-blizzard-boggly-eyed-bouncing assemblage at the next table. Doesn't speak; wondering: is English not her first language? Fair black skin, delicate features, tightly braided hair, cornrows. Children move to the play-doh table: invasion . . ..discomfort, searching looks for an adult, communicating without words or signs, both move gently to the abandoned shaving foam table.

What does the shaving foam snow make possible?

Calmness, quiet, handfuls of foam simultaneously crafted in to smooth balls. Reassured, contentment at physical proximity of the educator and absence of the rowdy crowd. Deep immersion with the foam – careful and gentle, moulding a smooth ball, extra scoops to increase the size of the ball, smoothed, swelling, all-consuming. Weightlessness of the foam produces mime-like motions. How unlike snow shaving foam is – not cold, not wet, no crunch, no solidity at all. Wondering: has this girl ever handled 'real' snow?. . ..

What does the shaving foam snow make possible?

With time and care a fresh set of snowmen are crafted by this lone girl and the educator – working in parallel, without interaction or words spoken they have an ease about their relationality and familiarity with the task. The educator intermittently assists (party hats down from a high shelf, scissors, something else and something else) – the educator leaves the girl by herself; seems unfazed. . . children approach the table – she stops – she freezes –remains mute, expressionless but frozen. They move away, she resumes shaving-foam-snow. The crafting of snow balls, texture of the foam. . .calming, all-consuming – as with case with the play doh previously. Wondering: how matter matters.

These observations might generate familiar thoughts. Deconstructing and critiquing take us to familiar places both theoretically and politically. Interpreting that which appears to be represented in this scene (re)tells stories about race and ethnicity, gender, SEN, ESOL, and pedagogical practices that are all too familiar. Putting to work feminist new materialism makes materiality and entanglements the starting place and enables us to rethink thought. We are freed from the anthropocentric concern to know and fix the child-subject. We are offered other, less certain possibilities. The shaving foam makes possible other ways to rethink thought about early childhood; cultural diversity manifests multiply through the events, the entanglements, and the assemblages as fleeting, fluid, shifting, co-constituted, and processual rather than fixed and residing within the subject. Taking the cardboard box and the shaving foam snowmen as multiple and interwoven material-semiotic-discursive entanglements provides us with something to think with.

Working with post-humanist epistemologies opens up possibilities to chart curriculum frameworks and research methods against what unfolds in the routine, everyday events in nursery environments – possibilities emerge between the porosity of discursive discourses and materialized practice. Dominant discourses readily perceptible include child development, multiculturalism, scaffolding pedagogies, free flow, social interaction, sensory play, and so on. But Haraway's practice of becoming-worldly-with begs that we consider the inter- and intra-relationality between human, nonhuman, more-than-humans, and everyday life and how it is situated politically, historically, and geographically.

Bennett (2010) shifts focus from the human experience *of* things to things themselves. She explores how political analyses might change if we acknowledge that agency always emerges in the ad hoc configurations of human and nonhuman forces. Recognizing that agency is distributed in this way, and that it is not solely the province of humans, might spur the cultivation of a more responsible, ecologically sound politics: a politics less devoted to blaming and condemning individuals than to

discerning the web of forces affecting situations and events. Taking the cardboard box; taking the shaving foam as something to think with, as a means to figure; and putting to work Bennett's ideas of "thing power" and vital materialism in early childhood contexts, we might ask: What does *becoming shaving-foam-snow* make possible? How does it function and connect with other things? What intensities does it stimulate or allow or refuse? What traces does it leave?

This questioning can prompt investigations into the assemblages of relational entanglements within the event itself: boggly eyes, too small furniture, cornrows, music, clocking practices, food, mirrors, hissing, silence, jumping, flapping, laughter, dismay/frustration, inclusion/exclusion – but also what informs the agents within the assemblages and where they might take us. These complex assemblages of relational entanglements offer another way to consider the politics of seemingly inconsequential events and everyday occurrences within early childhood contexts. In order that educators and researchers might persistently grapple with so as to produce alternative and more expansive understandings that might offer the space to collectively identify and reimagine *matters of concern* and *shared problems* in early childhood contexts. Educators are offered the chance to become entangled with the materiality of their practice in ways that enable a critical engagement with the structures of policy, curriculum with which they are expected to work and which they in turn shape.

The not-knowingness of research framed by feminist new materialism means that we cannot know in advance what will emerge, but it invites an exploration to try things out that might not work. The goal of research in this mode of inquiry is more open-ended and shaped by uncertainty. It is research that invites us to be curious, to wonder, to wander, to question, to falter, and to recognize that we do not have the solution because there is no one solution. But there are ways in which we can open ourselves to the not yet and not known rather than falling into old orthodoxies about what we think we know about childhood, diversity, and education – that merely reflect back and reinscribe.

We need to stay with the trouble of children's matters of concern as experienced and witnessed in everyday encounters and routine events. Expanding our conceptions of the child, beyond humanist concerns with the subject, to children as entangled and of the world creates ways to reshape ideas about pedagogical and research practices, advocacy, and activism. The becoming-shaving-foam-snow provides a "reference point for new questions, new practices and new values" (Stengers, 2010, p. 5). It creates spaces for entanglement to offer generative possibilities to pursue ambitions for experimental and creative, politically framed practices that offer generative potential.

Concluding Rethought Thoughts

Previously we made the point that when (re)search(ing), the desire was to allow for the play of intensive forces because it was within and among these that there were possibilities for challenging habitual ways of thinking and habitual ways of claiming

knowledge. We would like to suggest that both of the examples assemble human and nonhuman bodies, which in turn constitute both "an event and a sensation" (Stewart, 2010, p. 4). We want to also suggest that the two examples are imbued and carry with them forces and movements that in our view work against the "convulsive tics," that is, the "machinic repetitions" that can characterize research and which "serve to curtail the subject's capacity to affect and be affected, and which limit the field of possible becomings" (Ravaisson, 2008, p. 51).

Finally, the examples avoid making definitive claims, and in so doing, they both work at diminishing the role and position of us as researchers. So rather than being positioned as "agents on hot pursuit of something definitive," we are caught trying "to become attuned to what a particular scene might offer" (Stewart, 2010, p. 5).

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Porous, Fluid, and Brut Methodologies in (Post)qualitative Childhoodnature Inquiry

14

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Abstract

Since the 1980s, research practices used to investigate children and childhoods have experienced a philosophical upheaval, with challenges to traditionally designed research, invoking epistemological and ontological shifts. Both epistemological and ontological shifts have brought to attention the complexity and plurality of children and childhoods and highlighted its epistemologically unstable structures. In this chapter, we follow this trend to problematize the thinking in childhoodnature inquiry that perceives methodology as a set of fixed, controllable, foreseeable, neutral, and a-theoretical practices, which ultimately repeats and reproduces ontological and

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epistemological sameness. In resisting this status quo, we draw on post-qualitative scholarship, inspired by post-human theories of difference and relationality, who maintain ontological worldviews and methodological practices as fluid, dynamic, and unstable, founded within dimensions of uncertainty. In calling for divergent methodological practices in childhoodnature inquiry, we make connections between the foundational theories of Piaget to the innovative and radical work of Gilles Deleuze, suggesting such frameworks provide a leaky, yet productive, architecture for a rethinking of methodological practices. The notion of leaky architecture enables a rethinking of binary language to invite movement and relationality: between subjects and objects, children and adults, and theories and methods. This chapter ends with a call for porous, fluid, and brut methodological practices as a way to adhere to movements of the unrefined and leaky nature of childhood as well as methodology.

Keywords
Childhoodnature · Post-qualitative · Piaget · Deleuze

Introduction: Beginning in the Middle

In this chapter we problematize methodological thinking in childhoodnature inquiry which is usually perceived as a set of fixed, controllable, foreseeable, neutral, and a-theoretical practices often aiming to repeat and reproduce onto-epistemological and conceptual sameness. Since the 1980s, methodologies researching children and childhoods have gone through philosophical upheaval, including ontological and research design-related developments. Both epistemological and ontological shifts have brought into attention a complexity and plurality of childhoods and highlighted its epistemologically instable structures. These shifts have also altered the ways in which children and childhoods are theorized, studied, and researched and have reconstituted childhoods as epistemologically instable structures.

Similarly, to children and childhoods, "nature" is a very complex notion. It is beyond the scope of this chapter to explore all the complexities associated with brutal, romanticized, and naïve versions of nature related to children and childhood, including the notion of urban/nature/childhoods (Duhn, Malone, & Tesar, 2017). Our "beginning in the middle" builds on the notion that there is nothing static about children and childhoods: these are continuously moving structures that highlight the "methodology of a subject" as decentered and children as part of shifting connections within/in/alongside nature, more-than-human assemblages, and fields of relations.

Our argument follows post-qualitative scholarship inspired by the ontologies of difference and relationality, where methodological thinking appears fluid, unstable, and with uncertain dimensions. Moreover, the various exciting contemporary research projects reflect how post-qualitative inquiry has embraced philosophy into methodological thinking and doing (see, e.g., Lather & St. Pierre, 2013). Furthermore, authors of this chapter are also involved with thinking and doing philosophy as a method (e.g., Koro-Ljungberg, Carlson, Tesar, & Anderson, 2015). Post-qualitative thinkers have also introduced concept as a method (Lenz Taguchi, 2016) and practices of thinking with theory (Jackson & Mazzei, 2012).

Furthermore, conceptual and theoretical work "against the method" (see Law, 2004, 2006, Lather & Smith, 1997) already started some time ago, and this chapter continues and expands the anti-method critique by imagining methodologies-in-making, methodologies which might not carry the name of methodologies (see Koro-Ljungberg, 2016), and by revisioning how practices beyond the singularity of method could be (re)conceptualized and (un)practiced in the context of childhoodnature inquiry. Methodologies, as conceptualized in this chapter, are always methodologies-in-making in childhoodnature inquiry, inspired by various forms of critical/postmodernism standpoints and post-theories (Fig. 1).

Post-human scholars, such as Braidotti (2013) and Barad (2007), have critiqued anthropocentric ethics and ontologies. Methodological practices as "post-moves" (e.g., movement toward postmodern, poststructural, post-colonial, and post-human inquiries), and. . .and. . .and ongoing material and relational reconceptualizations bring forward potential ways to challenge dominant, rigid, and close-ended research approaches. In particular, these methodological choices problematize the role of generalizable and objective scientific method and methodologies in the context of learning, education, and childhood studies. However, it is important to acknowledge that even though we use the notion of "methodology" in this chapter to engage with broader methodological discourses, we find this term and concept increasingly problematic, and as such we call for serious creative and practice-based departures and breaks with tradition. In such thinking, the methodological question is no longer how to study children and childhoods in separate, developmental, and individual contexts, but how children and childhoods are constituted and positioned in childhoodnature inquiry, how childhoodnature inquiry functions, and how children relate to the other in a continuously changing the world of relations, power, and more-than-human. Thus, research questions and study purposes look, feel, and taste different, once we seriously consider and do post-turns. Furthermore, methodological practices, traditionally employed in childhoodnature inquiry, are challenged through scholars' reconceptualization of post-qualitative childhoodnature inquiry.

Our thinking in this chapter addresses and in many ways exemplifies ontological repositioning, repositioning that brings into the focus philosophy, relationality, complexity, and materiality. We discuss connections to relational ontologies that shape the enactment and production of philosophy as a method (see also Koro-Ljungberg et al., 2015). Relational ontologies bring theories to work and practices to theory constituting scholars, participants, and children as important parts of these relations, thus functioning as a continuously shifting process, transforming "method" and thought in the act (see also Manning & Massumi, 2014). Such a destabilizing and collective "method" uproots established humanistic (read human-centric) epistemologies and fixed anthropocentric ontologies covering a vast territory of thinking, relating, caring, and doing. We encourage readers to consider how theories enter practice of care, how thought in the act functions, how methodologies gain their relational traction, and how "thinking" and "doing" philosophy as a method shapes and is being shaped by relational ontologies, then and now, and what role post-humanism and new empiricisms play in these relations. We ask ourselves a question: how are methodologies and methods functioning in these relational spaces of childhoodnature inquiry?

Fig. 1 Fluidity 1

After the post-qualitative and material turn in ontology, methodologies and methods can no longer be viewed as containers that clearly separate inside from outside, self from other, or method from intuition, philosophy, or creativity. Similarly, Manning (2013) writes about skin as a container, where we draw a parallel to methodological discourses. "What if the skin [methodologies] were a porous, topological surfacing of myriad potential strata that field the relation between different milieus, each of them a multiplicity of insides and outsides?" (pp. 1–2). These kinds of porous methodologies are collective and relational. As a result of relationality and endless actual and virtual connectivity, "methodological sums" are always more than their parts. Methodological foldings bring into appearance both the strata and the immanence of matter, content, form, substance, expressions, and creative forces. Instead of independent singularities, methodologies might function as dynamic forms and forces of relationality and worlding that refuse categorization (see also Manning, 2013). Through this premise, we relate childhoodnature to an assemblage of concepts following a line of thinking that especially draws from post-method movement, relationality, and "methodologies without methodologies" (Koro-Ljungberg, 2016). In this chapter we offer brut, fluid, porous methodologies as potential methodological forms and examples of uncertain processes of inquiring into difference, and. . .and. . .and inquiring into difference differently.

To disorient the reader (in the hope of generating alternative paths to think and practice childhoodnature methodologies differently) and offer closer proximity to our "structures without structure," we have composed parts of this chapter as brute and unfinished relations and dialogical encounters between different discourses, voices, and perspectives. We share thoughts related to philosophy as a method and how thinking through a Piaget-Deleuze continuum or mobile space could assist us to reconsider methodological relations. We also carry on a conversation about the childhoodnature and relationality embedded in children nature spaces, places, and practices. Words, phrases, signs, images, and utterances in the middle serve as connectors, traces, and linkages between different thoughts and discourses. This way we also show how text and childhoodnature methodologies are productive and generative, yet they might resist generalizability, easy digestion, simplicity, and linear logic.

Childhoodnature Inquiry

From our perspective, philosophy as a method brings theory into the practice and ontologies into the research processes in different ways. For example, philosophy as a method represents a potential yet functional oxymoron and intriguing paradox forcing readers and users of methodology to give up their potentially fixed and overly normative uses and definitions of a "method." Philosophy as a method challenges existing practices and theories by connecting to other circuits, embodying critical questioning, and potentially pointing to the paradoxes and limitations of our

current schemas and conceptualizations. Philosophy as a method embraces thinking and the epistemological, ontological, and ethical relationship with a thought (Fig. 2)

It is possible that the diversity of post-qualitative inquiry proves the flexibility and plasticity of the research design within which it counts as research. Furthermore, thinking with and about thought and conceptualizing philosophy as a method could lead qualitative inquiry toward, but also beyond, the unthinkable. Thinking the unthinkable (alongside, with, or through philosophy) refers to the undoing of research design and categories, assumptions, and models. Conceptual and theoretical hybrids, leaps, arrests, and slips produce methodological surprises, which may enable the creation of methodologies which might mimic the creation of concepts (see Deleuze, 1991). When philosophy is brought into a method and/or seen as a method, method can no longer be treated as an objective set of procedures, automated activity, or a predetermined, single, and simplified task. Instead, philosophies create conceptual movement, critical questioning, and diversity in a thought-in-the-act where thinking and doing blend and interact continuously and seamlessly with the "other." In this sense, Law (2004) argues that method is about a way of being and the type of science (about ontological decisions) it chooses to practice. Method is not only reflective of ontology, but it ontologizes, and it reinforces ways of being and thinking. Therefore, we encourage the reader to think about slow methods, vulnerable methods, modest methods, and silent and silenced methods and explore experimental diversions from what would normally be thought (Fig. 3). And.

Methodological studies about children and childhoods perform the role where child as a human subject forms a center of an injury. As we have argued above, the focus or parameter of inquiry and knowledge in childhood research has changed throughout the years. First, the focus shifted from researching on a child to researching with a child and by a child. The recent methodological thinking challenges the role of human subject (including a child) on an ontological pedestal. And as such, a child's role and functioning in the world, agency, and independency and so on have been continuously reconceptualized, moving from children being objects of inquiry to be measured, observed, and hypothesized about (through objectivism, positivism, and other ideologies) toward children as relational subjects, becoming intra-active elements of inquiry (through post-inquiries). Through these methodological lenses, children are perceived as capable of creating their own interview data, talk, materials, and artifacts (see subjectivism, interpretivisms), but also, as per the theory argued above, children are too being conceptualized as a part of intra-active assemblages, constituted in more-than-human relations (postmodernisms, new materialism). These shifts and transformations have also influenced how knowledge, scholarship, and methods have been conceptualized and carried out in relation to children and their worlds. We argue that as thinkers shift and reconceptualize the role of the child (e.g., in relation to more-than-human world), methodologies and methods also need to be rethought and reconceptualized. It is for the scholars of today's post-human and more-than-human world to take on this challenge to move beyond stable, fixed, objective, or even subjective methodological thinking and imagine methodologies that are possibly porous, fluid, and brut.

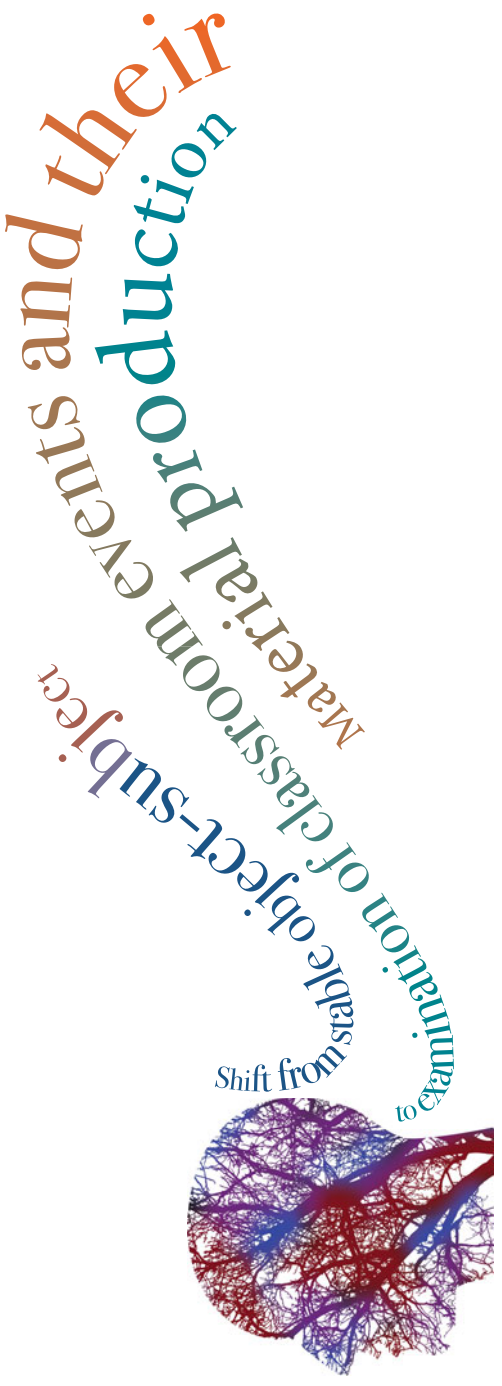

Fig. 2 Fluidity 2

Fig. 3 Fluidity 3

Porous, fluid, and brut methodologies can be traced through the ontological turn, which educational researchers recently have extended to childhood and children. We are exploring such ontological positionings of children and their childhoods. We can also see traces of porous, fluid, and brut methodologies: studies that address issues as diverse as policy documents on the rights of children (Dahlbeck, 2014a), children's movement and play (Land & Danis, 2016; Rautio & Winston, 2015), and the sounds and listening practices in early childhood classrooms (Schulte, 2016). These studies critique not only notions of childhood subjectivity but also stable and inert conceptions of material and ontological reality. For instance, Dahlbeck (2014a) found in the Swedish declaration of children's rights assumptions of child subjectivity based on universal essences and forms without a consideration of the relational production of childhood being. Such an understanding limits the role of ethics, or even that of a teacher, to "developmentally appropriate" behavior as opposed to attending to the facilitation of social encounters and events (p. 538). This methodological lens forms one response to concerns surrounding the limitations of universal child subjectivity. Thus, researchers have shifted their focus from stable object-subject interactions to the examination of classroom events and their material productions. Both Land and Danis (2016) and Rautio and Winston (2015) consider the events of movement and play not as a means to an end but as an end in itself, suggesting that such activities (movement and play) afford space for contradictory and critical ways of knowing and being in the world (Rautio & Winston, 2015). Through new ontologies and nontraditional methodologies, authors hope to get teachers and curriculum developers to think away from best practice and outcome-oriented pedagogies toward the relational and spatial makeup of classrooms and how interactions produce different classroom environments.

Childhoodnature inquiry is both an attractive concept in which children are positioned and a potential binary as well. It depends which methodological lens, and what methodological choice, we decide to make. For example, working against environmental and geographical borders, clear distinctions between urban and rural, organic and toxic, manufactured or "wild natural" child, and so on, we propose porous, fluid, and brut ways to not only constitute child in childhoodnature relations and inquiry but also in particular rethink methodologies inquiring into this relationality. Childhoodnature relations are never singular or a one-directional position where a child is situated within as essentialized binary of a "natural human-produced (read urban)" contexts. Rather childhoodnature relationality is more complex, multidirectional, always plural, and multiple in action and process.

Piaget Connections

Returning to the beginning in the middle, Piaget's philosophy of a child dominated childhoodnature inquiry, and its ruins are still seminal in the contemporary methodology. In this methodology lies ontological and epistemological assumptions, and for many post-qualitative researchers, "method" is affected and affective. From this

perspective, a method, born of ontology, is affected by ontology, so that methods always presuppose ontology. Affective method works within its ontological assumptions. Methodology as ontology cannot preexist or be separated out from research practices and thinking-doing (see also Higgins, Madden, Berard, Lenz Kothe, & Nordstrom, 2017). Method, like subject, is without an in-itself and never comes to the event fully formed but is formed in counterpoint with it (Manning, 2013). Even the structuralism of Piaget recognizes a complex, coevolving fluidity that is ontologically prior but is then organized and structured by a human brain which can transcend it. Method tames, segments the world into identities, and places identities into relation. This method, or "science," then:

> will permit [man] to understand and find his way . . . science, which is one of the most beautiful adaptations of the human spirit and a victory of the mind over the material world. . .Now, how has it succeeded? Not by accumulating knowledge or experience . . . It is in constructing an intellectual tool of coordination, thanks to which the mind has been able to put facts in relation to each other. (Piaget, 1948/1973, p. 135)

The fluidity of relational experience cannot be merely accumulated but also must be coordinated. Coordination could be seen as a method itself, and it results in structure, however, preliminary and transient. Deleuze (1990), however, aims to maintain the fluidity of difference as an ontological principle and invent methods which preserve the chaos and complexity of ceaseless interconnections, rather than organization. For Deleuze, the methods that create the identity of form must be undone, leaving only a difference that is intensive within a univocal life force, a differing of degrees of intensity within one form rather than a multitude of different, separable, forms (Deleuze, 1990). Matter, then, does not consist of finite forms; with univocity, everything exists as "a moment of an infinite concept which encompasses everything" (Somers-Hall, 2013, p. 44). In order to be generative and creative, method might not be constricted by processes of representation, subjectification, and signification which may reduce its spheres of potential. Instead, from this perspective, methodologies create an immanent plane in which many things and bodies are implicated, swirling, merging, and coming in and out of focus, without the containment of determination of any kind. The particularities of a method serve only for "prolonging the thought-path of movement" (Massumi, 2002, p. 12). In this case, linear method stutters and fails and becomes "fraught with connections, movement and becomings" (Myers, 2015, p. 59) rather than functioning as predictable, tidy, and controlled.

What happens when we insert the thoughts and writings of Deleuze, and Deleuze and Guattari, into Piagetian epistemology? Piaget assumes relationality to be a product, or method, of man, hierarchically positioned, and not an inherent feature of a universe endlessly becoming. For Deleuze and Guattari, Piaget's account might bind us to the strata of:

> the organism, significance and interpretation, and subjectification and subjection [which] separates us from the . . . abstract machine, where there is no longer any regime of signs, where the line of flight effectuates its own potential positivity and deterritorialization its absolute power. (Deleuze & Guattari, 1980/1987, p. 155)

Piaget's structuralism is a method in which man acts upon the world, noting the effect of his actions and using this information to construct a model of the world. Structures have their origin in man's schemes of action, "no knowledge is based on perceptions alone, for these are always directed and accompanied by schemes of action" (Piaget, 1981b, pp. 23–24). Thus, there is a process of "'assimilation' of objects to the schemes of that subject [with] a necessary 'adaptation' to the particularities of these objects" (Piaget, 1981b, p. 24). Objects become represented to be incorporated into a hierarchy of humanist representation.

Deleuze and Guattari might ask about the potential of becoming that stands between the observation and its assimilation into the framework. They might ask about the potential of becoming outside of human thought; different ways to address a gap or interval in which something might escape, where something of their ontological fluidity might leak out. Piaget did not present a notion of a fixed form of development, and in this, his refusal to be tied down to a particular teleological organization appears another leak, another spark of potential to cross the gap between fluidity and form:

> the internal evolution of a person (according to the aptitudes of each one) only provides merely a certain amount of rough outlines that are capable of being developed, destroyed, or left in an untouched state. But these are only rough outlines, and only social and educational interactions will transform them into efficient behavioral patterns or destroy them totally. (Piaget, 1948/1973, p. 55)

Might such total destruction suit Deleuze's purpose as a method that frees a fluidity of becoming? Might destruction here be generative? "In dismantling the organism there are times one courts death, in slipping away from significance and subjection one courts falsehood, illusion and hallucination and psychic death" (Deleuze & Guattari, 1980/1987, p. 186).

For Piaget:

> behavior [is] conceived not . . . as a product of external 'circumstances,' but as the expression of a constant need for overtaking (extension of the environment and increase of the organism's powers) [that] would constitute in fact the principal moving force of evolution. (Piaget, 1981a, p. 280)

A continuing structuralism. Deleuze too might argue that there are never outcomes such as products, but only becoming, only the endless generativity of the assemblage, connecting a-signifying signs and making them content and expression for a myriad of functions. "That which triggers off an affect, that which effectuates a power to be affected, . . . a signal: the web stirs, the scalp creases, a little skin is bared . . . Spider-becoming, flea-becoming, tick-becoming, an unknown, resilient, obscure, stubborn life" (Deleuze & Parnet, 1977/2007, p. 61).

Responsibility Before

Piaget saw the chaos and complexity that informed the child's world, but in his constructionism, he posited child or man as structuring that content, as placing upon it a perspective that shaped that content. Piaget effectively attempted to describe man's

method for making sense of the world, man's habits of perception which became then man's habits of understanding the world and which then limit his interactions with the world. In the construction of method as in the construction of a concept, there is always and already a perspective. Concepts and methods both "cut up and combine the things corresponding to them in various and always new ways" (Deleuze, 2004/2006, p. 325). An experimentation with signs seen as forces rather than signifiers moves research away from reified sign regimes "congealed in thought through habit" (Roy, 2003, p. 15) and toward new potentials in affect. This requires the suspension of "categorisation and comprehension of the other" (Bogue, 2007, p. 13), and instead an openness to the virtual potential explored through experimenting with the affective signs of the other. What method for such an engagement?

Manning (2013) suggests a "responsibility before" (p. 72) which is an engagement with the virtual plane preformation, the porous throbbing of chaotic potentiality. Responsibility before means that we have not already positioned ourselves (Manning, 2013) but are open to creativity and experimentation, the potentialities of life that are not already concrete in "this life." Rather than an overarching structure which makes sense of and categorizes the world to facilitate man's further action upon it, what might take place are "contracts between individual bodies" (Dahlbeck, 2014b, p. 20) that are real and productive. Dahlbeck (2014b) argues for such interconnections as a "pure ontology" (p. 8) based on relations with the real, rather than the abstract, based on the fluid openness of an experimentation with ontology and with methodology that post-human sensibilities engender.

Deleuze Connections

We have argued for new ontology of a child and childhoods in a childhoodnature inquiry. What about nature? In philosophy, nature is not merely a mirror of reality, a dichotomous relationship, such as a reflection of art is of life. As Deleuze

describes, life does not imitate art but rather is intertwined with nature, like roots of a tree that intercept and weave in and out creating. Nature is a place where, "roots are taproots with a more multiple, lateral, and circular system of ramification, rather than a dichotomous one" (Deleuze & Guattari, 1987, p. 254). Nature becomes a method of creation, where thought lags behind, in the interweaving leads of roots creating "biunivocal" relationships. A non-binary relationship of multiplicities is being created in a "radicle system," where natural reality separates from a principal root, thus creating multiplicities of secondary roots undergoing a flourishing development (Deleuze & Guattari, 1987). "Because natural history is concerned primarily with the sum and value of differences, it can conceive of progressions and regressions, continuities and major breaks" (Deleuze & Guattari, 1987, p. 235) Similarly, Spinoza describes nature as a large abstract machine with its pieces being the various assemblages and individuals, creating groupings of particles, infinitely enmeshed within an infinity of relations, the whole of nature being a multiplicity of individuated multiplicities.

Conclusion: Leaky Childhoodnature Methodologies

We think differently with childhoodnature inquiry. Transferring thinking into methodological discourses, childhoodnature methodologies are always also unfinished, plural, and shifting. Furthermore, we argue that porous, fluid, and brut methodologies exemplify leaky architecture of post-qualitative research. They all speak to different dimensions of this methodological leakiness yet supporting the movement, transformation, and relationality within methodological practices. Instant, immanent, and continuously shifting multiplicities of methodologies, minor parts, and molecular processes are never a part of comprehensive, bigger, and holistic "whole," but they become possible when brut events happen and raw elements are wedded and pasted together ad infinitum. Dislodged structures, abolished and redone methods, forgotten strategies, undone theories, and dispersion of concepts inspire much methodological thinking of here and today. Elsewhere (Koro-Ljungberg et al., 2015), we have discussed qualitative inquiry and methodology brut, naïve, raw, and unfinished. Methodology brut and methodological undoings which question taken-for-granted methodological practices often evolve through relationality, plurality, and connectivity when scholars reach out to others for ideas, thoughts, and philosophies to support the reversal of the injustices of earlier research practices and traditions.

In educational research, the term porous is used synonymously with permeability. It is the movement across a border or boundary. At times, porosity is used to describe a limitation of essentialized concepts: "[o]f particular significance and importance are critical explorations of the porous border between often essentialized and essentializing categories of 'oppressor' and 'oppressed,' as well as empowerment and disempowerment" (Higgins, 2016, p. 675). At other times it is used to describe the workings of institutions beyond its supposed boundaries: "The institutional boundaries within a carceral state are purposefully porous" (Annamma, 2016, p. 1211). Its methodological uses are even less frequent yet still centered around permeability

and movement. For instance, Reinertsen (2016) describes the porous nature of thought, writing, and language, implying the limitations of definite linguistic categories. As a methodological category, the notion of porous is largely undeveloped. However, porous inquiry practices are not new, and scholars have referred to hybridity, cyclic nature of qualitative inquiry, and blended designs (see, e.g., McKechnie, 2008; Saldaña, 2015). More specifically, the porous element of methodology illustrates the infiltration of ideas and traditions, blending of (intellectual) matter across labels and categories. Porous methodologies morph different components (e.g., of methods, data, representation, writing) into something different, and the ideas, authors, texts, authorities, and practices bleed into each other. Observations of children have elements of think-aloud methodologies, open-ended focus groups are carried out in creative outdoor spaces including elements of performance, and discourse analysis process utilizes some aspect, connections, and elements from visual analysis. The notion of porous methodologies focuses our attention to the absence of clear and distinctive methodological boundaries as well as impossibility of solid singular methods and research elements. Research design, data, and knowing subjects can no longer be assumed to constitute one agentic and fixed entity, but they multiply and shift constructing only evaporating, resonating, porous, accommodating, and temporary proxies, events, and organic forms of living and doing.

Fluidity, in turn, speaks to the continuous exchange, methodological movement, and transformational forces in inquiry. The use of fluidity in educational research most regularly refers to changeability in relation to the identity question. For example, fluidity is regularly deployed to indicate how gender identity (Sweet & Carlson, 2017), teacher identity (Bradley, 2016; Cuconato & Walther, 2015), or student identity (Hsiung, 2016; Malcolm & Mendoza, 2014) can change based on situation and context. Similarly, researchers use fluidity to describe changeable perspectives or paradigms of thought (Brunial, 2016; Kuby & Christ, 2017; Wolgemuth, 2016). In these contexts, non-fluid thought processes are troubled, seen as limiting, whereas, fluid thought processes afford flexibility and creativity. Less frequently is the notion of fluidity applied in relation to ontologies and material worlds. When researchers use fluidity in this light, it often refers to the complexity of the lived world and the difficultly of capturing singular representations (Walsh & Tsilimpounidi, 2016). Likewise, this use of fluidity might signify "the ontological dynamism of beings" and make explicit reference to material temporality (Nakagawa & Payne, 2015). Here, meaning is considered temporal and always open to change. The use of fluidity in educational research is quite frequent but largely limited to the analysis of data and not considered in relation to methodological processes. In this context we use fluidity slightly differently. For us, "methods" do not begin or end in a foreseen and predictable "order," but they are already always here and working, forming incomplete connections and shifting research approaches without absolute identities or non-identities. Methods and methodologies are functioning as temporary leaky structures that are being regenerated, reconstructed, and rebuilt again and again differently in each context and time-space-matter. Following this line of thought, methodological flows, tools, approaches, and techniques do not collapse, fail, or disappoint. Instead, they melt, transform, circumvent, infiltrate, appear, and disappear while opening up new directions for childhoodnature relations. Interview events

end with an exploration of material cultures which lead scholars back to new interview questions, while visual representations gradually turn into the investigation of historical and archival materials. Fluidity illustrates how one method or methodology transforms and shifts into another moving horizontally and potentially unpredictable ways.

Lastly, brutness informs the users of research that methodologies are always raw, unfinished, partial, and never able to capture realities and experiences in some complete or finished fashion. Within the last few years, uses of the term brut in educational research have increased steadily. The term indicates something base, raw, or animalistic. It has been used to describe cruel and unpleasant experiences (McLaren & Pinkney-Pastrana, 2000), as well as an unreasoning and unreasonable force (Swanger, 2002), but recently it has been most frequently used in relation to methods and data (Koro-Ljungberg et al., 2015; Martin & Kamberelis, 2013; St. Pierre, 2013). In relation to data, for some scholars, brut encompasses the baseness and rawness – "solid bedrock, building blocks" (St. Pierre, 2013, p. 224) – of an object but has largely been critiqued as something unattainable. Alternatively, its methodological uses have shifted away from clearly defined procedures to get at a clearly defined, essential, brut object toward brutness as an always-already-there "rawness" and particularity of events, things, and processes. Sometimes brutness is used to illustrate partial and becoming process in flux and in motion, "[an] uncertainty, rawness, and creative chaos by doing, engaging, collaborating, and reflecting without constant and continuous purification and 'cleaning' efforts" (Koro-Ljungberg et al., 2015, p. 614). The use of brut in qualitative and educational research is burgeoning yet encapsulates larger trends of methodological practices that include fluidity and porosity.

Furthermore, brutness in methodology enables scholars to face uncertainty, rawness, and creative chaos by doing, engaging, collaborating, and reflecting without constant and continuous validation and verification efforts. Brutness also reminds us that qualitative inquiry, future/past, methods, and philosophies are potentially not entities to be clearly, neatly, and holistically described, practiced, or understood. In raw partiality, everything is possible, but not everything is. Maybe there will be or already is a multiplicity of methodologies and childrennature relations without totality. Instead, raw events happen, and unfinished elements are wedded and pasted together ad infinitum. Dislodged structures, abolished and redone methods, forgotten strategies, undone theories, and dispersion of concepts take place and produce unthinkable and absent present-future and childhoodnature relations and methodologies brut, naïve, raw, and unfinished and leaky.

and···and···and

Leaky architecture of post-qualitative inquiry positions childhoodnature methodologies as thought-out arrangements with unknown number of loose, becoming relations, and elements that are open to difference and otherness. However, any perceived structural element is only illusive or at least unstable and ambiguous. Its position is held only by its (generative and always shifting) relations of difference to other parts. This ambiguity of leaky architecture enables paradoxical thinking, contradictory practices, and organic formations. Leaky architecture of research design and inquiry could function as a thinking tool and thought-in-the-act practice

to process and live through our scholarly activities, methods, and forms in less fixed and certain ways. Rather than thinking about methods and methodologies as learnable and understandable containers, leaky architecture utilizes form, lines, space, matter, and interrelatedness as elements to think about unexpected, surprising, and continuously shifting design with. In this context a leaky structure in methodology enables us to bring together porosity, fluidity, and brutness in the context of shifting perceptions, practices, and enactments of childhoodnature and its research.

For Frank Lloyd Wright (1971), organic denotes entity and relationality, ongoing, fluid relationship between whole and its parts. Organic architecture occupies spaces which are continuously becoming and which through all rhythms must pass. Similar to The Leaky Architecture of Beehives and Boxes performance where deconstruction is carried out through staging choices, leaky architecture in methodology enables the rethinking of binary dualism and binary language. Leaky architecture of methodology can position methods and research approaches simultaneously as organic and healthy and as manufactured and toxic. Leaky architecture sustains a paradox and produces seeds of deconstruction. One might argue that leaky architecture is no architecture or represents a failed design due to its insufficiencies, holes, absences, and unstable structures. Yet leaky architecture exemplifies becoming and openness to "other," other elements, potentially contradictory ideas, and multidirectional forces. This openness creates a welcoming space and a structure which calls for (and also relies on) patches, fixes, repainting, refilling, and remodeling. The leaky architecture of post-qualitative research design accommodates and invites differences in childhoodnature concept and practice, aporia of spatial childhoodnature spatiality, and the impossible thinking of childhoodnature subject-objects.

Cross-references

- ▶ Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism
- ▶ In Place(s): Dwelling on Culture, Materiality, and Affect
- ▶ Posthuman Theory and Practice in Early Years Learning

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Unconscious Activisms and the Subject as Critic: A Slam Articlepoem

15

Anne B. Reinertsen

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Abstract

This is a speculative philosophic slam articlepoem making a case against pessimism. Poeticization is/as constant productions with material words able to move the world.

My refrain is that of plastic and unconscious activisms. I begin from within instead of trying to objectively address sustainability from the outside. I ask who eats who?

Keywords

Materiality critique transformations · Unconscious activism · Multidimensional ontologies · Transpersonal methodologies · Poeticizing sciences and research · Immanent theorizing of moments

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The point is not to get out of this place but to cannibalize it – we may be *of* this world, but we are certainly not *for* it. Such out-of-jointedness is a distance. And distance is what begins the dark plunge into the many worlds eclipsed by the old (Culp, 2016. p. 8).

In Spring 2017 a whale stranded on the shores of a small local community on the west coast of Norway (Fig. 1). A rescue operation was initiated to help the whale find its way out into open seas, but alas the whale was very weak and it died. The autopsy that followed revealed 30 plastic bags in the whale's stomach. It had died from starvation. Thinking with microbes, enzymes, bacteria, and germs overcoming identity, I molar/molecular microbioecopolical multibody ask: Who dies? Who starves to death? Who eats who? Am I plastic? Do I eat plastic? Am I eaten by plastic? Am I dying? Do I eat you? My body is another. I speak of unconscious activisms and the ~~subject~~ as critic. Pictures and/as data and me as transpersonal empirical illustrations and/as affective pragmatic connections. The self as relations and my research position as assemblage, not personal not private. A "documentation" of trifles, smallness. . . Becomings always more than a product.

En Marche (*En Marche* refers to the movement created by Emmanuel Macron who was elected President in France 2017 – and we are in the middle of French philosophy and extras. . .), which translates into *working on* or *on the move*, I write a speculative philosophic slam articlepoem making a case against pessimism. It is a philosophy and speculative fabulations SF (Haraway, 2016, p. 134) and/or, as I prefer, poeticization and poetry is/as constant productions with material words able to move the world: the art that comes floating out of the daily life in childhoodnature, where everything exists in a beautiful and endless floating stream learning to listen to the myriad other voices beyond the human. Speculative philosophy uses facts/

Fig. 1 Whale with plastic in its stomach. https://www.vg.no/nyheter/innenriks/dyrene/syk-sotra-hval-hadde-30-plastposer-i-magen/a/23913888/. (Photo: Christoph Noever, University of Bergen, Norway)

fiction/faction to probe imaginatively into scenarios that operate according to different ontologies, unsettling our common senses of shared reality. However, grounded in situated knowledges and contexts, it projects towards a different wor(l)ding, and through this speculative philosophy has a radical shaping power stimulating different kinds of experimental practices and poetic/data/sign/Activisms.

An *articlepoem* is my "stream-of-thought from topic to topic essayist poetic type of writing contemplating knowledge, science, and self, hopefully involving you. Scientific article and poem, poetry and reality: Poetry and reality in science and research in poetry and reality" (Reinertsen, Ben-Horin, & Borgenvik, 2014, p. 466). This is, and to underline, therefore not about philosophy alone, but its meeting with that which is not philosophy, which is what creates events. The poet sets things in motion and move in affects. Through poetry, realities connect, but detached from time and place and new stories can be written. Political bodies inscribed in new ontologies. Poeticizing sciences and research. Immanent theorizing of moments. Standing up and joy.

I also speak of it as materiality critique transformations producing unconscious and affective critical bildung (*Bildung* (German: [ˈbɪldʊŋ], *"education, formation,* etc.*"*) refers to the German tradition of self-cultivation (as related to the German for creation, image, shape), wherein philosophy and education are linked in a manner that refers to a process of both personal and cultural maturation. Both Georg F.W. Hegel (1770–1831) and Wilhelm von Humbolt (1767–1835) wrote extensively on the theme as both existential and as lifelong processes of human development. https://en.wikipedia.org/wiki/Bildung. Accessed 6 July 2017.) pedagogies and research. Bildung here seen neither as processes of existentialism, identity, autonomy, education, learning, or human development as such, but as the cry of the land, and of pedagogues and/as poets and thinkers *against* excluding, compartmentalizing, instrumentalist and reductionist forces in our practises, and *for* possibilizing with, for example, hyperbolic excess. Thinking and acting in possibilities, in every situation that is. Not avoiding problems, rather creating them. Producing tensions that everywhere propels thought towards inventiveness. The political life is about and in the moment. These are embodied moments of realisms. Slam is battle.

Plastic activism, wor(l)d activism, action of signs?
Green*ish* critical bildung pedagogies and research?
Is it me in there?
I do not know. . .
It is

– "a sort of delirium" (Deleuze in Deleuze & Parnet, 2002, p. 40).
– "many politics" (Ibid., p. 124).

The Imperceptible Beingness of Engagement

Molecular-becomings in which the air, sound, water are grasped in their particles at the same time as their flux combines with mine. A whole world of micro-perceptions which lead us to the imperceptible. Experiment, never interpret. (Gilles Deleuze in Deleuze & Parnet, 2002, p. 48)

I am thinking philosophy, science, art, and literature, not as separate territories, but as a common concern which gives rise to multiple fruitful questions. For example: How can we think about the distinctness of the one together with the other? How can we appreciate values others create without denying our own affiliations? How can ambiguity, contradictions, and disagreements – read paradox – be ascribed as positive functions, contributing to consolidating community and sustainability? How to think of nature and culture together? How to think other about *X*? And what is it "to feel as" *X*?

I feel as plastic. I am not. I feel plastic and what it produces. I do not know what it is but it is engaged in/engaging my desires. My moving on. My poetry. Eventualizing me with/through productive aporias (Formal negations or *X* without *X*. I write Derrida and Deleuze together here to avoid too positive connotations to the term production and productivity. This also complies with Culp's (2016) criticism and fear of sneaking positivism even into Deleuze studies.) and what I am not. Haunting me… everything without… always against…. Derrida (1994) emphasizes three aspects of the aporia that are decisive and necessary to go through and experience… *feel as*…. First there is the aporia of suspension, second there is the aporia of undecidability, and finally the aporia of urgency: any *X*-sign/action/decision/name/subject/object/word and/or event is therefore both with and without rule or regulation; it is made through undecidability because we will never know for sure, still and however it is urgent because we must act and/or engage/being engaged. My aporetic slam poem. Poetry? Plastic? I plastic, I poem ….

It involves experimenting with non-unitary or schizoid modes of becoming: becoming minor, minor languages and molecular. Nothing/ness don't know. Events seen as machinations of production and the productive potential inherent in forces of all kinds. Representing a moment at which new forces might be brought to bear. Flows of engendering and empowering desires that introduce mobility and thus destabilize the sedentary gravitational pull of molar (linear chronos) formations. Thinking and creating constituted simultaneously, or rather thinking as its own event by embracing the rich chaos of life and the uniqueness and potential of each moment and "being as fold" (Deleuze, 1993). Nothing/something/*X*/it/me. The subject thus conceptualized as multilayered and dynamic. As an enduring entity; one that changes as much as it is changed through the connections it forms with a collectivity. Braidotti writes: "The subject is a genealogical entity, possessing a minoritarian, or countermemory, which in turn is an expression of degrees of affectivity" (p. 241 in Parr, 2010). I natureculture minor major plastic poem time and place a/wor(l)d….

The project is risky like any peace-battling project. Not against evidence and truths per se, but thinking that we probably get as many truths as we deserve from which criteria we use, and questions we ask. For Deleuze (2013), truth is "a matter of production, not of adequation" (p. 92). Therefore, and again, I try working mostly with expansions and possibilities… noologies…: "which is distinct from ideology" and "is precisely the study of images of thought, and their historicity. In a sense, it could be said that all this has no importance, that thought has never had anything but laughable gravity. But that is all it requires: for us not to take it seriously"

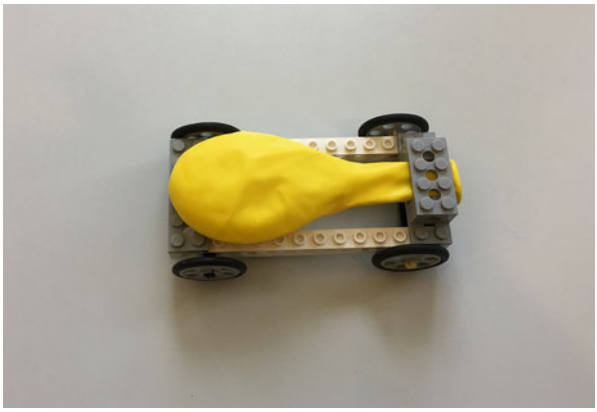

Fig. 2 Balloon car (Source: author's photograph)

(Deleuze & Guattari, 2004 p. 415). Truths to be grateful for. . . love and laughter. The vitalizing effect of plastic and a whale or *plastic feelings.*

The methods are simple. . . not, and to underline: they are about creating/writing new material discursive concepts, explore other ways of using language and/in materiality. Tearing apart and propelling language and matter out of its systems of meanings and a surface of/in immanence (More on immanence below.) wherein one experiments with formerly unknown collective alignments. Instead of concerning oneself with the unchanging and the general, this is about being brought out of the socket through approaching that which disturbs you, actively exposing oneself to the loss of references to the ordinary, to think with what happens. Experimenting with/through compelling forces in poetry – or plastic, to go further and be more thorough always. Poetry, plastic or the other way around (Fig. 2).

> I hear. When it comes to objects, it is not only possible to say them, pronounce them, say their names through language, but to hear their relations with the words themselves. Some words sound like nouns, words that are physical, having form and weight – a bucket of sand, – a balloon car running on air. . .. They have their own quality, a feeling from when you put them aside that they will substitute or displace an amount of the world around them. Other objects are verbs and in constant change. When I hear them, I see a pile of books is a song. An adjective, an adverb caressing a cheek, giving a hug. Things that refer to poems. To put in power instead of quantifying. Things need stories and artists/poets/researchers need to write. Writing in things. Things in writing. To write is a form of interrogating oneself. Being alert to knowledge. Who dies? Who starves to death? Who eats who? Am I plastic? Do I eat plastic? Am I eaten by plastic? Am I dying? Do I eat you? My body is another. Can you be my body for me? Can I be yours? Can my body, my breath, my energy make a car run? I write language. Language writes. The factor which kills is the factor; instructive. If so the flow of one's life stiffens.
>
> Free after Edmund de Waal (2013)

I Write Language; Language Writes

> In reality *writing does not have its end in itself, precisely because life is not something personal.* Or rather, the aim of writing is to carry life to the state of a non-personal power. (Gilles Deleuze in Deleuze & Parnett, 2002, p. 50, italics in original)

The tangible ecological principles that strengthen the earth's own life-giving ecosystems offer a more suitable language for materializing a sustainable development, economy, and pedagogy than the language that is obtained from accounting and finance. Language working in materiality and materiality working in language; and that we are equally driven forward by whims rather than systematisms, objectives, and resolutions. These are words catching the joy of the hunt and that we lose track of time and place when we search. Past, present, future working together. Our world. Nature and culture in togetherness. The smallest particles, not yet found, that do not divide between them. Humans as nature/culture and as conversations with/in what is and what was to come. Discoveries in hands and the shifting colors of the air. Children hearing bells in green and gold, the tick in every second. Building, rebuilding, reshaping. "If you as adult flip the generator, the fan moves faster because you have more muscles than me." Green*ish* pedagogies. She is five.

Nature/culture or natureculture: I put the words compactly together and break them up. I pour them from one sentence to the other to make the spaces around them bigger. Making the spaces around nature and culture together in reciprocity/entanglement/inter-/intra-dependency bigger. Joy keeps things in motion: spaces in constant flux. Adding depth, new vulnerabilities, and letters that leads us into the interiority of things and the value of small. What a child can smell, which is part of their landscape. The smell of different rooms. "Can I build my fantasy?" He is six.

These are explorations and experimentations to bring parts of components together, in different ways towards a future and sustainability. Knowledges, experiences, memories, sensations, discoveries, experimentations, affects, languages, and materiality to belong or inscribe/be inscribed as part of nature, not separate from, or, rather, thinking the anthropocene subject as "immersed and enmeshed in the world" (Alaimo, 2016, p. 157) and "thinking as the stuff of the world" (Ibid, p. 169). We breathe life.

It is a writing friendship. Writing and thinking through heads and hands and bigger spaces, thus debunking any social/linguistic determinism imploding analytical categories and dichotomies. Writing openings toward expanded meaning fields. Slowness, dedication, endurance in groping and errors. Committed presence and affirmation: something coming to matter. The/my self is writing itself again and again. Mattering processes that are poetic, political, and substantial. Poetry is/as other and transpersonally swirling ontology, epistemology, disclosures, political perspectives, post-human ethics, research, and environmental activisms together.

Languages below languages releasing one from meaning
Allowing that which means nothing in itself
Links between signs, events, life and vitalism
The potential for possibility
Microbes, enzymes, bacteria and germs and/as the "workhorses of life."
Quantum all
Entangle, trammel up and snare
I labyrinth you there
A scent in an unbudded rose?
Aye, a sweet kiss – you see your mighty woes.
. . .
Free after John Keats, "Lamia" (1820)

The Stand-Up Speculating Philosopher, the Poet, and/or the Fool

> Philosophy is the theory of multiplicities, each of which is composed of actual and virtual elements. Purely actual objects do not exist. Every actual surrounds itself with a cloud of virtual images. (Gilles Deleuze in Deleuze & Parnet, 2002, p. 148)

Speculative philosophy noology speculates about the limits of science and technology, mutates current techno-futurist desires, and builds an alternative new world, while exploring fundamental philosophical questions (Fig. 3). This involves continuously stretching and distorting a simple characteristic of the current environment, until it becomes almost unrecognizable, but is clearly an evolution and involution of the original. – Is it plastic, am I plastic not? It also entails speculation on what "sentience" or "qualia" might be in these different environments, where standard categories – real, virtual, life, death, body, mind, conscious, unconscious, male, female, human, non-human – are broken and re-assembled in new ways. Plastic eventualizing me… I want to create timelines moving positively and diffractively forwards. I am "training my imagination to go visiting (Hannah Arendt, in Haraway, 2016, p. 126). Visiting other – different ontologies, subject matters, sciences, curriculars, languages. Learning to listen to the myriad other voices beyond the human. Other tongues and/or microbio-ecopolitical-semiotics. The brain is shaped by the use…. Slam poetry is for everyone. The mission being performative or activist community engagement.

Fig. 3 Technoplay (Source: author's photograph)

> The poet,. . ., is one who lets loose molecular populations in hopes that this will sow the seeds of, or even engender, the people to come, that these populations will pass into a people to come, open a cosmos. (Deleuze & Guattari, 2004, p. 381)

Being exposed to poetry is to be exposed to change. Opening, innovating the artistic style and promoting inclusive elegance and beauty, which in turn is reflected in all aspects of the research process. The production of data, the analysis, the interpretation, the presentations: the titles, the preface or introductions, the self-annotations, the replying rhyming, the uni-topics, the narrations, and the arguments. Poetry and the poeticization of research and methodology experience stages, including lines of flights, preparations, laying foundations, reaching plateaus, and continuing. The reasons for poeticization thus lie in both the natural and social transformations and the tremulous changes in researchers'/authors'/writers'/poets' lives.

The Shakespearean fool, like stand-up comedians today, had a license to say almost anything. Smart and articulate or stupid and foolish, corrupters of words. Different characters for different jobs. Deflating pompous, socially superior characters and able to criticize kings. There were knowing, wise fools. Professionals, employed to entertain. Smarter than those in positions of authority and used by Shakespeare to mock them, reveal the truth of a situation, and provide social commentary. There were natural fools just providing some slapstick; however, also used to inadvertently reveal some home truths. Anyway, they were these strange characters that showed up and made witty observations and often became central to the action, sharing a capacity to stir things up, to say things that other characters couldn't. Therefore, useful vehicles driving moral and argumentative points home as/if/in drama. My slam stand-up comedy poem about. . .

> Am I plastic? Do I eat plastic? Am I dead? No, but about the (im)possible death of data and the transpersonal as a professionalizing method. – and a feeling . . . perhaps is the motor for action. . .
>
> If I am a materialization of discourses
> I must.
> This is the event of/in research and me
> My activism my methods
> My thinking ontology
> My body without

We need stand-up philosophers, poets, and fools to laugh, think, and ask more – to de-authorize knowledges. In the field of the speaking subject and the blindspots of autonomy, perhaps we can speak of creating a polyconsensus science and society and critical bildung pedagogies in which we recreate ourselves and our pedagogies, sciences, institutions, and systems again and again, not to lose force to create, on the basis of knowledge (Fig. 4).

> Magnus has painted: *"The king who smeared with the caviar"* He is six.

Fig. 4 Kaviar and kings (Source: author's photograph)

A Theory Method for Everything, or Something About Living, Thinking, Slow and Walking

> There is no position outside, no straight path, no belief in transparent global systems of knowledge, only modest protest and precarious pleasures, from within compromised locations shadowed by futures that will surely need repair. (Alaimo, 2016, p. 188)

Creating futures and becoming requires facilitating *rhizomatic* (Deleuze & Guattari, 2004) growth in natureculture and child with me. 3D/4D close-ups. Aesthetics in discursive material details at close range. The pleasant in the symmetry at a distance. I lean on aporetic noology speculative slam plastic poetry for help. Poetry about plastic. I plastic I poem. I childhoodnatureculture plasticpoem write. Child/nature/culture/plastic/write me. Everything already always. The poetic fictitious place which makes it possible to stretch boundaries between fact and fiction, real and virtual. The rhizome, in contrast to the root, has a breeding and unruly growth, a multiplying character, and can be approached in many ways. Becomings in creativity and experimentations where the immanent in every moment comprise building blocks in/for the processes of knowing. A place of multiplying character of repetition, everyday nuances. "Feeling as," something stretching towards expansions and community – an aporetic poetic slam crazy empiricism perhaps. . . thus poetic/data/activisms. I am plastic not, but I live-think with myself as such and what it produces. I don't know.

And to theorize: the surface, or the plane of immanence is a place in which consciousness no longer is capable of establishing an essentializing thinking subject. Absolute immanence is in itself. It is not in something or in relation to something. It does not rely on any object and associated subject. Substances through this becoming no more than possible modalities. It is only when immanence is immanent in itself that we might speak of a plane of immanence. Immanence is a life; life and

nothing else. Not immanence in relation to life, but the immanent, which is nothing, which itself is a life. A life is the immanence of immanence: total power, total bliss. A life not dependent of a being or exposed to a type of action, but in immediate consciousness. Action and activity, therefore, not with reference to a being, but as constantly portrayed or written or inscribed in a life. A life of potentiality in every moment, which is life. Free from subjectivity and objectivity through a *Homo tantum* as a moment of insight. I am plastic. I eat plastic. I am eaten by plastic, a whale. It is a life in immanence beyond good or bad. A life with knowledge.

But we do not encapsulate life in moments. Life is always, and in every moment we are actualized as subjects and objects, nature and culture. The moments are, however, empty, but offer immediate and simultaneous insight and consciousness about what has happened and what might; therefore, life contains nothing but virtualities. Plastic whale virtualities… life is made of virtualities, events, and singularities. It does not imply a lack of reality, rather that something – *X* – is actualized. The immanent event is actualized in the state of things and of the living which makes it/*X* happen. The plane of immanence is also virtual if events are virtualities. Plasticwhalevirtualities. I eat, I am eaten not.

It is the virtual which thus leads us towards poetry and poeticizing sciences and research. It implies reconquering traces of becoming events without placing it/*X*/fold/nothing/truth into a logics or narrative aspect. We might ask: what is it with this whale, this plastic, this researcher…? What does it/*X* have to do with me? How can I comprehend this? Should I? Should I feel it? How can I evaluate, assess, judge, decide?

That's precisely the moment when I use/expose myself to the abilities of poetry to freeze a feeling and meaning, but still allowing events and becomings to continue to emerge. To ask what plastic phenomenologically *is* thus becomes to explore how a poetic moment in which feelings, meanings, and matterings are set free and in which becomings continue to work. I start behaving rhizomatically. The poem having the ability to transform one event into the other event and we might speak of life navigations and possibilizing something new. The brain's limbic system is constantly evaluating what is good and true for me.

And speaking of pedagogies: it is important to de-authorize both phenomena and knowledges to make it less dangerous to learn something new. Or, rather, to make it safe to be unsafe. Immanent theorizing of moments turns the whale, plastic, and me into more than we can see. Through the whale we get a glimpse of a non-planned moment in our daily life – when I clean the dishes after dinner, and its importance. It cannot be brushed away, must be affirmed. It embodies a materiality critique transpersonal transformation.

These are thus my embodied words and rhizomatic writings full of contradictions, uncertainties, anxieties, desires, and disturbances haunting the/our shifting landscapes of monsters, and explorations of junctures of human and more-than-human or non-humans and politics. Human and non-human entities constituted together and in constant inter-/intra-action with each other, ultimately increasing its/our value to more than what we can see.

My body is (a) thinking territory and process quality being/doing becoming now. I try to perform attentive engagement and compassion living thinking poetic withness in/as both education and research and academic analysis, forwarding a

constant curiosity, new worldly collectivism as a form of life and complexity, self-learning thinking, ultimately compassion for expanding and expanded natureculture contracts and justice. I focus on the possibility of tackling ongoing economical and identity-political crises (*"We have lost the rhizome or the grass"* (Deleuze & Guattari, 2004, p. 20)) as well as on new kinds of educational and pedagogical experiments, both for academics, policy makers, and activists: withness and wellness for joyous teaching and learning pedagogies.

> . . .This streaming, spiralling, zigzagging, sneaking, feverish line of variation liberates a power of life that human beings had rectified and organisms had confined, and which matter now express as the trait, flow, or impulse traversing it. If everything is alive, it is not because everything is organic or organized, but, on the contrary, because the organism is a diversion of life. (Deleuze & Guattari, 2004, p. 550)

The aim is to exceed what we already know, creating layered upon layered thinking as entanglements, connections, and bifurcations of lines; all sorts of possible relations. I see them as human-technology – "pen and paper," "speech and language," mixtures and as studies of events and actions not individuals. A transpersonal writing and/as my/our research methodologies. We inscribe and are inscribed in each other's bodies and paradoxes are the powers of the unconscious. Not easy – a whale, a child:

> I thought that if I just walked slowly enough, someone would start wondering if something was wrong

This is from a newspaper story about a little boy who was never in a rush to get home: "I tried to tell about my home situation all the time. But I never *spoke* to anyone. That was too painful, and the words would have been too ugly for those whom I spoke to" (http://www.aftenposten.no/meninger/kommentar/Jeg-skal-ikke-skrive-ett-ord-om-forjulsstress-Men-604-om-en-gutt-jeg-en-gang-kjente-71217b.html). Rhizomatic growth in the child with me or living/thinking lives and seeing the boy's slow walking thoughts I must. *Livingthinking* lives that are able/enables us to think of oneself together with others and community; *livingthinking* one another; *livingthinking* walking with *oneanother*: re-conceptualizing conditions for action and creativity becoming the hub in/of our thinking of innovation and sustainability. This thinking about both ourselves and others; ourselves with others; our response/abilities for *oneanother* ultimately our natureculture social contracts with *oneanother*. . .. This is what my duty and my professionality thus looks like in a moment: allowing, including all. Learning something, learning life, learning as I live I love (Fig. 5).

Text universalities

> I see that I have trained my words
> To move my body
> To guide it safely
> Through the world
> While my body stays awake

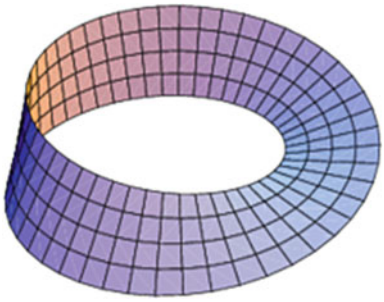

Fig. 5 Möbius strip. Source: https://en.wikipedia.org/wiki/Möbius_strip

> And knows exactly where it is
> Lost
> In me
> Inger Christensen (2006, p. 217)

Transpersonal Methodologies Producing the Unconscious

> Produce some unconscious, and it is not easy, it is not just anywhere, not with a slip of the tongue, a pun or even a dream. The unconscious is a substance to be manufactured, to get flowing – a social and political space to be conquered. (Gilles Deleuze in Deleuze & Parnet, 2002, p. 78)

Summing up, moving on, could have been the start, the rise of post-human new materialism/s shown here through my natureculture slam poetic livingthinking plastic activisms pushes the limits of critical social theory and inquiry towards immanent and affirmative critical onto-epistemological approaches ultimately speaking of a need for multidimensional ontologies. I add theory about nature and together. Attempting and helping to approach the imperceptible becoming/s and/or the in/accessible plasticity, the un/intended effects, and the im/materiality of social formations as, for example, gendered, cultured, racialized, and/or classed relations; epistemic bias and/or injustices calling for epistemic shifts. Critique as diffractions as new possibilities for actions spreads, and as refractions when the breaks between actions and words create new possibilities for actions in practice.

It implies focusing on the unconscious in thought as much as the unknown in the body, or moving thinking from its position within the conscious towards the unconscious or unknown in thought and the unconscious or unknown in the body. Consciousness registering effects of affects only: feelings in a fleeting moment as I clean up after dinner. Who dies? Who starves to death? Who eats who? Am I plastic? Do I eat plastic? Am I eaten by plastic, a whale? Am I dying? Do I eat you? Am I eating myself? Affect conceptualized as pre-personal, thus non-subjective intensities streaming through our bodies without giving haven to any precise meaning, thus evading form and expression, and therefore not available to us.

Producing unconscious has thus nothing to do with, for example, reproduction of childhood memories or any repressed memories or phantasms, but has all to do with non-personal powers producing “blocs of childhood” which are always in the

present. We produce not with a core from which we emerge, nor with the people who attach us to it, nor with images that we draw from it, nor with any structures of development or growth. We produce "with the scrap of placenta which we have hidden, and which is always contemporary with us, as raw material to experiment with" (Gilles Deleuze in Deleuze & Parnet, 2002, p. 78).

A warm stone – a warm tone – might become a warm friend in a child's cold hands. The same stone might be painted and turned into a doll to play with – a tone to lean on. . . I memory livethink with the boy again and his walking crying for help. . . connections in the becoming of knowledges. It might be called activist philosophy and speculative politics or the other way around. I suggest increased focus on system/process-quality. I suggest increased focus on ecosophy/sustainability and collectivity. I suggest semiotic/research – and methodological expansions in/as this new form of contracts. . . perhaps. . . – because he is/all/we are worth it . . ..

We are in what I call the transpersonal quantum competence and polycritical landscape of Deleuze and Guattari's (2004) philosophy of difference and immanence, body without organs and the human as a "thinking territory" (Deleuze, 2004, p. 44), normalizing critique, judgement, and decision-making through writing. Our tasks in every case being to discover the libidinous or sublime speech of the body and its investments in the social area, possible internal conflicts between, relations with and to pre- or unconscious investments in the same area and then again possible conflicts between these, or rather the whole inter-/intra-play between machinic desire and the suppression of desire. A real non-teleological revolution, body as profession in lifegiving insecurity and resistance.

Speaking against fear
Speaking against clarity
Speaking against power
Speaking against giving up

Thus Making a Case Against Pessimism

Text connectivities

Ich bin Du
Novalis

As mentioned previously, one's location does not matter. One must simply try.
consciously to aim straight into the impossible. Of course one must stay balanced.
as one goes. But only on the condition that balance is made uncertain.
Increasingly uncertain.
Inger Christensen (2006, p. 188)

In the Anthropocene man has become a force of nature in its own accord. That force can heal and repair. It can divide and destroy. We might not even discover it. . . structures and repetitions can lead us into the most perfect oblivion. We therefore

need resistance and to rehearse intolerance towards what we do not want but nevertheless see happen. Our oceans are filling up with plastic. I had fish for dinner. . . my methods and responsibilities are therefore always myself and what I can write for natureculture sustainability. The pause between breathing in and breathing out when my self-consciousness is suspended and I am open for everything. There is much I do not know. The future is full of information I do not remember. There are no straight paths to walk, but to imagine something new is to recreate it. A thin veil of possibilities. Who dies? Who starves to death? Who eats who? Am I plastic? Do I eat plastic? Am I eaten by plastic? Am I dying? Do I eat you eating myself?

When physicists search for the mystery of dark matter, it is based on the question: what does the universe consist of? What does the universe *really* consist of and what is dark matter? Dark matter streams through us and the universe all the time. There is dark matter in every room keeping things together. So far, physicists know that it makes up approximately 80%, but that it is not made up by known substances/materials. They also know that dark matter is affected by gravitation and weak nuclear power, not by electromagnetism (the matter is dark) and strong nuclear power. The rest is speculation. What one work/think with is dark matter as Weakly Interacting Massive Particles (WIMP) and that it is always present in suitable amounts. The million-dollar question is, however, how to find it? The answer is the following:

1) One can be hit by it, and that is good because then it can be measured. The problem is that one tries, but that it is very tricky.
2) One can find residue after collisions at particle levels and catch them (particles that is). That is also good, but takes a long time. It will be a long search.
3) One can make dark matter through creating particle collisions. That is what physicist try in CERN, Switzerland. If dark Matter is a WIMP one hopes to find something during the next 10 to 15 years. If not, the joy of the hunt continues. Even if one finds it, one still cannot say that it is what it is. It might not necessarily be a particle, and perhaps one must think anew about gravity. It is nice to work towards different directions because we might be wrong.
Free after Are, Raklev (2017)

Something streaming through, keeping things together, but we don't know what it *really* is – and I can't help myself from thinking with WIMP whims simultaneously. . .. One can be hit by it. An epiphany perhaps. A sentience or qualia? Something striking you as valuable, important, urgent, et cetera. One can find it. At least traces of it and patience. Allowing slow walking/thinking/writing. It is also good. Most important, however, is making/creating, continuing the hunt and different directions. I add refractions and diffractions and what they might produce. It is a *scienceing* up of childhoodnature research and no subjective convictions. As a researcher, I think I can best encounter erasures between, for example, true and untrue through showing that dissemination of scientific insecurity is simultaneously part of both the problem and the solution. Who dies? Who starves to death? Who eats who? Am I plastic? Do I eat plastic? Am I eaten by plastic? Am I dying? Do I eat you eating myself?

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Children's Imaginative Play Environments and Ecological Narrative Inquiry

16

Deborah Moore

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Abstract

The methodological inquiry developed here about the natural environments in which children play extends the theory and practices of narrative inquiry in educational research, in particular, Clandinin and Connelly's extensive scholarly work in that field. This ecological approach hinges on the inclusion of young children and uses multimodal methods (such as mapping, drawings, and memory boxes) to prompt in children a self-questioning of the stories they told and retold about playing in different environments, the incorporation of a historical/temporal and comparative intergenerational sensibility that demonstrates the complexity of the children's telling of stories, and, subsequently, an extension of Clandinin and

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Connelly's (*Narrative inquiry: Experience and story in qualitative research*. San Francisco, CA: Joseey-Bass, 2000) three-dimensional narrative analysis model via the analysis of contextualized re-stories and mind mapping. Of central importance to this ecology of inquiry was a revealing of the ontologically temporal (and spatial) nature of how the children's stories shifted and deepened over the course of four iterative conversational interviews as the participant-researcher relationship developed. Notably, this temporal process was enabled spatially and geographically through the children's preferences for playing outside in "naturally" perceived places such as a tree, a clump of bushes, or a creek and being reinterviewed in that ecologically imagined and "played" space. This ecology helped children engage in deepening their ongoing conversations with the researcher in relation to the affordances in nature they preferred to use for their self-constructed imaginative play places. Children's rich, sensory experiences with these aspects of nature were observed ethnographically during the conversations, which added further depth and meaning to their stories and what that might mean for childhoodnature ecological, pedagogical, and research development.

Keywords
Narrative inquiry with young children · Researcher reflexivity · Ecological narrative inquiry · Temporality, spatiality, and affect in nature · Storytelling · Imaginative play places

Introduction

The central aim of this narrative inquiry was to examine any changes in contemporary and historical children's imaginative play places over time. In conceptualizing imaginative play, researchers have found that young children are capable of understanding the difference between reality and imagination through their play, where they purposefully "transcend time, place, and/or circumstance" (Taylor, 2013, p. 3) to enable "border crossings into other worlds" (van Manen & Levering, 1996, p. 32). The findings from this intergenerational inquiry indicated that the children's physical and/or symbolic places they consciously constructed in nature for their imaginative play have changed little over time, despite contemporary deficit discourses that suggest otherwise and despite contextual constraints placed upon contemporary childhoods (Moore, 2015). While this chapter, and indeed this version of narrative inquiry, does not produce generalized, universal claims about childhood imaginative play or the places it is enacted, it does illustrate the complexity of children's storytelling and their capacity to participate in a narrative inquiry.

The empirical "testing" of this unorthodox methodology of narrative inquiry generated further dimensions of researcher-researched reflexivities. Some key findings are described briefly for illustrative purposes only but set the stage for ongoing methodological inquiry. Grounded in the extensive work of Jean Clandinin and Michael Connelly's narrative inquiry methodology, this more ecological approach to narrative inquiry enabled young children to engage in emotion-infused

storytelling about their deep relationship to aspects of nature they "live" and "play in" in a way that other research methodologies do not always achieve.

This chapter begins with a brief overview of the insights involved in developing researcher reflexivity and its relevance to this narrative inquiry with young children. Next the historical foundations of narrative research are outlined and how the emergence of narrative inquiry has shifted the field through the extensive work of Clandinin and Connelly. My own interpretation of their work is then discussed and how it informed the ecologically relational narrative inquiry this chapter is based on. The context and multimodal methods used in the inquiry are then outlined; followed by an explanation of the key touchstones of the study. The final section of the chapter provides examples of individual stories told by young children and shows how the analysis of these stories demonstrates both the complexity of their storytelling and the construction of their relationship with/in nature. This in turn leads to an emergent temporally and spatially alert conceptualized and contextualized version of childhoodnature.

The Shifting Positions Within Research

Grix (2002) argued that once the ontological and then epistemological position of the researcher has been acknowledged, the methodological position for the study "logically follows" (p. 177). In searching for an appropriate methodology to identify and interpret children's ecologically imaginative play places, I needed to develop a methodological approach that aligned with my understandings about ontology (multiple realities rather than one fixed "truth"), epistemology (as socially constructed and changeable knowledge), and axiology (valuing the subjectivity of the researcher and participants). More specifically, the visibility of emotion or feelings or affectivities was important to me in educational research with young children. Neumann's (2012) argument for including emotion as an integral part of the research process rather than trying to deny its existence resonated with my own search to accommodate emotionality and a reflexive stance within the methodological approach developed for this research.

Researcher reflexivity is characteristic of qualitative research paradigms in which the researcher acknowledges how their own values and assumptions can impact their interpretations of the phenomenon under study and their research interactions with participants (Denzin and Lincoln, 2001). Drawing on Denzin's (2001) claims, I was keenly aware that my interpretations of the participants' stories throughout this inquiry were influenced by my own experiences, feelings, and assumptions. Of increasing relevance therefore were Fontana and Frey's (2008) contention that a "powerful way in which to accentuate reflexivity" was through the narrative research use of where "in trying to understand the 'other' we learn about (our) selves" (p. 141). Given my research was focused on investigating the meanings of children's imaginative play places over time and the decision on how best to invite; then interpreting these meanings influenced the final methodological choice. Subsequently, a narrative inquiry emerged as providing a clear "fitness for

purpose" for this study (Cohen, Manion, & Morrison, 2011, p. 115) with its inherent capacity to enable and deeply examine the meanings of participants' lived experiences playing in nature and re-storying it over time while acknowledging the researcher's subjective position within the research.

This chapter is representative of the shifts in position that the research, the researcher, and the research participants experienced throughout the study. The times and timing of researcher-researched experiences were a prominent concern. Running parallel with my starting position as a researcher engaged in narrative inquiry based on Clandinin and Connelly's extensive work was an evolving approach that has moved narrative inquiry to a new ecological level of inquiry. This evolution can be seen through the research processes, and stories embedded in this chapter juxtaposed against my own shifting position as I realigned my research approach to be more attuned to young children's ecological awareness with/in nature. The research participants also shifted positions, as they told and retold stories that they questioned and changed over the course of the inquiry, so that the "stories they lived by" were reinterpreted into new story lines (Clandinin, 2013).

Narrative Inquiry: A Relational Methodology

When I look back on my decision-making about the methodological approach to use, I recall strongly resonating with Clandinin and Connelly's work on narrative inquiry, in particular, their respect for the multiple voices of others while encouraging the inclusion of the researcher's own voice and the significance of temporality, spatiality, and geographical/topographical place in the analysis of the stories (re)told by participants to the researcher. On further investigation, the underlying principles of a narrative inquiry linked well with my world view of reality as multiple and understanding of knowledge as socially constructed and voiced, experiential and embodied. The following section shows how the field of narrative research has shifted over time toward the inclusion of a number of complimentary forms of research including the evolution of narrative inquiry. Clandinin and Connelly's contribution to the field has similarly evolved over a number of decades, with this study providing a stronger ecological dimension to their original foundation of narrative inquiry.

From Historical Foundations Toward Narrative Inquiry

Stories have always played an important role in helping people understand their lives (Elliott, 2012), with storytelling seen as a way to communicate important cultural practices between generations and over time (Rogoff, 2003). Narrative scholars have described this phenomenon as "living a storied life" (Clandinin & Connelly, 2000). Traditionally, stories in narrative research were positioned within a more formal investigation of linguistics and narratology, until a shift in the 1960s heralded a new way of looking at "ordinary people's oral narratives. . .as worthy of study"

(Chase, 2008, p. 63). Following on from these shifts, a swing toward postmodern thinking in the 1970s and 1980s prompted a "narrative turn" (Denzin and Lincoln, 2008) within social science research away from purely scientific statistical data to "honor[ing] people's stories as data" (Patton, 2002, p. 115).

More recently, narrative researchers have collectively reinforced the value of stories and storytelling as worthwhile data and data generation methods in research. For example, Kramp (2004) explained how lived experiences can be made more meaningful through storytelling, suggesting "[s]tories preserve our memories, prompt our reflections, connect us with our past and present, and assist us to envision our future" (p. 106). Squire (2013) also argued that the process of storytelling enables the feelings and emotions attached to experiences to "become part of consciousness" (p. 48). With the continued recognition of the value of stories, the field of narrative research developed many diverse forms which have oscillated between the process and the product of narratives (Riessman, 2008). Among this diversity, narrative inquiry has evolved to provide an analytical investigation beyond an analysis of the words used or a description of stories (Bell, 2002). While narrative inquiry shares some common features with other forms of qualitative research (Clandinin, Pushor, & Orr Murray, 2007), its difference lies in the need to "do something" with the stories not just report or curate them (Riessman, 2008).

Clandinin and Connelly's "Alternative View" of Narrative Inquiry

Clandinin and Connelly have been instrumental in developing the methodological theory and practice of narrative inquiry through their extensive work over the past three decades and, more recently, in collaboration with other scholars. During this time, they have continually redefined their understanding of narrative inquiry from a "form of empirical narrative in which empirical data is central to the work" (Clandinin & Connelly, 1990, p. 5) to a "way of understanding experience" (Clandinin & Connelly, 2000, p. 20). Their theoretical links to a Deweyan interpretation of experience and continuity are apparent in their understanding of lived experience along a "personal and social continuum" (Clandinin & Connelly, 2000). Clandinin and Connelly (2000) considered that their "alternative view" of narrative inquiry was emphasized in their stance that research should not be an accumulation of categories or codes taken from stories but rather the use of questions and conversations between the researcher and the participants as "a way toward deepening the inquiry" (p. 55). In this way, "the particular of each participant" is still evident within the inquiry rather than being reduced and possibly lost within generalized categories (Polkinghorne, 2007, p. 634).

Following their earlier work, Connelly and Clandinin (2006) rephrased the term "data" into "field texts" as created through personal journals, stories, photos, artifacts, and conversational interviews. Field texts are subsequently used to create a narrative or "research text" of a person's experience of a phenomenon (p. 478). What is of particular significance in Connelly and Clandinin's (2006) analytical processes is the simultaneous examination of the "three commonplaces of narrative inquiry –

temporality, sociality and place – which specify the dimensions of an inquiry space" (p. 479). These interpretations of narrative inquiry were later extended by Xu and Connelly (2010) when they highlighted the difference between traditional narrative research and a narrative inquiry by stating:

> Story is not so much a structured answer to a question, or a way of accounting for actions and events, as it is a gateway, a portal, for narrative inquiry into meaning and significance. Story in this sense, is complex and may be analysed in inquiry. (p. 356)

In this definition, the depth of investigation into meanings of experience is positioned as a critical point of difference. Stories, therefore, can be seen as a way into the inquiry rather than the foci of the research as is often the case in other forms of narrative research examining spoken narratives.

Recently, Clandinin (2013) has rearticulated the "key touchstones" (p. 212) which shape, inform, and align a study to the principles of a "relational narrative inquiry" (p. 81). These "key touchstones" focus on the formation of an ethical relationship between the researcher and the participants as essential elements of a narrative inquiry. Further to this, Caine, Estefan, and Clandinin (2013) have argued that a narrative inquiry is intrinsically aligned to the researchers' epistemological and ontological "commitment" to the research participants by holding "responsibilities and obligations for, and toward, the people whose stores are lived and told" (p. 56). A relational narrative inquiry therefore seeks to understand lived experiences through a reciprocal, interactive, and highly ethical relationship between the researcher and the participant (Clandinin, 2013).

Narrative Inquiry with Young Children?

Despite research with children gaining interest since the UN Declaration of the Rights of the Child (1989) and the onset of the sociology of childhood paradigm (Dockett, Einarsdottir, & Perry, 2009), there are limited examples of the use of a narrative inquiry with children 7 years and under in age. This is especially the case in research where storytelling is invited through conversational interviews. Some narrative researchers have used children's naturally occurring language during play to examine their lived experiences (Puroila, Estola, & Syrjala, 2012); while others have focused more on the developing linguistic patterns of children's speech (cf: Tsai, 2007). However, very few studies are available in the literature where researchers have used the essence of a narrative inquiry approach with young children.

Despite an apparent acceptance of children's stories providing "authentic, rich, and respectable data" (Cohen et al., 2011, p. 455), there appears to be a dichotomy between the rhetoric and the reality in believing that young children are capable of providing "valid" stories for research purposes (Kirk, 2007). Skelton (2008), for example, argued that although there is a need for all research with young children to be "ethical, sensitive, and respectful" (p. 23), she also argued that young children

were "not. . .fully competent" to participate in interview-based research (p. 24). Another example of this dichotomy is evident in Barrett's (2009) narrative inquiry into young children's musical engagement in which the children were not asked about their experiences. Instead, observations were taken of the children in conjunction with parental interviews to provide qualitative data. Notable exceptions are Farquhar (2012) and Richards' (2014) narrative inquiries where 4-year-old children were interviewed and seen as fully capable of telling important stories relating to the phenomenon they were examining.

While in past inquiries Clandinin and Connelly have invited the participation of children, the children were typically well over the age of 8 years (cf: Huber & Clandinin, 2002). Of particular relevance, Clandinin, Huber, Menon, Murphy, and Swanson (2016) recently investigated early childhood research methodologies and found that it is rare to find young children as active participants in narrative inquiry. They surmise that this is because researchers tend to be overly influenced by a "dominant discourse" which implies that children are not "trustworthy participants: that is, children may be thought incapable of storying the 'truth' of their experiences" (p. 251). The authors acknowledge that young children need to be offered the opportunity to be participants in more narrative inquiries in the future. In personal communication with Jean Clandinin (10 March, 2017), she confirmed this gap in the field and noted that little had been written about how the environment informs the stories the children tell in an inquiry. This study, therefore, provides a new, ecologically attuned way of conducting and interpreting narrative inquiry that includes young children as active participants while examining the influence of the natural environment in which they play on their stories. The "Companion" in this handbook on childhoodnature offers more examples of children as co-researchers and able representers of their experiences.

A New Interpretation of Narrative Inquiry with Young Children

In this section, the context of the inquiry is briefly outlined followed by an explanation of the multimodal methods chosen for this study adapted from Clark and Moss' (2011) "participatory tools" when researching with young children.

Context of the Inquiry

As the key aim of the study was to examine any changes to imaginative play places over time, four families consisting of three generations in each family were invited to tell stories about their childhood experiences of places they chose for imaginative play (Moore, 2015). Each family included one grandparent, one parent, one primary school child (6- or 7-year-old) and one preschool child (4- or 5-year-old) and lived in different geographical areas around Melbourne, Australia. A pseudonym was assigned to each family to symbolize their various geographical locations, that is, the Beach family, the City family, the Farm family, and the Bush family.

The participants were individually interviewed over a series of four iterative storytelling conversational interviews. The University Ethics Committee deemed it problematic for me to visit the children's homes in case the children's imaginative play places were made visible to others, so the conversational interviews with the children were held at their respective educational settings. The same range of multimodal methods were available to the children and the adults to invite and prompt storytelling and questioning throughout the conversations. For this chapter, however, only the research interactions with the children will be illustrated with brief reference made to the intergenerational findings.

Multimodal Methods to Invite Storytelling and Questioning

It is of particular importance in a relational narrative inquiry with young children as participants for the researcher to reveal their philosophical "orientations" at the forefront of the study (Baptiste, 2001). This is because methodological design is strongly informed by the researcher's ontological world view as well as their epistemological understanding of knowledge construction, their "image of the child" and perception of childhood, and, therefore, how children are positioned within a researcher/researched relationship (Clandinin et al., 2016; Moss, 2016). As a consequence of my ontological commitment to the children in this study (Clandinin, 2013), multiple interpretations of imaginative play experiences were sought and valued rather than expecting one "single kind of [knowable] truth" (Pinnegar and Daynes, 2007, p. 30). Similarly, my understanding of knowledge as a social construction of meanings informs my belief that children are highly capable of constructing their own knowledge of their lived experiences. The young children were therefore seen as active participants who were respected as capable storytellers with valuable knowledge in the form of unique, subjective stories. Underpinning this was an ethically based understanding that children could negotiate the research agenda in terms of time, place, and levels of participation in ways they chose throughout the research.

In line with the relational and ethical foundation of a narrative inquiry, one form of communication was not privileged over another when designing the inquiry methods. Consciously pushing back against the use of a "pack of activities" (Waller & Bitou, 2011, p. 17) or "gimmicky tasks" (Albon & Rosen, 2014, p. 125) to manipulate young children's participation in research, I provided a range of multimodal methods which the children could voluntarily engage with or not during the research (cf: Clark & Moss, 2011). The multimodal methods available for the children included:

- Telling stories then drawing the place/s their imaginative play was located
- Continuing to tell stories while on a walking tour, with an invitation to take photos of imaginative play places in their educational setting (and at home) and later, the use of these photos and a collection of three dimensional materials for further storytelling while mapmaking of imaginative play places

- Each child collecting imaginative play artifacts from home into a memory box to tell, retell, and question their stories
- Finally, negotiating which stories could be used for the inquiry and/or if they wanted particular stories deleted, changed, and/or retold in any way

The following diagram visually represents the multimodal methods available within the four iterative conversational interviews with the children over the 6 months of the study (Fig. 1).

The purpose of these methods was not just about the creation of field texts but to provide a communication platform for the children to represent their storytelling in multimodal ways. Therefore, each child was given the choice to engage (or not) with the method in their own unique approach to the inquiry. To do this, I first invited each child to "tell a story" about their imaginative play places they created at home, early childhood setting, and/or school, and then offered the other methods of communication for their use if they so desired.

It was interesting to note how each child responded differently to the methods they were offered, choosing to decline or engage with each one. While most children chose to take up the offer of drawing while extending their initial stories, 4-year-old Harry (Beach Family) firmly told me "I don't do drawing." The map making was approached by the children in a wide range of ways from declining entirely, some only attaching their photos, to others creatively constructing a complex map of places. This was evident in 4-year-old Georgia's (Farm family) decision to spend more than an hour constructing and telling an intricately woven network of stories around the places she created on her three-dimensional map. All of the children eagerly engaged in "walking" storytelling while showing me around their outside places at their center or school, with their stories becoming increasingly complex with each subsequent conversation. The children's memory box storytelling was noteworthy in the way it triggered sensory-based memories and stories in a way no other method enabled. This was seen in 4-year-old Harry's (Beach family) overwhelmingly positive response to showing me his half-brick representing his steps up to the fig tree cubby and again, in 6-year-old Sonya's (City family) tentative disclosure of her "babyish teddy" hidden among other artifacts in her memory box, whispering, "I don't usually show people."

In providing four distinct opportunities for conversational interviews rather than only one "storytelling occasion" (Riessman, 2008), the children were given the time to tell stories in the first conversation, then subsequently question, change, and deepen their stories in the following conversations. Over time, each of the children demonstrated their rich knowledge of imaginative play places as well as their substantial capacity for storytelling.

The "Key Touchstones" Embedded in This Inquiry

As a starting position, this narrative inquiry was grounded in Clandinin and Connelly's extensive work. There is a clear alignment to the relational "key

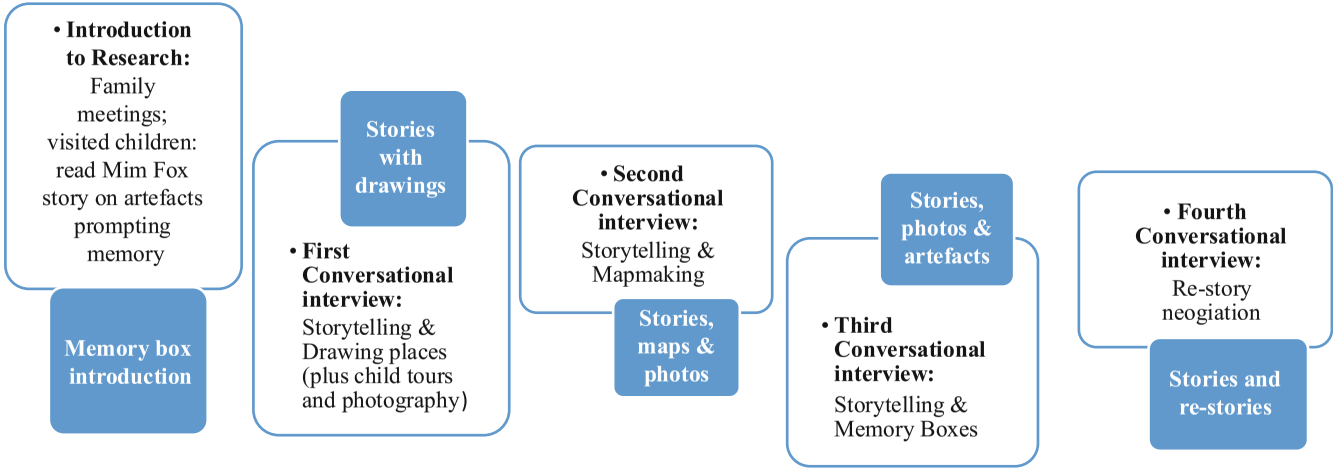

Fig. 1 Multimodal methods embedded in four iterative conversational interviews

touchstones" Clandinin (2013) articulated in the way the study demonstrated an ethical commitment to the participants in relationship with the researcher; an acceptance of the trustworthiness of the stories, the inclusion of the researcher's voice, and re-storying and taking the re-stories back to the participant for renegotiation. This starting position is illustrated in this next section and how my interpretation of these touchstones lifted the study to a different level of inquiry.

The development of a relationship between the researcher and the researched is seen to be central to a relational narrative inquiry. A close research relationship is encouraged by acknowledging "emotions and personal meanings" in an interview, rather than avoiding them as is typical in a more traditional form of interview (Ellis & Berger, 2001, p. 851). I was surprised how quickly a research relationship formed between myself and the children and how intense my emotional response was to their stories. I was constantly surprised how trusting and open the children were to telling me confidential stories of their places for play and that the research relationship developed in such a reciprocal way. For example, when the young children spoke in hushed, impassioned voices about how they made their cubbies in any "hidden" place in nature they could find, these stories instantly returned me to my own search for these significant places in so many different places throughout my childhood. On further reading, I was relieved to find other researchers had similar emotional experiences. For example, Kramp (2009) found the participants had "invited [her] into their lives" realizing she was not an "objective bystander or observer" (pp. 10–11); while Tanner (2009) revealed she had "found [her]self crying and struggling to find the right words" during an interview (p. 71). My strong emotional connection with the children was heightened when their emotion-infused stories intersected with my own experience of childhood imaginative play and the importance of natural places.

Trustworthiness was frequently questioned in the use of young children's stories as "data," with many asking, "How do you know if the stories the children told are true?" Stories told by young children are commonly dismissed when adults believe that the "truth" cannot be found in a child's subjective view (Frank, 2010). I started to sense that it was more important to focus on what the children wanted to "express" through their stories rather than if the stories were "true" or not. For example, 4-year-old Georgia's (Farm family) story about the "snake eyes" that she and her friend found in their bush cubby was a co-constructed story based on past experiences, questions she asked me during her storytelling and her emotional state while in the bush. It was not important that this may have been a fictionalized story; instead it was Georgia's sense of agency and independence she was expressing that was more noteworthy. A narrative inquiry is not "simply a factual report of events," rather, an examination of the meanings participants wanted to convey through their storytelling at that time and in that place (Riessman, 2008, p. 187).

Continuing the reciprocal nature of a narrative inquiry, the researcher's voice is also audible in the conversational interviews and subsequently visible in the written research text. As the researcher, I had initially assumed I needed to refrain from expressing my emotions and thoughts when a participant's story resonated with my experiences; however, I quickly realized this was not necessary in a narrative

inquiry. For example, when 6-year-old Laura (Beach family) told stories about her cubbies up a fig tree, under the tea tree, and behind the stand of wattles, tearfully I asked her what would she do if she did not have these trees to build her cubbies. The complexity of a narrative inquiry is clearly seen here and shows its point of difference in which the binary between the researcher-researched is blurred and messy rather than fixed and objective.

While the practice of the researcher re-storying participants' original stories into a co-constructed story including the researcher's voice is common in narrative inquiries, it is not common practice when researching with young children. In the creation of a re-story, the researcher interprets and reconstructs the participants' stories into a more contextually situated version of the original story (Ollerenshaw & Creswell, 2002). The re-stories are rewritten using the researcher's voice as the narrator, with direct quotes from the participants embedded as "an integral part of the re-storied narratives" (Beal, 2013, p. 700). An important, but difficult, part of the re-storying process is the "taking back" of the re-storied versions to the participants (Clandinin & Connelly, 2000). This is not to "check" if the stories were correct but to ask participants if these new versions captured what they had wanted to express through their stories. The complexity of the "taking back" process was evident when 4-year-old Frank (Bush family) insisted "I didn't say that" when I read out my re-storied version of his story. Despite the use of his own words quoted within the re-story; Frank was not happy with the inclusion of this particular story, and so it was deemed unacceptable for use in the inquiry. At times, a similar pattern occurred with other children, and as a consequence, many stories were not able to be included in the inquiry. Despite this, I found this process an additional and valuable opportunity for the children to further extend their stories in a way that was more meaningful to them. Although this could be seen as a limitation of the study, it is also a stark indication of the ethical foundation of this relational narrative inquiry with young children.

Narrative Inquiry Extended

In this section empirical examples are provided to show how this study has extended Clandinin and Connelly's work into an outside-orientated, ecological approach to narrative inquiry. In addition to the oral and visual multimodal narrative methods available to the children to invite their storytelling, additional layers of inquiry evolved and became apparent the further we progressed into the study. It is through these additional sensorial layers of inquiry encountered in different outside environments that the children's heightened emotional responses to their imaginative play experiences with/in nature were heard and seen.

Sensorial Layers in an Ecological Approach to Narrative Inquiry

On looking again at the children's stories and re-stories through an ecological lens, there are many instances in which the children's interrelationship with nature

featured on a deeper level than was first apparent. These deeper levels or layers consider temporality in a different way that included the shift or persistence in children's stories over time, layers of spatiality which included the children's conscious choice of a place in nature for the physical enactment of storytelling, and the layer of affect in nature which referred to the children's heightened sensorial awareness of place which informed and influenced the stories chosen to be told. Extracts of four young children's stories and re-stories are retold here to illustrate the complexity and continuity of these additional layers of an ecological narrative inquiry.

Laura's Story of the "Little Nest Cubby"

Initially, 6-year-old Laura (Beach family) and I were allocated to a desk at the back of her Grade 1 classroom to start our research conversations. It was immediately clear by Laura's constant glances toward others in the room and her hushed voice that she felt constrained by the threat of others listening in to her stories. Shortly after this stilted beginning, I invited Laura take me on a walk around the school playground to talk about any imaginative play places she felt comfortable to reveal. Once outside, Laura quickly recovered her voice and began a series of stories that richly described imaginative play places she had constructed for herself and her younger brother, Harry, in their backyard at home. Laura told the following brief story while moving in and out of a thicket of wattle on the edge of the school fence line (Fig. 2):

> Once I found like a little cubby, and it was near like the driveway going up. And I found some bricks to make like stairs to go up a tree and step in there and I found a ladder and a chair. . . and it didn't have any legs on it. So I put it on a branch that I liked to sit on and then I put the ladder on there so I could climb up and sit on there. . . it was like a very old tree . . .

Fig. 2 Laura's little nest cubby up in an old fig tree in their family home garden

> there's like a little nest made up of all lots of sticks in it. . . I found it first and there's like a little nest and my brother climbed up it and sat in there. And I asked him if it was comfortable and he said it was . . .. (Laura, Telling & Drawing, 5.6.13)

Over the course of our conversational interviews and as our research relationship developed, Laura's stories became increasingly emotional and sensory-based in their delivery and their content, as seen in the following extract of a story told while making a map of her imaginative play places:

> Sometimes I run outside when people are trying to look for me inside. . .and then I go and sit up there [when I feel] a little angry and sad and a little emotional. . .I get some more happy thoughts into my head and feel much better when I am up there. . . (Laura, Mapping, 19.6.13)

With the addition of the photo of the "little nest cubby" onto the three-dimensional map she was creating, Laura's story followed on from the original one about the fig tree but was extended to include an understanding of the restorative effect of the tree on her emotional well-being. Laura continued her narrative thread about the significance of this place in her imaginative play throughout the stories she told; and later, she was able to reinterpret her own thinking when she answered my query about the abstract notion of loss if there were no trees to make her cubbies, saying,

> We wouldn't really have any place to be ourselves and play together in special places, and we would have to find really tricky places and it would be really hard to get in there.... (Laura, Mapping, 19.6.13)

It is evident in these brief story extracts that 6-year-old Laura's stories were fundamentally influenced by the physical environment she chose to tell her stories. The desk-bound stories were stilted and distracted; while conversely, Laura chose to tell the rich, insightful, and deeply emotional stories about important places for imaginative play when she was storytelling among the wattles. In consciously choosing this place in nature to tell these particular stories rather than when inside was indicative of Laura's heightened awareness of the sensorial attributes of this place.

Collectively, scholars such as Hart (1979) and Moore (1986) found that children have a strong attachment to the "spaces" they subsequently construct as meaningful "places." Following these earlier studies, Rasmussen (2004) and, later Lim and Barton (2010) have concluded that place is important to children and,that children are highly capable of constructing their own symbolic places for play. Pink's (2009) work on sensory ethnography takes this notion of a sense of place further by suggesting the "materiality and sensoriality of the environment" markedly influences the experience of place (p. 25). These theories of place were evident in Laura's stories where her finely attuned sense of place together with her capacity to question her story lines to explain her relationship to natural places was illustrated. In many ways, the place Laura chose to tell her more emotional and sensory-infused stories was a symbolic representation of the "quiet, uninterrupted, and hidden" places

that were consistently identified in the stories told within and across generations that the historical and contemporary children constructed for their imaginative play (Moore, 2015).

Ted's Story of the "Secret Tree Base"

In contrast to the persistent stories Laura told, 7-year-old Ted (Farm family) dramatically changed his stories over time. During an initial visit to the semirural school playground, Ted was adamant that he did not engage in "pretend play" now that he was seven and that he only "played" basketball and Pokémon while at school. Ted proudly showed me the basketball courts and the sacred place for Pokémon trading as we engaged in a "talking while walking" (Kuntz & Presnall, 2012) tour around his school playground. He told many stories about the different cards and how he traded them with others. Much later, walking past the school oval to a thickly treed area, Ted appeared to falter and subsequently change his story, as seen in the following story extract:

> I don't really know... [long pause while looking intently at an old tree stump] ... but sometimes I do play over there. . .that's the other place I hide. That's our secret spot, secret stuff sometimes happens here and there. . .it's not just mine, its mine and my friends, and it's actually a tree.... (Ted, Telling & Drawing, 17.6.13)

Following on from this disclosure about his "secret tree," Ted suggested that the teachers and other children thought he and his small group of friends were "just playing footy on the oval." In reality, however, the children were running back and forth between their secret tree base and other trees, in an enacted version of a "virtual game" among the trees (Fig. 3).

What was of particular note in the shift in Ted's story was his whole change in body language with this new storyline. Instead of the dominant discourse of Pokémon-infused play surrounding a contemporary 7-year-old boy at school, Ted had moved beyond the expected storyline and revealed the hidden "counter narrative" (Bamberg and Andrews, 2004) of his play in nature that was still happening even though he was seven. Seemingly to reinforce this shift in his story, Ted hugged the tree trunk and then smiling broadly, rubbed the bumpy bark in an affectionate way to demonstrate the depth of his relationship. Remarkably, Ted's grandfather, Bob, had a similarly emotional response when telling a story about his favorite childhood oak tree. Bob had nearly leapt over the table with his affirmative reply when I asked him if this old oak tree was still an important place for him (Moore, 2015). It seemed as though this connection with particular trees had been passed down through the family, though no family member mentioned this pattern.

In walking up toward the "secret tree" on a later visit, this place and the natural affordances within it appeared to trigger an overwhelming emotional response in Ted as he decided I was now trustworthy to reveal his "secret tree" story. Had we not had the time and opportunity to establish a trusting research relationship in which the questioning of story lines was encouraged and emotional responses were welcomed, Ted's new story would not have been heard in this inquiry. While Marsh (2013)

Fig. 3 Ted's old secret tree that he hugged when he changed his story plot line

maintains that "toys reflect the zeitgeist of a given era" (p. 59), I argue that children, as Ted had shown, are highly conscious of this expectation to only play with "popular toys" among their peer group and within society. Ted's experience is mirrored in Cross's (2009) study, where a small group of 9-year-old boys fiercely protected their "real version" of a popular online game that they enacted under a stand of oak trees well away from their peers (p. 133). Collectively, the children in this narrative inquiry have shown that they were able to move beyond peer group expectations at least in their imaginative play in private and natural places.

Sonya's Story of the "Old Tree Behind the Gates"

To illustrate children's relationship with nature is not always geographically predicted, such as in Ted's semirural playground or Laura's bushy backyard; the stories 6-year-old Sonya (City family) told about her concrete-dominated school supports this argument. Sonya was in Grade 1 in an inner-city primary school, and I was asked to meet with her during an out-of-school-hours program so as not to interfere with her schoolwork. From the very beginning of our first conversation, Sonya wove stories in and around our conversations so well I could hardly think of anything else to say or ask, so I just listened much of the time.

One of the persistent stories throughout Sonya's conversations revolved around her favorite "very old tree" that was locked away behind a high gate in her school playground. During the first of our walks around her school playground, Sonya showed me the peppercorn tree and the enclosed corner beside the tree where she and a small group of friends had created their symbolically hidden place for imaginative play (Fig. 4).

The significance of this tree and this place was made clear when I asked Sonya how she felt about the tree being locked behind the gates. This was seen in Sonya's response in the following re-story using direct quotes from Sonya's mapmaking conversational interview blended with my voice as the narrator:

Fig. 4 Sonya's favorite old peppercorn tree locked behind a high gate

> That's my favourite tree there" said Sonya pointing to an ancient peppercorn tree hanging heavily over the fence, but locked behind a high gate. I asked Sonya how she felt about her favourite tree being behind a gate that was never opened and she replied that it was "a bit bad because the seats are . . . you are supposed to. . .it's actually not supposed to be behind gates. I don't know why it got in a gate, how it somehow got behind the gate. . .. It's my favourite tree in the whole school. . . it's nearly the tallest. . . and its very old" she said in a perplexed voice... Standing there behind the gate, Sonya disclosed that she frequently "talked to the tree" and that the tree was from a time when "the school was a castle", many years before she came there. (Sonya, Mapping, 13.6.13)

In this re-story, Sonya's strong relationship with her "favorite tree" is evident, although she experiences this connection from behind a gate. While the material affordances of the tree are only symbolically accessible to Sonya, its presence was still felt and named as an important character in many of her stories. These re-stories show that despite her contextual constraints, Sonya's relationship with nature was keenly sought in any creative way possible.

Later in this conversational interview, I asked Sonya if she was ever concerned about anyone overhearing her pretend play, such as when she was talking to her favorite tree. I decided to ask this question because Sonya had mentioned she often played games other people did not think were fun, such as "playing pretend horse riders on the oval pathway next to the tree while looking for bug tracks." Despite Sonya's confidence and creative thinking, it seemed she was very aware of the

accepted peer culture and adult regulations of school playground play and seemed anxious to comply with the rules that surrounded her use of place. The following brief re-story extract highlights her changing response as she subsequently questioned the previous stories she had told:

> She started to answer, "No" she said, "I don't care if anybody hears us talk to the tree. . ." then paused mid-sentence and dramatically changed her answer, saying instead ". . .but. . .because when I hear some people that are going around I sometimes start to stop because I think they are going to be laughing, because sometimes we do some games that are a bit private to me and my friends, that's why I wait for them to go first." (Sonya, Memory Box, 26.7.13)

In this re-story extract, Sonya's shift in thinking was clearly audible as she stopped talking and appeared to question her own thinking about the "stories [she] lives by" (Clandinin, 2013, p. 21). In this way, Sonya could be seen to be moving beyond the "everyone must play together" discourse expected of children in educational settings (Skanfors, Lofdahl, & Hagglund, 2009, p. 107), to a narrative where privacy and an emotional response to imaginative play was able to be expressed. Although the stories around the importance of the old tree persisted throughout the whole inquiry, it was interesting to note how Sonya's metacognitive thinking about her imaginative play deepened over time and so changed her meaning-making of her experiences.

In the analysis of Sonya's field texts and re-story extracts, the significance of enacting a relational narrative inquiry with young children is foregrounded. The research relationship that had formed over time between Sonya and myself was clearly influential in the trust she displayed in telling me about her imaginative play while "talking to the tree" that was not possible in our first initial conversations. Golombek and Johnson (2004) claim that a narrative inquiry allows the participants to "question" what they thought they knew about a phenomenon. Questioning their own stories was possible when the children were given time and opportunity to think about, change, and shift their thinking over time rather than telling a story that remained as one "fixed entity" (Huber & Clandinin, 2002, p. 792). This empirical example illustrates young children's capacity in questioning their own stories and retelling a deeper, more emotionally meaningful story over time.

Harry's Story of the "Tree Cubby"

For the final story retold in this chapter, I have chosen Laura's little brother, 4-year-old Harry's (Beach family) version of the family story of the old fig tree, partly because it shows the nonlinear, voluntary processes of this narrative inquiry. I have also chosen this story to retell because it provides an example of both the limitations and the successes of this narrative inquiry with young children.

Four-year-old Harry did not want to fully engage in the research process with me. During my first few visits to his early childhood center, Harry vaguely pointed out various "places" where he played "pretend" in his playground – "this is the place for playing dogs" – he said in a monotone voice as he nodded in the direction of a

"built" cubby house. Harry was neither interested in talking and drawing nor making a map of the places he played. While the idea of taking his own photos was initially exciting, Harry found the use of the digital camera frustrating. Another day he firmly stated I was "not allowed" into a particular place where he and his friends were "playing fighting," he declared. While Harry had ticked the assent form to be involved in the study at the start of every visit, his body language and the words he used told another story, and this was the one I was ethically bound to listen to. I walked away most days wondering if I should continue trying to establish a research relationship with Harry.

I decided to try one last time on the day allocated for a possible memory box conversation, assuming Harry's response would be his usual monosyllabic one. However, I was shocked to discover Harry's intense excitement in wanting to immediately "tell a story" about his memory box, even though he was knee deep in mud at the time of my arrival. The following re-story extract describes Harry's emotional response to the memory box:

> Harry chose a place for us to sit next to the creek, but hidden behind a bush, to talk about his memory box saying "You remember this place Deb, we've been here before." This was surprising as I had not thought Harry had taken much interest in me trailing behind him on previous visits. And now, as we sat down, other children started coming up the hill to look at his memory box too. In an amazing shift from his earlier attitude, Harry held up his hand and called to the other children, "Stop, we're talking here. . . come back later." With our privacy assured, Harry then enthusiastically showed me what was inside his memory box – a leaf, a twig, a matchbox car and, significantly, half a brick. On asking Harry about the brick, he triumphantly replied, "This is the stairs up. . .I made the stairs, but Laura made a lot. . .up to the tree cubby. . .it has a ladder and a balancing thing and a bed and a little chair. . .all those things. . . and do you know where the little chair is? It's in the tree! It's just for me and Laura and no one else goes in there. . . they don't find out about it." (Harry, Memory Box, 14.8.13)

This re-story extract illustrates Harry's heightened emotional connection to his "fig tree" at home, linked to his creative act in making his "own place" for imaginative play in this significant tree. I am not sure if it was the connection with home that made this method so appealing to Harry, but it was clear it was Harry's decision when, where, and to whom he would tell his private and important knowledge about his "tree cubby." This was confirmed when other children approached our "talking-place" and Harry held up his hand and loudly called out, "Stop, we're talking here. . .come back later" (Fig. 5).

Also significant was Harry's insistence on telling this important story in a specifically chosen place in nature which closely resembled the natural place he was emotionally describing in his story. This did not appear an ad hoc choice but one that was consciously chosen with natural affordances and sensorial elements in abundance to enrich Harry's experience of storytelling. Linzmayer and Halpenny's (2014) study suggests that children learn to "define their interactions, and make meaning of their relationships with nature" (p. 424). While Harry's stories also illustrate this point, I argue further that it is a child's decision as to if and/or when they share their knowledge of their places in nature; and if they decide not to tell their stories, it does not mean this

Fig. 5 Harry's photo of the place by the creek behind a bush he chose for our memory box conversation

close relationship with nature does not exist. It is, as Goodenough (2003) contends, private information they have decided not to share with others.

Ecological Narrative Inquiry and Childhoodnature

Young children under the age of seven years of age are traditionally not considered "competent enough" to engage in an "interview-based" methodology (Skelton, 2008, p. 24), such as a narrative inquiry (Clandinin et al., 2016). However, through the use of this ecological narrative inquiry, young children's storytelling and their capacity to question and reinterpret their own stories were highly valued, providing multiple interpretations in a partial account of children's experience in/as nature. The complexity of the young children's storytelling and the stories they told were seen in the stories and the analysis of their re-stories shown in this chapter.

It is interesting to note that Clandinin and Connelly most commonly conducted their conversations with participants in classrooms, though they were always careful to find "safe [inside] places for sharing secret stories" that were negotiated with the participants for their storytelling (Huber & Clandinin, 2002, p. 795). Similarly, although Clandinin et al. (2016) stated they "negotiated time and space outside school hours," their conversations were still held inside an "unused classroom" (p. 188). This current study has demonstrated an extension to Clandinin and Connelly's work on narrative inquiry by providing empirical evidence of an outside, more ecological approach to the methodology.

The idea of interviews conducted in an outside environment is not new; it is often the basis of an ethnography or case study. However, what is of significance in this inquiry is the conscious choice children appeared to be making to choose a "place in nature" for their storytelling. This may have been due to the need for privacy to overcome the threat of being overheard. Or perhaps, the provision of sensorial affordances in outside, natural places resonated with the storyteller and informed the story content which in turn added to the depth of the emotion-infused stories

chosen and told by the children. Or importantly, it may have been that these places in nature aligned most strongly with the children's "need" to construct their own "emotionally safe" places for imaginative play in natural places. This "need" was persistently identified in the historical and contemporary children's stories and subsequent analysis, indicating the continuity of this phenomenon over time (Moore, 2015). The inherent relationality of this ecological mode of inquiry with its layers of temporality, spatiality, and affect have enabled the slippery and permeable blend of childhood imaginative play places with/in nature to be seen and heard in a way that other research methodologies may not be able to achieve.

At first glance, these findings and this summation may appear to stem from a romantic view of the construct of childhood as "innocent" or "the young child as nature" in which children need to be protected from the realities of contemporary life (Dahlberg, Moss, & Pence, 2007). Or it may appear to have arisen from a moral panic discourse in which adults fear the loss of childhood as they knew it, and so, a "natural childhood" needs to be preserved at all costs (Adams, 2013). Other readers may find a human/nature binary apparent in this inquiry where children are referred to "in" or "with" nature as potentially problematic suggesting the externalization of nature from children. However, I argue, it is much less adult-driven and contrived than these issues suggest. In providing an inquiry space for young children to question their stories, to go beyond the dominant discourse of contemporary children's play, the young children in this inquiry have subsequently been given time and space and experientially playful opportunity to articulate their deep relationship with/in nature in a way that emotionally resonated with them.

This ecological narrative inquiry avoids universal claims about childhood imaginative play and notions of nature. It is not possible to make such claims, given the study was located within four particular families in a particular place, at a particular time. Nor is it possible to claim that the researcher now "knows" the "unknowable" child and, therefore, what a child definitively thinks and understands (Moss, 2006). Nor is this chapter able to provide generalizations on how every young child would respond to the invitation to be involved in a narrative inquiry. Instead, what this chapter has provided is an example of how an ecological approach to narrative inquiry was able to push back against the contemporary deficit discourses on marked changes in young children's imaginative play and showed that play in natural environments is important for contemporary young children. And, of relevance to this handbook, a narrative inquiry developed in this ecological way has provided some empirical evidence into children's episodic lived experiences of their preferred local environments and their relationship "with" and "in" nature, which, potentially and mindful of the limitations of the study, might say something about children as temporally/spatially/affectively "as nature" in an emergent version of childhoodnature.

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Unplanning Research with a Curious Practice Methodology: Emergence of Childrenforest in the Context of Finland

17

Anna Vladimirova and Pauliina Rautio

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Abstract

This chapter explores the notion of curious practice and the methodology of its application in the context of primary school education in Finland. The concept of curious practice encourages us – researchers and educators – to ask "How does curious practice help us to address children's relations to forests beyond the child (in) nature dualism?" Curious practice challenges the existing environmental education methodologies employed in recent years that draw heavily on research planning, the child's representation of nature, and the results of a completed study. Despret's (Domesticating practices: The case of Arabian Babblers. In G. Marvin and S. McHugh (Eds.), *Routledge handbook of human–animal studies* (pp. 23–38). New York: Routledge, 2014) approach of curious practice encourages researchers to unplan and make themselves available to the yet unknown, for

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every single encounter with the other is a mixture of unpredictability, the researcher's attentiveness, and imagination. The rationale behind curious practice is in learning more about what is seen and heard via questioning the encounters that accept various absences of a preconceived framework of research. As a necessary complement to such a methodology, the chapter also presents a semiotic approach, employed by Eduardo Kohn (*How forests think: Toward an anthropology beyond the human*. Berkeley: University of California Press, 2013), to inform the method of studying the logic of the world beyond human symbolism. The data used reveal an interdependency of children and forests that will be referred to as childrenforest in that it continuously generates a network of signs which adults and children themselves often are unable to access or represent. These present absences found in curious practice are crucial for our understanding of what we have overlooked while claiming that the other is known. With that, however, childrenforest cannot be fully grasped. Andrew Pickering's (*Natures Sciences Sociétés, 1*(21), 77–83, 2013) notion of islands of stability is utilized to elaborate the ways that childrenforests signal the presence of the seemingly stable configurations of their dynamic becoming. The chapter concludes with a short discussion of the potential areas of curious practice application beyond the ethological and childhood research.

Keywords
Curious practice · Despret · Islands of stability · Semiosis of childrenforest · Reals · Unplanning

Introduction

The concept of childhoodnature is fluid, and so there are numerous ways to formulate its practices in research, or pedagogy, or policy. The methodological inquiry discussed in our chapter focused on research aims to clarify one key understanding, simultaneously relating this understanding to other research practices of children and nature. To do this, we discuss a study conducted in the context of primary school education in Finland. We introduce an in situ development of *curious practice* as a methodology to explore what we will call *childrenforest*. "Curious practice" is a theoretical notion coined by Donna Haraway (2015) and inspired by Vinciane Despret (2014). At the heart of Despret's ethological work lies the demand for scientific and philosophical inquiry into the relationships of people and animals, observer and observed, and researcher and researched in ways that challenge rather than rely on these binary positions.

The research context of the empirical study is a nature school to which local school classes make field trips in a northern city in Finland. The research involved 5 weeks of full-time work between February and March 2017. The human participants were the nature school teacher Niina, 438 children from first to fourth grade (i.e., 7–10 years old), class teachers, their assistants, and the researchers. The forest visited by the school children and adults comprised a diverse collection of more-than-human participants,

emerging differently with each visiting class. And so, the unit of analysis was conceived as *childrenforest* – a concept to be developed in what follows.

The methodological question discussed in this chapter is *how does curious practice help us to address children's relations to forests beyond the child (in) nature dualism*? The primary goal is then *to explicate the ways in which curious practice aids in highlighting the neglected properties of the mutual becoming of children and forests*.

The philosophical and methodological approach evident in our framing of childrenforest with curious practice reflects emerging "posthumanist" (i.e., beyond humanist or human-centered) approaches to educational research (e.g., Snaza et.al., 2014) that partially converge with "sociomaterialism," "post-anthropocentrism," "new materialism," or "new empiricism." These perspectives are mobilized by theorists such as Barad (2007), Haraway (2008), Braidotti (2013), Bennett (2010), and Stengers (2011). At the core of these approaches is a focus on the *relations between agential entities* rather than on the individual (human) actors. This means that emphasis is on the shared processes through which relations take place rather than on individual (human) views of these relations. This theoretical insight helps to elaborate a basic premise of childhoodnature in which humans and their nonhuman surroundings do not exist independently of each other (Malone, 2015; Rautio, 2014; Snaza & Weaver, 2015; Taylor, 2012).

Childrenforest is invoked as a living, throbbing, productive, open whole rather than composed of interacting (turn-taking), clearly discernible individuals. Childrenforest is a cumulative effect of the diversity of individuals labelled "children" and the multiplicity of things and beings called "forest." Childrenforest is an entanglement, a more-than-human entity that emerges unpredictably and cannot be planned in order to be known, especially through conventional methods of qualitative research. Our concern is, therefore, with exploring encounters of children and forest in terms of their emanating, but not palpable, assemblage, which nevertheless leaves traces and "speaks" with a researcher through unusual, interesting, and unexpected events. This is an approach to qualitative inquiry and to data that Svend Brinkmann (2014) calls abductive or breakdown driven, and Maggie MacLure (2013) characterizes as openness to surprises and to the mutuality of researcher and data reconstituting each other. Both challenge the idea that research is both planned ahead and executed accordingly and that data is simply collected; Brinkmann (p. 722) suggests that inquiry arises out of a surprising situation rather than in relation to collected data. Such openness to serendipity can generate new knowledge of what is significant in the relationships of children and forests through highlighting what has been missing from previous – well planned – studies and how, by approaching childrenforest, we can enrich the understanding of who we are as humans.

To study childrenforests as entanglements capable of surprising us, we apply curious practice as a methodological form of what is called multispecies inquiry or multispecies ethnography. The novel yet rapidly emerging approach of multispecies ethnography (Kirksey & Helmreich, 2010) foregrounds all animals as embodied individuals sensing and making meaning of their environments and thus as

legitimate participants in the ethnographies of shared lives (Buller, 2014). Multispecies ethnography thus focuses on human-animal coexistence in terms not only of what the individuals are (biologically) but what they do (biosocially) and not as beings but as becomings creating themselves together through action and interaction (see Ingold, 2013). In our study, the curiosity in curious practice reaches beyond animate beings – or rather questions the notion of "animate."

We begin by briefly reviewing the literature that explores children in forests. This will assist us in characterizing what has already been done methodologically in disclosing and representing the experiences of forests by children. On the surface, these studies do not seem to treat children and forests as categorically separate. But a closer reading shows that an underlying binary exists: children are often put in a dominant position of knowledge producers whose task is to experience forest (as if it is an object) and express it in a representational manner. Ultimately, these subjective representations are further used to improve learning objectives and are often presented as a portrayal of an objective reality.

We will then move to describing curious practice, as introduced by Donna Haraway and based on the work of Vinciane Despret. The relevance of our methodological choice and its location within a broader field of multispecies ethnography is discussed. In the section where we present our account of curious practice, we show that curious practice of childrenforest differs slightly from the curious practice described and performed by Despret. Despret's (2015) aspiration to make ontological claims about the potential "reality" of her research companions, or the "mystery manifestation"/"resolution of enigma" (p. 59), as she puts, is what we will leave out. For this and other reasons, we combine the methodological foundations of Despret's curious practice with Eduardo Kohn's (2013) "anthropology beyond human" in order to customize curious practice with respect to our research context, subject, and the participants. By thinking with Kohn, we attend to the ways of looking at childrenforest through the notion of "human and nonhuman semiotic selves" to go beyond mere symbolic representation inherent in humans. We also apply Andrew Pickering's (2013, 2017) concepts of *decentered becoming* and *islands of stability* to the encounters of children and forest to demonstrate the co-constitutive becoming of children and forest and the appearance of seemingly stable configurations within this becoming.

Previous Literature

Intellectual conditions for thinking beyond the "child" and "nature" dualism exist and have existed for a while (e.g., Russell, Sarick, & Kenelly, 2002). Many authors contributing to this current handbook engage with the entangled childhoodnature rather than with childhood and nature separately in order to challenge the nature/culture divide implicitly present in much of (early) childhood and outdoor/environmental education research that we review below (see also Clarke & Mcphie, 2014; Malone, 2015; Rautio, 2014). The following studies are dedicated to an investigation of children's experiences in the forest and mainly concern exploring the effect of

forests on a child's well-being. For the purpose of relating and contrasting curious practice and childrenforest to these approaches, we will trace the methodological commitments of these studies and the level of the children's own contribution to the end result and formulation of new perspectives for the development of educational knowledge.

There is an evident trend, located at least in the Nordic or North European countries, of growing numbers of forest day-care centers, gardens, and schools. The reasons behind the upsurge of educational contexts close to nature are yet to be explored in detail, for instance, the parental choices that create the demand for such places (Borge, Nordhagen, & Lie, 2003). There is no shortcoming of research emphasizing the positive influence of direct contacts with nature to children's well-being. Among these are overall health and motor fitness (Fjørtoft, 2001), linguistic development and concentration (Schäffer & Kistemann, 2012), increased engagement and prosocial skills for children with special needs (Griebling, 2015), as well as growth of interest in forest life (Harris, 2015). Due to the prevailing developmental approaches to education, children's doings are often subjected to meanings ascribed by parents, educators, and other fellow adult citizens (e.g., Blaise, 2016; Burman, 2007). The forest school trend and its underlying justifications seem to be no exception. There are studies that seek to foreground children's views and experiences. These, as we will argue by introducing a few examples, are methodologically conventional in that they entail little flexibility and/or critical evaluation of research designs and so often fail to address what matters to children beyond adult-imposed categorizations.

Nicola D. Ridgers, Zoe R. Knowles, and Jo Sayers (2012) conducted a study of children's experiences of play in a forest school using a qualitative approach (pen profiles and verbatim quotations), which constituted a well-planned research project with an anticipated objective of methodological rigor to be demonstrated through trustworthiness, credibility, transferability, and dependability of data. The result was to be approved by all authors during a triangular consultation process. The authors, however, concluded that their research lacks depth without presenting children's own voices, though evaluated "not in the manner that would typically be expected" (p. 53). This statement indicates the researchers' frustration over the initial plan for data presentation, which led to their agreement on the introduction of "raw" narrative – the individual opinions of children – that does not require interpretation and should be presented in the language of the children themselves.

Magdalena Rudkowski (2015) explored children's experiences in the forest with the help of hermeneutic phenomenology and the Mosaic approach. Children were encouraged to express their sense of the forest through photography and drawings, bookmaking, and child-led tours as well as in casual conversations with a researcher that would reflect on the children's experiences. Rudkowski also conducted a pilot study before the actual empirical research so as to test "whether they [data collection tools] were effective in capturing the children's experience and of interest to the children themselves" (p. 42). Rudkowski mentioned that six children (other than the main participants) were "included" in the pilot study. Yet, their experiences were excluded from the discussion. By doing this, the researcher immediately reduced to a

common denominator those children's interests, values, and personalities that were investigated in order to ensure the effectiveness of the research objectives. Division of a research project into concrete stages with limited periods for "productive" data collection, aspirations toward results, and silencing some of the voices will not, however, ensure what Rudkowski called "open-ended, malleable and versatile opportunities without the specific design and tailoring for young children" (p. 106(7)).

Anna Golden (2013) embarked upon exploring and making meaning of the forest with preschool children, whose task was to express their experiences and understanding of the natural world through various forms of representation: drawing, writing, photographing, clay, blocks, embroidery, and other tools. Golden highlighted the importance of looking at children's own ways of seeing the forest, their ability to reflect upon the landscapes and their favorite places in order for adults to better understand children's learning objectives based on their representations of the forest. The binary of (wild) nature and (agential) culture is evident throughout, for example, in phrases and quotes such as "wild space," "wildness," "model of the forest," "stewardship of the forest," and "the world outside them." While Golden's methodological approach is in line with the conventional way of doing a qualitative inquiry, we found intriguing the fact that an inquiry into the children's view of the forest included, as if protecting the children from the same forest, "countless changes of dry, mud-free clothes" (p. 125).

Most of the studies reviewed promote the well-being of children and their positive attitude to the forest, as well as increasing the time spent outdoors as part of formal education; these studies nevertheless belong to the perhaps unintentionally anthropocentric ones (Clarke & Mcphie, 2014; Malone, 2015). Furthermore, most of these studies emphasize the importance of planning in research. Planning, and following a plan, indicates an approach where the researcher knows about the topic/participants beforehand and/or has a clear hypothesis to test. In contrast, when the researcher lets go of much of her preconceptions and is curious instead, the task of planning becomes harder if not impossible. Well-planned and dutifully followed studies rarely break free from what is already known. This is especially weighty if what is presented as known is a child.

Furthermore, presented studies are exceedingly attentive to a child's representation of forest. Focusing on meanings or explanations behind children's actions – be they adult imposed or the children's own – does not acknowledge the interdependence or relationality of childrenforest. Any single meaning or explanation is always only partial. Any symbolic representation of a child's interpretation of their movements is, therefore, limited only to human perception or cannot be interpreted at all. Alternatively, the focus in this chapter is on *the co-constitutive processes that give rise to childrenforest*. All of the actions, intentions, and intensities are the result of co-constitutive process of both children and forest. With such processes, it does not make sense to ask after meanings or explanations of only one kind of individual. Childrenforests emerge spontaneously: a child and a tree, for example, are drawn to each other in complexly relational situations where categories do not apply but where categories can be made. Curious practice shows us the ways of approaching these emergent categories, and with that, we proceed to the exploration of this

methodology in the next few sections, where the processes of the childrenforests are discussed.

Curious Practice Unfolding

Although the idea of being curious and having a sense of wonder in doing research is not a novel one (Daston & Park, 1998; Evans & Marr, 2006; MacLure, 2013; Stolberg, 2008), an approach of Vinciane Despret stands out among all the approaches, for it encourages researchers to work relentlessly with their curiosity, ask interesting questions, and immediately doubt them. What is most important, Despret does it not only and not so much for the sake of humanity as for the sake of more-than-humans.

Curiosity as a natural human ability for inquiry is commonly argued to be a desired trait in both teachers and students, scientists, and everyone who shares an idea of lifelong learning (Dewey, 1933; Schmitt & Lahroodi, 2008; Stolberg, 2008). Frederick Schmitt and Reza Lahroodi (2008), for example, attach a higher epistemic value to curiosity than to a sense of wonder, stating that "In wonder we are not overridingly motivated to resolve cognitive conflict, while curiosity motivates us to inquire" (p. 132).

In other words, wonder does not necessarily imply a desire to know, when in fact curiosity does. In wonder, you might find something/somebody curious and appreciate its/her/his mystery without going further than that. This something or somebody usually stands in a position of novelty to an observer (Leask, 2002, p. 25), though it should not always be the case. Oftentimes, these two notions are used interchangeably as their borders are not clearly defined. Given the visible ambiguity of both terms and a definition of imagination presented further (see at the end of the current section), we suggest a notion of *wondering curiously*, based on our interpretation of Despret's (2014, 2015; Buchanan, Chrulew, & Bussolini, 2015) works. For a researcher, to wonder curiously would mean to stimulate himself/herself to notice novel/interesting even in ordinary, learn to be surprised at it, and then, if given an opportunity, approach it by means of imagination.

What Patricia Williams (as cited in Gordon, 2008) refers to as the "vast networking of our society" (p. 19) and Avery Gordon (2008) calls a "complex personhood" summarizes the existing approach to curiosity, which pivots on the curiosity oriented toward complexities and intricacies of human society, whereas Despret teaches us to think both with humans and not. She urges us to build our nowadays very fragile relations "with and for earthly beings, living, dead, and yet to come" (Haraway, 2015, p. 5) as well as to recognize the risks and limitless possibilities of "wonder" within human-nonhuman encounters. There is no need to deny a historicity and a profound complexity of multiple nonhuman forms of life, which we, as humans, are nested in.

Vinciane Despret seeks fertile collaborations with people and animals through an art of *visiting*. For her visiting is a skill of resistance to grand narratives by means of co-creating new stories with more-than-humans. It is an ability to unplan research by

turning it into a spontaneous journey rather than a data collection process. It is an art of "sniffing" an invitation to enter a territory of the other with a brief and polite visit. Donna Haraway (2015) further clarifies:

> Visiting is not an easy practice; it demands the ability to find others actively interesting, even or especially others most people already claim to know all too completely, to ask questions that one's interlocutors truly find interesting, to cultivate the wild virtue of curiosity, to retune one's ability to sense and respond – and to do all this politely! (p. 5)

Curious practice or the polite way of visiting is about creating conditions for encounters. The kind of conditions a curious researcher is after are interesting and lively and of the kind that will lead to encounters without assuming that the other can be known. Rather than focusing on "rich data" production, the researcher is responsible for finding ways of listening, seeing, and being with others in the moment. Despret (2015) herself associates this practice with the word "respect" as a form of suspicion of one's own reasoning. The politeness of a researcher thus includes doubting the commonly accepted, human-centered approach to her nonhuman co-researchers. The researcher is responsible for approaching research in a way that will put herself in a position of resistance, in a way that will perplex things to the extent that new questions need to be asked, the kind of questions that matter for the nonhuman participants and co-researchers. One must talk to the others, listen to, be inspired by, and, eventually, tamed by them by virtue of, if not reaching, then coming closer to an understanding of what matters to other-than-humans.

Curious practice can be seen to be the heart of multispecies ethnography or multispecies inquiry attending to the hybridity, entanglement, and relationality of all entities and lively beings, humans included (Haraway, 2008, p. 330; Lorimer, 2007, p. 913), and thus dismantling the modern myth of the purified and separate realms of "nature" and "society" (Latour, 1994). For the purposes of the study described in this chapter, and as opposed to many studies in the field of childhood and nature, curious practice recognizes both children and nature as being entangled and relational co-researchers rather than objects of the study. It resists an intended dialogue being replaced with a prescriptive monologue; it focuses on the openness and availability of the researcher, rather than that of the participants. According to Despret (2015):

> The ravens will literally recruit their researcher into what will become a passionate inquiry; they will reveal to him the resolution of an enigma the difficulty and the interest... In learning to recruit them, he learned to be recruited by them. That which constitutes achievement for a raven now constitutes, in another way, achievement for himself; feeding on their emotions, letting himself be pervaded by their joy, letting himself be drawn into their enigma: converting the environment into a little more of himself. (p. 59, 66)

In the study discussed, the children and the forest will recruit the researcher. And so, rather than trying to guide the hybrid and entangled childrenforests, the researcher becomes guided by them.

In order to be guided, the researcher has to admit to the necessity of being open to the yet unknown, to the possibilities of seeing differently. She has to learn how to be a not-yet participant of the potential assemblages of children and forest, to be within

and yet observe from afar the childrenforest becomings. The monist overtones of such vocabulary imply freedom from the dualist worldview, the legacy of science. It is not even a matter of obligation, but an unconstrained, effortless, naturally occurring being and acquiring of another sort of vision, which Margaret McMillan (1904) referred to as seeing beyond human sight or attending to the higher structures of mind:

> Half the difference between the discoverer and the ordinary man may be said to consist in this, that the former can see that which is invisible to the other. – He can conceive movements and forms that are beyond mere physical vision. (p. 168)

This type of vision, in accordance with Despret, is equivalent to imagination or the ability of a researcher to create multiple hypotheses, versions of the same event, which are hidden from an ordinary person behind often blunt and commonly accepted cause-effect relations (Buchanan et al., 2015). The task of the researcher is to imagine what is absent from the scene in order to create conditions for approaching something not yet revealed. Imagination in the current chapter is, therefore, defined as a tool to gratify one's curiosity, an immense power of humans to think in terms of possibilities, create, link, mix, divide, or separate ideas that might further explain an observed phenomena within given sensorial capacities (Hume, 1975). What is lost, however, in the process of representing the "data"/versions that might perform a quite functional duty is nonrepresentational. The affect (Deleuze & Guattari, 1987) from the encounter of children/researchers and forest, emergence of childrenforests, is exactly what intensifies the moment and oftentimes liberates us from the meaning-making. With that the researchers are often limited in their ability to imagine/see this sort of irrationality of unknown content and have to either "grope about in darkness" or find a way to go beyond a mere imagination (Holton, 2016, p. 915). Alternatively, as Despret (in Buchanan et al., 2015) explains, the researcher has to learn "to trust the world" (p. 170) in order to be guided in darkness, meaning a human imagination is rather an extension of the thinking world that is alluding to the right questions and possible answers. We, as researchers, just need to sometimes acknowledge that irrational in our head might be an echo of ordinary, the gesture of a wondering other.

In the next section, we will discuss how to unplan research with the help of curious practice. We will exemplify this by going through how curious practice was employed theoretically and methodologically in the context of the study conducted at a nature school in the north of Finland.

Customizing Curious Practice and Unplanning Research

Theoretical Synthesis

The decision to unplan research might seem risky – as scholars we are educated first and foremost to avoid losing control. Yet, studies in which unpredictability and loss of control are taken as productive, if not virtues, are proliferating (e.g., Despret,

2014, 2015; MacLure, 2013; Rautio, 2014; Taylor & Pacini-Ketchabaw, 2016). Affrica Taylor and Veronica Pacini-Ketchabaw (2016) point out that our encounters with other-than-humans are by nature unpredictable and, therefore, planning is not only impossible but even attempting to plan is often impractical. MacLure (2013) discusses the unexpectedness of wonder in the research process of data collection and its capacity to engage with us in a form of event that cannot be planned in advance. It may just *happen*, if we are lucky enough. In regard to this, Despret encourages researchers to avoid remaining passive in a hope of seeing/sensing wonder and rather amplify the chance of its occurrence. By amplification, Despret (in Buchanan et al., 2015) does not always mean planned actions. Instead, she indicates the ability of a researcher/an involved human to persist in proposing differing "gestures," to lure the other or rather respond to its subtle signals:

> You don't improvise your own gestures, you just hope that making a gesture will provoke one of the responses you expect, and if not, it will be a response that will make the dancer respond. (p. 175)

To be able to address the emergence of childrenforest, we bring Eduardo Kohn's (2013) thinking to resonate with what has thus far been said about curious practice. Eduardo Kohn is an anthropologist, whose research attends to the questions of human nature mediated by the forest. He attempts to think with forests through people for whom a forest is more than a place of dwelling. Kohn invites us to reach beyond human thinking with the help of *semiosis* (the creation and interpretation of signs), and he draws mainly on the Charles Sanders Peirce's typology of signs. In order to understand how curious practice is applied to the relationality of children and forest, we need to obtain an image of how Kohn translates this typology into his study and what he suggests searching for.

The famous Peircean triadic model of signs stands for icons, indices, and symbols, whereby icons are "involving signs that share likenesses with the things they represent" (Kohn, 2013, p. 8); indices are the product of relations among icons, "they tell us something new about something not immediately present" (p. 52) or point out the as yet-inexperienced; and symbols are "the product of relations among indices" (p. 53), "distinctively human representational forms" (p. 8) and what makes human language possible. All these signs constitute a complex hierarchy of signs, where symbols are the products of and nested within indices and indices are the products of and nested within icons. They are not strictly delineated but rather flow into each other in the continuous chain of receptive relations. Indices need icons and symbols need indices, but not the other way around. Therefore, icons are the most basic signs that exist at the margins of semiosis, because iconicity makes it hard to notice the difference between two things. A brief example of the sign relations can be a moment when Niina showed a picture of a worm to children in the lesson called "Animals' food in the forest" and children replied that birds eat worms. The picture of a worm is the icon, a very close resemblance of what the object represents. Immediately this picture sparked among many children a reaction of disgust, because it pointed to the possibility of relations with this worm (holding it, being

near), and it seems it is not a very pleasant experience for some. That reaction bears an indexical reference to the event not yet present. And only after Niina asked whose food it is, did the children reason that it was a bird's, because for them (humans) the picture of a worm became a symbol of a bird's food in the process of their education.

Icons and indices, being *reals* or manifestations of something material/immaterial (thoughts) that exist independently of humans are embodied in worldly "habits, regularities, patterns, relationality, future possibilities, and purposes" (Kohn, 2013, p. 59) and are "far more expansive and extensive than human consciousness and its languages" (Payne, 2016, p. 171). In other words, icons and indices are aligned with an evolutionary process during which they emerge and proliferate as a part of form, as reals, which we humans cannot always identify. Kohn's idea in his research of thinking behind the forest is to attend to those iconic and indexical signs that are often unnoticed or to go further than our only habit of symbolism in order to become available to those diverse habits, relations that extend far beyond humans. Kohn's ambition unites his research with that of Despret and methodologically echoes her idea of curious practice in many ways.

The unifying feature of Despret's and Kohn's methodological approaches is their aspiration to know beyond the human and, hence, a need to train oneself to cooperate, live, and sense with nonhumans. Both Despret and Kohn participate in observing nonhumans through and with humans, sometimes through their own experiences, or at times in the absence of humans (see Kohn, 2013, Chap. 5). Likewise, we hope to approach childrenforest through and with the help of children and forests, via creating opportunities for their emergent dance. Secondly, both Despret and Kohn deny the accuracy of causality of the world with relation to the way human beings perceive it: "We don't know outside causality how things connect together," Despret (in Buchanan et al., 2015, p. 176) says. Therefore, we shall abstain from looking exclusively at the connectivities of an event that our brains tend to create immediately and unquestionably. Finally, both researchers bring to the forefront the importance of being imaginative and being less bound by theories that colonized our minds. Kohn (2013) observed that "People in Ávila try to make sense of these various selves that inhabit the forest by trying to see how they see, and by imagining how different perspectives interact" (p. 96). He also very meticulously explored and imagined different versions of various phenomena. Similarly, Despret admits the partiality of cause and effect interpretations and encourages us to search for and to imagine links between events in unlikely ways, creating unimaginable connections that develop into a multi-version story.

Expanding imaginative abilities in the framework of the study discussed means that we do not take for granted even the most mundane events: a child making a snowball, for example (see Fig. 1). Our first instinct and the answer to the question "What is happening?" is to view a child making a snowball for the fun of it, perhaps to throw it. We then move to viewing how the event could be taken as a relationality of signs. The round shape of a snowball takes us to what Kohn (2013) refers to as a *form*, a pattern propagated by "configurations of constraint on possibility" (p. 157). This round shape evolved as a result of an interplay between a human hand of a special bone constitution that forms arches and snow that has

Fig. 1 Form. (Source: Authors' photograph)

specific sticky lumping properties. A natural human grab of the right kind of snow will produce a snowball of a fairly round shape. This, in its turn, means that a ball's round shape is irreducible to more basic forms and is the simplest in itself. The round shape of a snowball emerged because of human and nonhuman agencies. Snow with its recurrent properties emerged independent of humans, and its representational modalities support its functionality in this particular context. So to speak: "semiosis exists beyond human minds" (p. 159) and informs humans about itself through humans thinking about it. The child, for that reason, performs an action with snow not necessarily because he/she *solely* decided doing so but also because the thinking forest conveyed a message to be further substantialized. As Despret (in Buchanan et al., 2015) put it: "if we know what importance means, it's because a blackbird taught us" (p. 176). Similarly, Kohn (2013) instigates an idea: "...the fact that we can make the claim that forests think is in a strange way a product of the fact that forests think" (p. 22).

Therefore, Despret and Kohn talk about imagination that is less shaped by human knowledge, dogmas, and common categories of thinking and more by the knowledge of other-than-humans. This type of imagination is peripheral, uncontrolled, or emergent and allows the researcher to visualize links within one event or between events otherwise. The opponents would argue, though, that imagination of this kind is a foe of impeccable science or falls within a certain *themata*, as Gerald Holton (1996) explains – "the often unconfessed or even unconscious basic presuppositions, preferences, and preconceptions that scientists may choose to adopt, even if not led to do so by the data or current theory" (p. 201). Eventually, there is a possibility that adherence to these convictions might lead to speculative conclusions and an academic fiasco. In spite of that, Holton recognizes undeviating need in scientific breakthroughs, which the thematic imagination, visual

as well as other types of imagination might successfully fulfill, as they inspire to imagine unimaginable and "open up entirely new worlds" (p. 207).

On the other hand, the fundamental difference of Despret's (2014, 2015) and Kohn's (2013) methodological frameworks is in their research subjects. That is, Despret's interest is to investigate, reveal, and unearth animals' behavior which a human being has never been aware of before. Concurrently, Kohn delves into a more-than-human semiosis or, in particular, the thinking behind the forest. Both tasks are hard to tackle, and both of them require an enormous commitment in terms of attention, curiosity, self-critique or politeness, and of course time. Yet, observing, working, and thinking with animals are essentially distinct from thinking with the forest, which many living beings are part of. While Despret's idea is to propose many different gestures to the animals in the hope they would respond to these gestures, Kohn proposes to think in terms of patterns, habits, and regularities to approach the way the forest thinks. In both cases there is a chance that other-than-humans might make themselves knowable: animals through a new, interesting behavior and the forest through semiotic processes.

According to our account of curious practice, we, in line with Despret's research, show a plurality of childrenforests in the same manner as she tries to demonstrate to the world what makes "a plurality of singular animals" (Buchanan, 2015, p. 18), but therewith we acknowledge the ontological differences of our respective research subjects. We do not observe a behavior of childrenforest; we observe a communion of children and forest, their "becoming with" (Haraway, 2008) that reveals itself through patterns, generals (habits, regularities) (Kohn, 2013), traces, inclinations, and neglected confluences (see further). Among these, signs with indexical reference can also be classified as islands of stability (Pickering, 2013, 2017).

Andrew Pickering (2017) helps us to understand "islands of stability" as joint products of humans and nonhumans, "configurations, sociomaterial set-ups, where some sort of reliable regularity in our relations with nature is to be found" (p. 140). According to Pickering (2008) and to the philosophical orientation, labelled post-humanism, humans, and nonhumans "appear on the same plane as mutually constitutive of practice and as each irreducible to the other" (p. 292). Thus, all participants in the research are decentered and always already transformed in a decentered becoming. Neither children nor trees/animals/air/snow hold a position of priority. Everyone is transformed in the dances of agency (Pickering, 2013) or transmogrified by the worldly dynamic processes. The desire to find stability, albeit illusory, is inherent in humans and nonhumans as we are as all living organisms that seek for survival; thus, we are in need of structures, which, however, are still under the control of nature and its "unpredictable liveliness" (Pickering, 2017, p. 143). With that, we are still emerging with and are being transformed by the world; we are part of the worldly flux of matterings and becomings, in which islands of stability sustain the inevitable duality of people and things.

The idea of islands of stability can be extended to cover all living organisms that create these islands for self-protection. An example of such organisms could be antibiotic-resistant bacteria that undergo mutational adaptations or horizontal gene transfer (Munita & Arias, 2016). While antibiotics can be considered an island of

stability for a human, the changes in the bacteria's gene structure is an island of stability for bacteria or at another level called as endosemiotics. For us, in the study of childrenforest, the islands of stability are not only material constructs but also the impetuses and intentions leading to the emergence of these structures in the first place. With curious practice, we focus on the ways in which children and forests seek mutual stability. These ways can be intentions, facial expressions, movements and intensities, sounds, shadows, gazes, hints, or any minutiae unique in its transient being which could otherwise go unnoticed, undiscovered, and, most importantly, unremembered (Duhn, 2016). The presence of the teachers and the researchers in the forest can also be considered as an island of stability, as adult and nature relations form invisible structures of protection for children that allow them to feel relaxed and open to the engagement with forests. The task of a researcher is to think beyond these islands of stability, that is, to "see" their origins, to locate their embeddedness in each historical and sociocultural situation, and eventually to be able to argue for the significance of childrenforest.

Looking at the childrenforest becomings through the notions of islands of stability and decentered becoming helps us to see more clearly each and every sign, habit, or an emergent real that appears, exists, and grows through the chain of signs. Being indexical in their nature, islands of stability point to the fragility of life, which urged humans and nonhumans to create these islands in the first place. We ask why these islands appear, and what motivated their creation? This automatically lead us to a better understanding or guess about the potential in our respective context reals. With Vinciane Despret, we politely explore, imagine meanings otherwise, and create links between meanings in a hope to approach these reals that exist and proliferate in the world in the same form as they appear to the nonhumans. The element of "unplanning" is ingrained into the whole process of uncovering the routine: from unexpected and interesting encounters to wondering curiously and the interpretation/representing connections as a form. The occurrence of the "data" is as unpredictable as the questions/revelations about reals that come to the researcher during the childrenforest moment or later when the "data" lives its own life and never stay stable. These questions might appear in a dream or when we try to remember what was the dream about, in the laughter of children, or in the cry of gulls. We will be informed about these questions/connections and their importance by the messy entanglements (Pacini-Ketchabaw, 2013) or disrupted collaborations of the world.

To sum up, "curious practice" is an overarching concept that is primarily developed and applied in Despret's research but is also inherent in Kohn's studies. We have synthesized them by picking out the best in both. We have also applied a concept of islands of stability to help in theorizing about meanings and potential versions of the same event. Furthermore, we consider the concept of childrenforest as possessing some limitations in regard to the participants in the research, who are not only children and forest. Taking this into consideration, we do not pretend that a thorough investigation into childrenforest has been made, rather the point has been to create arguments for the significance of such a construct – beyond individual "child" and "forest." In what follows, the study grounding this chapter is presented and explained in detail.

Empirical Application

The nature school studied is a city-owned public institution in the service of local schools. Annually, up to 7,000 pupils visit the nature school – every day a new group of children arrives. In these circumstances, neither the nature school teacher nor the researchers can get acquainted with the kids let alone have a chance to build emotional bonds with them. However, some groups were familiar with the nature school teacher Niina from previous visits, and it made it easier for Anna as a researcher to be trusted, because Niina introduced Anna as her friend. Every day, Anna introduced herself in front of a new group and asked for permission to make pictures and videos, promising those pictures will not reveal personality, and headed to the forest.

Since, there is no one precise definition of what a forest is (Chazdon, Brancalion, & Laestadius, 2016), we defined it in line with the research context; children's sensitivities toward invisible in the forest, such as folklore (Karhunkorva, 2005), media (Korhonen, 2008), and cultures in a given context (Goldman, 1998); objectives; and philosophical affiliation of posthumanism (that is beyond humanism) as:

> a big living organism punctuated by human/nonhuman dwellings, human-made structures; engaged with climatic, political, geo-political, economic, sociocultural forces and flows; represented by multiplicity and variety of living and non-living organisms, both humans and more-than-humans, among which trees, mycorrhizal network and soil biodiversity outnumber the rest; a process of co-constitutive growth and development.

The context of Finland, its history, and culture, in addition to the northern location of the research city, perhaps, determine the myriads of ways children and forest engage. Forest is both people's home and temple. *Home*, *nature*, *people*, *animals*, *peace*, and *unity* are all synonyms of the forest. Such polysemy and accordingly complexity of human-nonhuman relationships attracted us to trace their significance with the help of curious practice. Intricacy and broadness of the definition, however, perplex the very notion of childrenforest, meaning that the current study attends to this phenomenon in a quite introductory manner. By defining the forest as an organism, we imply it possesses cumulative consciousness (Kohn, 2013; Reid & Salonen, 2016). For this very reason, permission was also asked from the "three sisters" tree in the forest, adjoining the nature school, to conduct an unplanned study. Anna asked to allow wonders to reveal themselves for/in/with children. She asked to be a participant-observer of this revelation. And she apologized in advance for anything that might disturb this.

The role of Niina in the research cannot be underestimated and it was manifold. Mainly, she was doing her job by organizing forest trips and ensuring children were engaged with the forest through various activities. These activities were not always planned by Niina as she followed the enticement of the moment, the invitation to engage with something from the multiple learning supplies in her rucksack. From this perspective, she was a research partner who was creating, changing, trying multiple situations for children to engage with a forest otherwise, continuously using a "method alert to off-the-beaten-path practices" (Haraway, 2015, p. 6). The

most interesting engagements between children and forest took place not during performing an activity proposed by the teacher Niina, but rather in between these activities, "on the move" or when children and forest had a chance to engage with each other through all the unruliness of the moment. Therefore, hospitable conditions in the spirit of Despret meant for Anna and Niina to be offering the circumstances for unstructured play and thus accepting the invitation of a forest to step on one of its paths without any prearrangement. This, we noticed, increased the chances of childrenforest emergence. Luckily, Niina sensed Anna's desire not to frighten away some interesting childrenforests, and she was often a rather careful observer who allowed children and forest to evolve into something else, unknown and unique.

In the following, Anna's journey into becoming a curious practice researcher is highlighted. Rather than a thought-out process with replicable and explicable how-to-do steps, this becoming was and necessarily is an intuitive process, more an attitude than an exact practice. In general, when methodologies are seen as situational, immanent, changing, and "becoming" (Deleuze & Guattari, 1994), inquiry and research practices seem to draw scholars closer to singularity, open-endedness, and creativity. This is true of curious practice as well.

At the beginning of the research visits, Anna decided to simply experiment with what she holds, how she moves, or whether she speaks or is silent. She did not plan any of this but rather was ready to be changed by the moment. Oftentimes, it was air that brought about change. Her encounter with fresh air was a sort of impulse giving and guiding, telling her, mostly, to forget about taking notes. "It doesn't help," it says. To be in the moment with a hope to capture childrenforest demands maximum attention, inquisitiveness, and 360° vision, if you like. Anna's goal at this stage was to concentrate on the performance, rather than interpretation, and on movements rather than thinking. By any means, she could not write in these circumstances. The number of humans and nonhumans participating in the research was big enough for her not to know anything about her co-researchers. Anna should not have and could not have anticipated the capacities, abilities, interests, intentions, desires, and movements of children and more-than-human entities. Being aware of causal relationships amidst some events, Anna was still "walking in darkness" not knowing and not controlling what can happen in the forest in the next few seconds.

One of the examples of childrenforests Anna had a chance to observe was a moment of children-led play and their building figures out of snow during the forest trip. "What can be the most expected event?" one might think. Even a seemingly ordinary snowman is a unique construct each time it becomes made, a creation of both snow and a human being. Yet, children were not building snowmen/women. Figures unknown to her grew out of engagements between snow and children. Anna was just observing the process without interrupting in the hope of finding out what kind of marvel is revealed. At a certain point, she came closer. One boy stretched out on the ground to be further covered up with snow until only his face remained to be seen. His friends were adding snow handful after handful so that the boy's snow body was growing and evolving. Suddenly, friends built five strange small entities on top of the boysnow: they resembled a traditional snowman/woman in shape, yet

their bodies were undone and did not conform to any particular rule. Finally, boys mounted a single branch on top of his head. Anna could not resist and asked what this was that they had created. They were unaware of what the whole structure was yet added that the branch was meant to be a horn. What Anna saw was an as yet unexplored snow-human-animal body born out of the childrenforest entanglement, nameless, but horned. At this point, she decided to halt any interpretations and preserved this event *in a jar* (S.Crinall, personal communication, February 2, 2017) (see meaning: to put all the data collected into an imaginary jar to open it in a while and see the data as a whole), to speak to it later.

"Later" came at the moment of writing this chapter. A desire to "open a jar" and focus on the fusion of data emerged spontaneously: the data tames the researcher and suggests the appropriate time for their mutual engagement. It may occur beyond the "original" context, and, rather, the shifting and fluid data creates new layered and fibrous contexts (Koro-Ljungberg, 2015). Thus, we consider that collaborations of children, forests, researchers, and teachers as well as the emergence of childrenforests might/can be multi- and/or acontextual (here: not essentially having meanings in one particular context). An open and curious researcher is rather a mediator between her research subjects and the audience, and not necessarily the one who controls this collaboration. Conversely, there are no childrenforests with certain experiences or understanding, because everything is entangled and we can only hope that this entanglement will guide us.

In an attempt to ask childrenforest the right questions, we subsume ourselves in thinking about this becoming as being nested in the broader semiotic processes happening in the forest with children, namely, as a part of a form. By looking at this event as a part of a form, we would like to refer to what Kohn calls a rhizomatic propagation of form (Kohn, 2013, p. 174). The boysnow emerged in a spontaneous rhizomatic process of co-constitution of children and snow. Children could not explain the meaning of the structure, because it was built by kids intuitively through following the patterned rhythm of the forest's thought. As Kohn would say, they were simply "listening" to the forest without necessarily realizing it, and that strange structure materialized as a product of co-constitutive power of living thoughts of both children and forest. Children were harnessing their exploratory freedom (Kohn, 2013) and thus were free from planning and meaning-making. At the same time, a snowboy creature evolved as both meaningful and without any special meaning. It evolved as an iconic manifestation of emergent real and effortless propagation of form, basic in itself and always unique.

Furthermore, these snow elements serve as a point of departure for us to be viewing them also as islands of stability for they emerged as more or less reliable structures/as non-living forms/as a product of constraints on possibilities that humans can identify with. It seems that, by having a touch of regularity in the unexplained, unrecognized, and nameless, children can escape the continuous turbulence of a dynamic world and stay impervious to this suspense while still being a part of it. Rather than perceiving childrenforest entanglements only as a romanticized version of children being in the forest, "children enjoying nature," and children uniting with nature, we suggest that childrenforests are multiple short-lived events.

Childrenforests are both moments of boundless unity with all and moment of temporary categories – islands of stability.

Anna heard children exclaiming: "It is so much fun!" A particular kind of experience is embodied in this word "fun": it is something that matters to the children and to the forest, something that is of importance in their co-constitution. Our (human) modes of representation often fail in addressing how something matters. Our intentions of not to elicit or investigate the reasons behind the boysnow rested on the decision to avoid making meaning but rather focus on how things matter.

There are epistemic challenges in understanding languages we do not speak, namely, a language of both children (Murris, 2013) and forest. It can also be questioned whether children themselves can describe with words a moment that mattered, the mattering that appeared as quickly as it disappeared (Koro-Ljungberg, 2013). To demand of children to characterize what has just happened is also to deprive childrenforest of its fleeting beauty, of its elusive and short-lived exceptionality, and of its curiosity in itself. To characterize these events is similar to reading words that consist of native and foreign letters:

Gสวัд ดีอrเชr

This phrase would not make sense to an unaware reader.

And while we can see these letters, childrenforests on the other hand are not so obvious to an eyesight. Without aiming at oversimplification, this (see Fig. 2) might be an accessible example of how childrenforest felt:

Can we characterize this type of mattering, the essence of it, if any? Can we think of the appropriate words to approximate the meaning of the childrenforest entanglements? Pickering (2013) urges us to decenter the "words, language, symbols, representations, science" (p. 80) and imagine another type of science, one "of

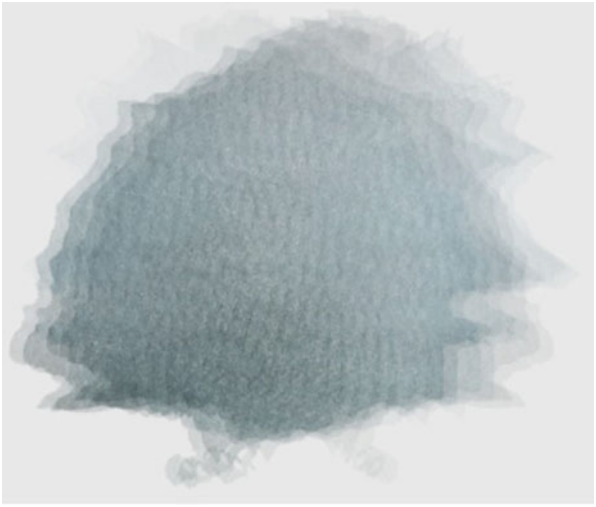

Fig. 2 Mattering. (Source: Authors' photograph)

experimenting directly in, and learning from, dances of agency, instead of conjuring them away via some epistemological sleight of hand" (p. 81). And, as in curious practice, in science, we shall impugn our judgements, assertions, and unquestionable verities with reference to the other and remind ourselves of the emergent and (ir) regular in its uniqueness, continuously changing, growing, and developing.

Movements of children inseparable from forest leave traces. The examples of such traces from our research visits were the body of the boysnow, telling us that something has happened right here between snow and a child; a snow angel with a print left from a jacket; the smile of a child, who adds more snow to the growing snow entity; the roar of a child happy in a moment; frozen toes and fingers; a moan of hunger after an active play; a plucked plant thrown on the ground; a howl of the female-imagined werewolves, protecting their kennel; hands smelling of mushrooms; a fir cone in a pocket; the message "Hello" written with a branch; a broken icicle a moment ago being a scepter; the echo of a song in the forest; pictures, memories, the emerged names of new creatures, and wet socks; and snow ricocheting off the shoes, to mention but a few.

Apart from traces visible, heard and observed by most of the participants, yet still taken-for-granted, curious practice allows us to focus on something that is not instantly useful or meaningful but simply intriguing. In particular, it enables us to start noticing the hardly-observed *inclinations* and *neglected confluences*. Inclinations are the sort of movements and intensities, depicted in a snapshot, where the child and forest act upon each other, incline to one another, reach out, tend, and desire for the childrenforest entanglement. It is similar to seeing an action in slow motion, depicting a spontaneous and momentary event. In one of the images, a girl is pictured falling onto snow with the intention of making a snow angel (see Fig. 3). While the snow angel is a trace or here a symbol, the falling girl and the as yet untouched snow, which in a second will become something else, are an inclination. We also believe that inclinations are entanglements in themselves, by which a girl and snow are always already intra-acting. It is a moment when clearly something happens in between, and we as researchers can use this opportunity to attend to this entanglement in case it is noticed. Snowballs hanging in the air, levitating children, hands reaching out to a dog, the dog's friendly sniffing in a direction of a child, leaning bodies, a snowflake falling but not yet reaching the cheek, a tongue trying to catch a snowflake, snow piles lying on the boughs asking to be shaken off, and oftentimes hands stretching to these snow piles.

And while inclinations happen intentionally, neglected confluences are unthought spontaneous fugitive moments of the bonding of humans and nonhumans that usually pass unnoticed, and no human, except for the observer, is actually aware of their existence (see Fig. 4). Neglected confluences are also islands of stability but, and according to its name, often overlooked. An island of stability in our understanding is every seemingly stable configuration resulting from children-forest relations, somehow substantiated/delineated in a world of dynamic transformations. An example of neglected confluence is a pine needle hooked on a hat; a hair accidently left on a tree; a shadow with a symbolic representation formed in an assemblage of children and forest; a snow castle, built by everyone, but accidentally

Fig. 3 Inclination. (Source: Authors' photograph)

Fig. 4 Confluence "In line with the tree shadows." (Source: Authors' photograph)

in the shape of a heart, the fact of which was left unnoticed; the stripy patterns of a boy's jacket and the bark of a birch tree that the boy leaned on; and children reflected in a drop of melted snow slithering down the bark of a pine.

Kohn (2013), while pointing out the intentionality of the processes happening beyond human (p. 91), did not mention unintentionality. The accidental moments (such as neglected confluences) that are often overlooked are also semantic and produced by the camera of a smartphone. The smartphone is a participant of the semiosis as it triggers meanings. The images in this chapter, which we could

designate as "intellectual photography," resulted both from human and nonhuman intelligence and, as Kohn put it, refer to various images in his book, including photographs: "these images amplify, and thus render apparent, something about the human via that which lies beyond the human" (p. 222). Likewise, Jamie Lorimer (2010) when examining moving imagery for approaching nonrepresentational dimensions of more-than-human life asserts that moving imagery opens "thinking spaces for an affective micropolitics of curiosity in which we remain unsure as to what bodies and images might yet become" (p. 252). We argue that photography in this chapter that depicted a moment in slow motion is also a sort of moving imagery, which allows our imagination to extend and grow a number of propagating becomings, which we are not aware of yet – all essential characteristics of curious practice.

We have approached the enigma of childrenforest – of the co-constitution of children and forests – by seeking to be tamed by children and the forest and by politely attending to their gestures and invitations. The ethical grounds of human-nonhuman encounters presuppose that we (humans) do not intrude or rather that we are limited in how far we might go. Slavoj Žižek (in Žižek, Reinhard, & Santner, 2013) exemplifies it while discussing the ethics and politics of neighborhood:

> I will never be able to account for myself in front of the Other, because I am already non-transparent to myself, and I will never get from the Other a full answer to 'who are you?' because the Other is a mystery also for him/herself. To recognise the Other is thus not primarily or ultimately to recognize the Other in a certain well-defined capacity [...], but to recognise you in the abyss of your very impenetrability and opacity. This mutual recognition of limitation thus opens up a space of sociality that is the solidarity of the vulnerable. (pp. 138–139)

What Žižek ascribes to interhuman relationships here can be applied to human-nonhuman relations, because human morality is nested within a broader concept of value, which is inherent in all living selves, both human and not. Value, thus, defines what is good or bad for a kind that aims at survival and subsequently flourishes on this planet (Haraway, 2008; Kohn, 2013). Therefore, and what Kohn reasonably noticed, "the goal is to be able to communicate across the boundaries that separate kinds without destabilizing them" (p. 144), and to that end, "politely" as Despret (in Buchanan et al., 2015) would say.

The ultimate purpose of this "communication" is to allow "the logics of life beyond the human to work their ways through us" (Kohn, 2013, p. 225), so that, with the help of other-than-humans, we could think beyond a human-constructed morality and strive toward a better world, the one with a little less evil for every living organism. It is noteworthy that neither Despret nor Kohn cultivate the idea of a perfect world, where cruelty and violence per se would cease to exist. However, Despret (as cited in Buchanan, 2015) imagines a world where people would neither hide behind a mask of innocence nor claim that a lack of innocence permits them to go beyond limits. In this world people would share a responsibility of hearing others after asking right/different questions. This idea eventually informs us what the environmental education is all about.

Conclusion

In this chapter we have discussed and described curious practice as an approach or methodology through highlighting the use of it in an empirical study. The methodological hallmarks of curious practice are underplanning, polite visiting, and responding to invitations. This means that the approach challenges any preconceived ideas or categorizations of the topics or participants in the study, making way for unanticipated arrangements and allowing attention to focus on what matters momentarily, rather than insisting on research being a meaning-making endeavor. What we have called childrenforests in this chapter are ongoing and open-ended processes of co-constitution and reciprocity. Childrenforests appear and disappear and often stay unnoticed. They came into existence in this chapter because we applied curious practice in our research of children's relations with forests: curious practice re-tangled and diversified the categories of "child" and "forest." And moments of childrenforests, temporary co-constitutions or islands of stability, were formed as result. The purpose was not to investigate children's experiences but to define ways in which curious practice allows the neglected properties of the mutual becoming of children and forests to be seen, appreciated, and contemplated under the terms and conditions of both children and forests.

Methodologically, this chapter has outlined a flat, situational, uncertain, and critical approach to researched phenomena which are complex, unpredictable, non-linear, and involving human-nonhuman intra-action (Fenwick, Edwards, & Sawchuck, 2011; Lenz Taguchi, 2011). Theoretically and empirically/practically, this calls for future studies in which curious, intuitive inquiry, situational living, and methodological encounters cannot be copied or uncritically reproduced. What follows will be diverse and unpredictable multiplications of methodological practices. These will be no doubt hard to control but nevertheless needed as they will provide new ways to "practice what we preach": to approach educational phenomena as inherently complex and mostly unpredictable.

Despret's curious practice aided us in establishing a framework of uncertainty with multiple possibilities of communication through the art of polite visiting. It informed expansion of the "limen" of our imagination and seeing beyond the normative. Every time during the trips in the forest with children, we abstained from noticing only what our eyes can see; we tried to observe the not easily observable without trying to interpret. Later, though, the meanings were created as we tried to imagine a bigger picture of what was happening in the moment. Kohn's anthropology beyond the human provided us with a more practical framework of searching for signs that will keep the engagement across kinds open, inspirational, respectfully indifferent, but thoughtful. Likewise, Pickering's idea of islands of stability assisted us in making suggestions about possible intersections of human-nonhuman agency and how those are signs-generative. We, therefore, argued for the impracticality of the planning the empirical phase, which is always unpredictable when we work with children and forest, the momentous emergence of childrenforest.

As researchers and teachers, our calling is to better address the lived experiences of children in ways that help us to facilitate a more just future for all. To be able to break unhelpful patterns of knowing for and about children, we need methodologies

that make it difficult to know or to plan, methodologies that require us to just experiment, be attentive, be lost and confused, and be always open. We are trained either to neglect ordinary moments as insignificant or to quickly interpret and turn them into profitable meanings. Ordinary moments can contain momentums for surprise, however. Attending to them might bring us closer to what really matters to our children, students, and human and nonhuman co-researchers and how this significance is likely to be born. We need to retrain ourselves to learn from non-humans and ask interesting questions to understand their way of thinking.

The questions to be further asked are as follows: How do various discourses and interests potentially change/impact childrenforests? What is the role of curious practice in guiding these discourses? What are the ways curious practice is utilized/adapted in a variety of contexts? Apart from ethological studies, childhood and environmental research, curious practice is to be applied in any kind of inquiry that exists at the margins of an unknown, where difficult questions arise and where it is hard to speak about unspeakable, where no shared framework applies to a human being and her co-researchers, which would instantly guide them into the "likely-to-happen" kind of thinking, and where the researcher might be allowed not only to look at but also to respond. The examples of such research spaces are studies on death, historical geography, feral childhood, and spiritual and powerful traumatic experiences to mention but a few.

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Exploring Space and Politics with Children: A Geosocial Methodological Approach to Studying Experiential Worlds

18

Kirsi Pauliina Kallio

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Abstract

The chapter introduces a methodological approach that the author has developed for the empirical and analytical exploration of children's geosocial worlds. It builds on a threefold conceptual baseline: *political subjectivity* as a human capacity, *topological polis* as a relational context of living, and *the political* referring to subjectively experienced and socially shared, contextually forming matters of importance. These three interrelated starting points provide the theoretical ground and its methodological framework for exploring the worlds where children lead their lives, from their perspectives and with them, through spatially embedded narrations that unveil situated and contextual truths. For empirical inquiry, I have operationalized the geosocial approach into three analytical layers, focusing on social, spatial, and political relationalities. The chapter describes the

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methodological approach, including a theoretical introduction and a thorough explanation of the geosocial analytical means, and empirical illustrations that inform a politicized notion of childhoodnature. It concludes with recommendations for ongoing methodological inquiry into children's social and environmental worlds and further theorization of the geosocialities of childhoodnature, as limited by the empirical contexts informing this chapter.

Keywords
Geosocial · Experienced space · Topology · Spatial methodologies · Children · Relational space · Political subject

Introduction

Recent scholarship in human geography and the neighboring disciplines emphasizes spatial relationality. The shift to relationality contrasts with the more conventional approaches of nested spatial scales and territorial structuration. Scalar perspectives – framed in terms of micro–macro, proximate–distant, local–global, urban–rural, national–transnational – have not ceased to exist. Since the late 1990s, several "competing theoretical accounts concerning the nature of scales as social constructs ranging from an idea or metaphor functioning as an epistemological ordering frame (e.g., Jones, 1998) to the more materially embedded question of reach in strategic networking (e.g., Brenner, 2001)" have emerged (Häkli, 2018, p. 272). This still ongoing debate has engendered different branches of thought on relational spatialities where attention is given to the "interconnections and mutual constitution of socio-spatial relations and processes," observed by Jessop et al. (2008), "social and material entities are seen as assembled in ways that cannot be captured by scalar geometries," as promoted by Marston, Jones, and Woodward (2005), and "the co-presence of particular spatialities but also their co-implication" are emphasized, as in Leitner, Sheppard, and Sziarto (2008) (Häkli ibid.). This development is of keen interest and relevance to the contemporary study of childhood spatialities, as indicated in the recent special issues of the journal *Global Studies of Childhood* (Millei, 2014, 2015).

As part of these broad discussions that have engaged some childhood and youth geographers as well (Kallio & Häkli, 2015; Kallio & Mills, 2016), *topological theorization* has been introduced as one potential way of rethinking how spatial relations constitute and exist (e.g., Joronen, 2016; Martin & Secor, 2014; Mezzadra & Neilson, 2012). Instead of identifying new territorial frameworks or scalar dimensions, topologies are attained by tracing the social ties that people, including children – as individual agents and collective actors – adopt, create, maintain, transform, challenge, and refuse, as part of their everyday activities, through their interactions and relations developing and unfolding in various lived environments (e.g., Ahlqvist, 2013; Ek, 2006; Häkli, 2018; Lorimer, 2010; Sepp, 2012). The relational realms thus exposed are not static constellations as they constantly transform through people's practiced relations. Neither are they completely fluid realities where nothing holds its place, as "geosocial life" is conditioned by established

spatial structures with geopolitical and geoeconomic underpinnings (Mitchell and Kallio 2017). Moreover, geosocialities involve interaction with natural, material, and immaterial elements, as part of the ongoing constellation of lived realities that people experience and enact diversely (Johnson et al., 2014).

Joining this branch of research, in collaboration with Jouni Häkli, I have developed a theoretical idea of "topological *polis*" (Häkli & Kallio, 2014a, b, 2016; Kallio & Häkli, 2017). As part of this work, I have created a methodological approach for exploring people's geosocial worlds, primarily from the perspectives of 10–17-year-old children and youth, as I have been working with them in my recent research in Southern Finland and Northern England. This chapter focuses on introducing the methodological approach and showing how it can be operationalized in empirical research.

I begin with a brief theoretical introduction, explaining the key concepts informing the methodology and its philosophical orientation. Then I turn to discussing the analytical means and illustrate them with examples from my ongoing analysis. Before the summarizing conclusions, I ponder on what the approach may offer to the interdisciplinary study of childhood studies, and in the final section modest suggestions for the childhood studies research agenda are given.

Publications demonstrating the methodological approach through empirical analysis include Kallio (2014a, b, 2016a, b, 2017a, b). Portions of this chapter also appeared in author's previous publications that are referenced throughout this chapter. These include Kallio, Häkli, and Bäcklund (2015) and Kallio (2018, forthcoming), as in the list of references.

Theoretical Grounds of Geosocial Methodology

The geosocial methodological approach that I have developed builds around the theorization of political agency (Häkli & Kallio, 2014a, 2018a, 2018b; Kallio & Häkli, 2011a, b, 2017). This section offers a brief introduction to the key concepts: *subjectivity* as human becoming–being, *contextuality* in the form of topological *polis*, and *the political* denoting matters of subjective and shared importance.

Following a phenomenological orientation, I understand political agency as a human condition providing people capacities to lead their lives as political subjects. This includes that political agency is conditioned but not predetermined by socially constituted (inter)subjectivities, that is, the social selves that people acquire when becoming members of the communities and societies in which they are situated. Secondly, the phenomenological orientation emphasizes experience as a focal element of political subjectivity, and specifically, human experience as a particular way of relating to lived realities. Philosophically and ontologically, the approach stands in contrast with the posthumanist and new materialist thinking where the dissolution or dispersion of human subjectivity is taken as a starting point (for a thorough critique, see Chernilo, 2017; Häkli, 2017; James, 2017; Payne, 2016; Rekret, 2016; van Ingen, 2016). Rather than understanding agency as distributed between human and nonhuman actors, I deem that different actors have different kinds of

agencies that may have political ramifications. Human agency, however, involves specific political characteristics that should not be lost from the sight at the childhoodnature research agenda. As I will discuss next, children among other people can form and express attitudes, advance their desires, present views and disagree, and take action in ways unforeseeable and unexpected, by drawing from their socially conditioned, intersubjectively developing, and subjectively established political subjectivities.

With subjectivity, I refer to the experiential dimensions of selfhood: *who* I feel I am. This "whoness" is a constantly developing human state of becoming. It builds in relation to negotiated identities: *what* I am in terms of race, gender, class, age, ethnicity, and other social categories. These conceptual starting points draw from Arendtian political philosophy (Arendt, 1958, 2005, also Kallio, 2014b, c, 2017a). The idea of becoming indicates the dynamic processes of subject formation, in line with theories of subjectivity that appreciate it as an intersubjective process based on mutual recognition, including importantly political and ethical elements (e.g., Cornell & Murphy, 2002; Crossley, 2001; Honneth, 1995; Noble, 2009). In this Hegelian sense, subjects depend on mutual recognition to exist as individuated selves. Hence, the mundane situations where recognition is given and received – and sometimes struggled over – are concurrently the source of personal agency and the foundation of sociality.

While subject formation is an ongoing process, continuing throughout the life course, it is particularly intense during the early years of life (Elwood & Mitchell, 2012; Habashi, 2017) and in significant turning points, like life course transitions related to migration, for instance (e.g., Kivisto & La Vecchia-Mikkola, 2015; Peña & Ybarra, 2017), and societal and personal crisis (e.g., Baines, 2015; Väyrynen, 2014). However, it is important to note that, as a subjective human condition, "becoming political" is not oppositional to "being political." Because intersubjective subject formation requires the active presence of the subject, becoming unquestionably includes being. As part of political development, or subject formation, people take part in their own processes of becoming as well as in those of others within their social reach, both implicitly and explicitly. When transitioning through intensive periods of intersubjective geosocialization – as I have come to call the contextual processes of political subject formation (Kallio 2016c, 2017a, 2018) – people are hence not less "whole" or "present" than during more stable periods of life, as subjects and active agents. Thus, being always includes the potential of becoming; by being with others (including more and less active presence), people enhance their political subjectivities intentionally and less so. Childhood and youth researchers, in particular, have emphasized the importance of noticing these aspects, to stress the equality of children and young people with other people in their communities and societies (for an overview, see Prout 2011).

The second key dimension of political agency is contextuality that I frame in terms of "topological *polis*," which notably diverges from the classical city-state idea of *polis* (for a thorough description, see Häkli & Kallio, 2014a; Kallio & Häkli, 2017). In short, the concept refers to the relational realms where people find themselves living. Following topological logics, *polis* is a geosocially constituting

reality, consisting of everything that has meaning to those involved in its life. Respectively, these meanings are definitive of its scope and extent. Due to its social constitution, *polis* can never be described accurately in topographical terms. Its form and contents vary depending on where, when, and from whose perspectives they are approached. Similarly, its temporalities are blurred; *polises* do not rise and fall similarly to polities. As "a specific 'shape of space', that operates by different rules of connectivity and transformation than, say, a plane or a sphere" (Martin & Secor, 2014, p. 433), topological *polis* is constantly in transformation. Different *polises* cross over and mold each other, forming new political realities at some points, in some places, with some people. This kind of subjectively experienced yet intersubjectively practiced spatiality is outlined already in Arendt's conception of *polis* (Arendt, 2005, p. 128, emphasis in original):

> [S]omething that is shared by many people, lies between them, showing itself differently to each and comprehensibly only to the extent that many people can talk about it and exchange their opinions and perspectives with one another, over against another.

Even if the emergence of topological *polis* does not follow a singular spatial logic (e.g., territoriality, network, or flatness) and has no stable or general condition, it does not constitute randomly or change haphazardly. *Polis* is known, practiced, and struggled by the people who are experientially involved in its geosocialities and whose agencies are conditioned by the prevailing geopolitical and geoeconomic situations (cf. Hörschelmann and Reich, 2017; Sparke, 2017). Its constituents are brought together by matters that gain importance in its life – that are *politicized* in a given realm. Moreover, my thinking includes that while the nonhuman constituents of *polis* may be influential in many ways, only people are capable of initiating politicization as that requires abilities to experience and share contextual importance (cf. Häkli, 2017). These capacities, embedded in political subjectivity – the condition of possibility of political agency – are central in human political agency.

The concept of *polis* already hints that, in this theoretical framework, the third major concept, "the political," is employed on a relational political–theoretical basis, along with pragmatist and phenomenological philosophical lines of thought (e.g., Barnett, 2012; Dikeç, 2013; Simonsen, 2013). As political, I consider matters that people identify and define as particularly important in their lived worlds, i.e., *polises*. This means that politics never exists in abstracto; things are always political to "someone," living somewhere in a specific time, and hence, to become political, "anything" needs to be politicized (Kallio, 2017a). Similarly, things may lose their political significance as they cease to be considered particularly important in a given context (albeit they may still be called "politics" or "policy").

Potential to politicization arises when something starts to appear as particularly important to someone(s) who, personally or collectively, find this matter undervalued or misunderstood in their lived worlds. To gain the contextual importance needed for politicization beyond individual subjects, these experiences have to be shared with other people, which may include implicit and explicit forms of sharing on broader or smaller scales. Placed in the topological *polis* and informed

by the intersubjective conception of political subjects, this idea of sharing reformulates Arendt's (1958, p. 179) concept of "speech" by which people "show who they are, reveal actively their unique personal identities and thus make their appearance in the human world."

Put together, the theoretical approach informing geosocial methodologies, as I have developed them, holds that the experiences constitutive of politics are primarily *subjective* but political life exists only through *social practices*. What stands as political in a given time and place is understood, negotiated, and struggled by the *people involved* in a certain geosocial reality, as becoming–beings whose political subjectivities shape up through *mutual recognition*. The topological *polises* where these lives are led are *conditioned* by large-scale geopolitical and geoeconomic forces that mobilize in various forms in people's everyday living environments. In this framework political agency is, on one hand, a contextual process through which people come to be recognized as political subjects and potential actors in their communities. Concurrently, people influence the constitution of *polises* from their personal stances, together with their significant others, by participating in mundane political life. Thus, political agency is thoroughly contextual and socially embedded while relying on people's subjective capacities to experience their lived realities.

These starting points provide a theoretical ground for exploring existing political worlds from the experiential perspectives of, among others, children and young people, who are active participants in topological *polises*. The second part of the paper delves deeper into the geosocial methodologies as developed in my recent research with children and youth, opening up the analytical potential embedded in this approach and illustrating how it can be used in empirical research.

Analyzing Topologies

To begin with, I wish to emphasize that I have developed geosocial methodologies to create an approach that would allow and provide for the empirical study of topological space, not as a theoretical exercise only that tends to serve mostly scholarly debates. Therefore, the empirically oriented approach involves simplifications and formulations that can easily be questioned on a philosophical level; it is nothing but a still imperfect and evolving methodology. Further empirical and conceptual work is thus required to theoretically develop geosocial methodologies, a challenge I return to in the last part of the chapter.

As topological space constitutes through social processes and mutual recognition, the first step in topological empirical inquiry is to learn about people's social lives and their experienced identities. Second, as topological *polis* configures as a spatial relationality, people's experiences and understandings about places, locations, sites, events, cultures, histories, and discourses need to be related analytically in ways not predetermined by topographical imaginaries. Third, as the political in my thinking refers to matters politicized in *polis* by the people involved, the political dimensions of topological space have to be traced from people's experiential

knowledges and agencies. These three analytical steps, or layers, are opened up in the next sections, including empirical examples from my ongoing research with 10–12- and 14–17-year-old English ($n = 134$) and Finnish ($n = 128$) school children (hereafter referred to as participants).

All names used in the analysis are pseudonyms, and where necessary, the participants' identities are protected by changing minor details from their biographies. Fieldwork in Finland was carried out with Elina Stenvall. Fieldwork in England was carried out by Marie Avril Berthet and Roger Hart and facilitated by the University of Leeds Geography Department.

Entering Geosocial Worlds: Social Analytical Layer

At the first stage of geosocial analysis, social relations are identified as entry points to people's existential lived worlds, leaning on a phenomenologically oriented perspective. In our everyday lives, we create long-lasting relationships with our significant others, have fleeting encounters with strangers, and connect indirectly with distant others. Additionally, social relations may involve explicit information exchange, like teaching at school, information transmission through media, and knowledge sharing in informal situations. In the intersubjective processes of "geosocialization," also these factual pieces of knowledge turn into experiential understandings (cf. Mitchell and Elwood 2013 on Stiegler). Through social relations, people learn what the world seems to be like, how they and other people seem situated and related in it, and which matters seem more interesting and important than other matters.

This "seemingness" does not refer to doubtfulness or falsity, quite the contrary. As Arendt (2005, p. 128) emphasizes, "no one can adequately grasp the objective world in its full reality all on his own, because the world always shows and reveals itself to him from only one perspective, which corresponds to his standpoint in the world and is determined by it." Moreover, Foucault (2003, pp. 7–8) stresses the importance of noticing, particularly, "naive knowledges, hierarchically inferior knowledges, knowledges that are below the required level of erudition or scientificity," as they may propose critical counter perspectives to dominating truths. The perceptions and understanding that children acquire often fall, indeed, within the remit of such disqualified knowledges (Kallio, 2012, 2017c).

In my recent studies, I have used a mapping exercise to identify children's key social relations. The reason for using mapping platforms, based on Google Maps, is that I needed to locate their lifeworlds somehow with them, in the first place, to start making sense of the topologies of their *polises*. Even if the topographical spatiality that the mapping platforms manifest is exactly what is being deconstructed in topological theorization and analysis, they provided a good starting point for fieldwork. Finnish and English children are familiar with these maps, as spatial representations, which made it relatively easy for them to start portraying their social worlds on them. The deconstruction of topographical spatiality took place already during the fieldwork, as we discussed their markings

in relaxed interviews and continued throughout the analysis (discussed in the next section).

In practice, the young participants were provided with six mapping platforms, representing (1) the neighborhood around their school, (2) the city where their school was located, (3) the region around the city, (4) the country where the fieldwork was done, (5) Europe and its bordering regions, and (6) the world. By using felt pens and post-it stamps, with three colors (green=positive, red=negative, yellow=neutral), they marked roughly on the maps things that are important, interesting, or merely existing in their lived worlds. After this, we talked individually with each participant about their experienced worlds, beginning from the markings that they had made yet expanding from them to various directions (more about this in the next sections). After the interviews, the participants could write stories, draw pictures, or portray their experiential knowledge in other formats, to complete the "narrative biographies" that they co-produced in the study with us.

The research practice followed child-centered methods throughout as applicable in the research contexts (Lagström, Pösö, Rutanen, & Vehkalahti, 2010), emphasizing especially the participants' rights to determine what aspects of their lives may be included in the study (for details see Kallio, 2012, 2017a). The interviews were conducted in the format of relaxed chats, in places such as the school library, and the power relations between the researchers and the participants were determinately reduced during them and in all fieldwork. We did not introduce themes of our own liking into the discussions unless there was a clear hint in the child's narrative about such matters. For example, if the child expressed concerns for environmental issues, we asked about environmental hazards; or if she/he mentioned changing social relations, we felt that it was okay to bring into discussion themes such as caring agency and diverging ethical stances. In a critical ethnographic spirit, I regard the research materials as "partial truths" affected by the situatedness of knowledge and the positionality of the researchers and the participants (e.g., Rose, 1997). As mentioned above, they were co-produced by the involved researchers and the participants and only as such should the materials be analyzed, as specific portrayals of the participating children's lived worlds.

The social analytical layer of geosocial analysis aims at accessing the lived reality of another person, which is always a particular world even if shared with many others in a number of regards. Therefore, it is of utmost importance that the researchers doing fieldwork seek to keep a distance between their own worldviews and those being traced with the participants. Disengagement from normative assumptions is important at this phase of the research (I return to this point in the political layer.). As an example of a particularly challenging case in this regard, consider the piece of analysis based on Rasmus' biography (for an extended analysis, see Kallio, 2016b).

Rasmus is a 12-year-old boy living in a middle-class area in Tampere, one of the bigger cities in Finland. In the mapping exercise preceding the interviews, we had noticed his provocative way of expressing political thoughts, which made us anxious about working with him. Figure 1 portrays Rasmus' map of Europe on which he has made three markings. Finland is colored green (positive) and specified as "the best country ☺," as is the case on many children's maps (73 green markings out of

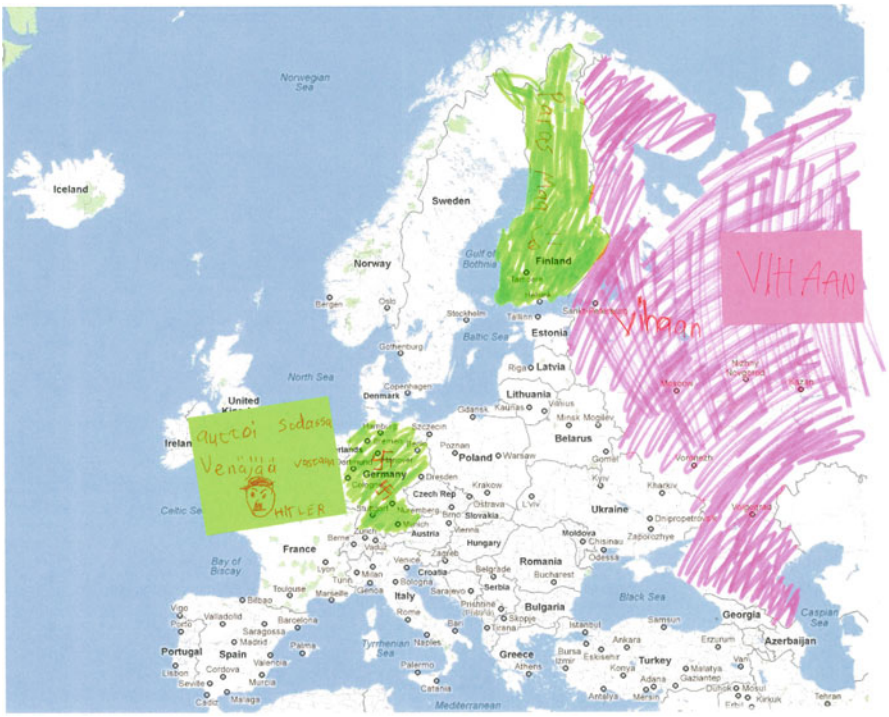


Fig. 1 Rasmus' map of Europe

122 markings in the Finnish sub-study). Russia is colored red (negative) and accompanied with a double label of "I hate." This attitude was not unexceptional on our Finnish participants' maps (37 red markings on Russia and hardly any with other colors). Yet Rasmus' annotations on Germany are one of a kind. The country is colored green with the explanation: "helped in the war against Russia." The text is accompanied by an established image titled "Hitler" and two swastikas.

Prior to the interview, we expected that Rasmus wanted to annoy us by presenting things he knew to be inappropriate, perhaps to test our tolerance or to withdraw voluntarily from the study (which happened with some other participants). Yet he was very happy to participate and talk about his world and perspectives. We subsequently discussed his map of Europe:

Interviewer: You have a green mark on Germany, what do you think about it?
Rasmus: Well I think it is a fine country and then it is good in the sense that it helped Finland in the wars, and so on.
Interviewer: What do you think war is about? Why must wars be fought?
Rasmus: Well of course they shouldn't be fought but, well, countries help each other if someone is at war, for instance in an unfair . . . Like if the other country is way bigger than the other; just like Russia against Finland, when Germany came to help.

This excerpt reveals that Rasmus had taken the exercise very seriously. Following the instructions, he portrayed the world as it appears to him. He wanted to tell us that Finland is where his heart resides, with Russia as its overpowering enemy and Germany as its long-term friend. His way of conveying this was nothing but fanatic. As we discussed further his interest in guns, war games, the army, and hobbies involving war-type features, it became evermore evident that he was not intrigued by violence and did not idealize fascist or other politically oriented movements. Instead, amiable relations with family and friends took center stage in our discussions.

It would be easy to render Rasmus' understanding about the relations between Finland, Russia, and Germany as childish and incomplete and thus disqualify it as knowledge, to use Foucauldian terminology (cf. feminist geopolitics perspectives such as Massaro & Williams, 2013). Such a reading includes the assumption that, with time, he will develop more sophisticated interpretations of these international relations, as he learns what the history between these nation-states *really* is like and how much this violent history *should* affect the way we think about their relations *today*. While this may be a fair assumption, it is not very fruitful in understanding his geosocial reality in the present. Another possibility is to approach his ideas through the world where he lives, the topological *polis* that forms a multifaceted context of his political development and agency.

This is just one example, among others, from my research indicating the importance of learning about experiential spatiality first through social analysis and only after that through spatial and political lenses. In Rasmus' biography, state relations appear comparable with personal relations, and in both cases, he considers taking the side of the disadvantaged and weaker as righteous. Similarly, yet using completely different examples, many of the participants talked about their close relatives and friends vis-a-vis other people and actors whom they knew, to stress their understanding about fairness and inequalities (Kallio, 2018).

As a second example, from the English sub-study, I present Mukhtar's biography to demonstrate how the social layer can be used in this methodology, from a different perspective (for an extended analysis, see Kallio, 2018). Mukhtar, an 11th grade student, described his familial relations as a portrayal of experienced geosociality with clear geopolitical ramifications (Fig. 2). In this case, also, we sought to put aside our own understandings about transnational migration and refugeeness and the politics of war in the British–Afghanistan context, to be able to understand how social relations were shaping Mukhtar's understanding about the world in which he lives.

Challenging life situations are rarely merely individual even if they are personally experienced. Mukhtar's biography provides one example of how political agency may be developed when one's *personal* situation is not contested; instead, at stake is his *family* broadly understood. Mukhtar, currently living in England, is from Afghanistan and has family there, but in Germany and Denmark as well. He has visited all these homes over the years and goes to Afghanistan yearly. Seeing how differently people live and take social positions, especially regarding familial

Fig. 2 Mukhtar's map of the world

relations, has led him to form strong opinions about richness–poverty, privilege–vulnerability, and ignorance–empathy. Mukhtar has no respect for his well-off German relatives whom he describes as:

> Arrogant, ignorant, they don't take other people's advice on board, they think they're upper class but they're not [. . .] don't have an idea of what goes on around the world, they don't understand poverty. I mean in my family we really focus on charity, but they just spend it on other things, pointless things.

In Denmark, Mukhtar has had quite different experiences:

> The way people, the Danish people treat each other is really good. They treat each other equally. It's all equal, yeah, it's really good. They help the poor as well. I've never seen anyone arrogant up there.

This again is in vast contrast with his conception of the English:

> People here are just selfish. Like, I'm not being judgemental or anything, but there's a lot of people who are arrogant, ignorant.

In later stages of the analysis, I have identified that Mukhtar's political agency is strongly connected with his familial identity, guided by an empathic understanding about people's differing positions and their interconnectedness across countries. He is developing political agency through these shared global relations that seem to strengthen, concurrently, his critical awareness *and* categorical, if not ethnocentric,

attitudes. This analysis – making visible key facets in Mukhtar's topological world and how things are politicized – was possible only by engaging with his biography through the social analytical layer in the first place.

In conclusion, the social analytical dimension of geosocial methodology provides the entryway to the empirical study of people's existing topological realities, or *polises*. At this stage of research, the aim is to identify key social relations by which people, and in the context of this study, children, engage in their lived realities as political subjects. Through the processes of intersubjective socialization, based on mutual recognition and including the active presence of political subjects as being–becomings, children learn about their political realities in particular ways, including tacit and explicit ways of knowing. The social analytical layer also allows a preliminary analysis that paves the way to the next analytical phases, focusing specifically on the topological spatialities of geosociality and the political aspects of these relational worlds.

Identifying Spatial Relationality: Spatial Analytical Layer

In my ongoing analysis, based on the research materials created with English and Finnish young participants, I am seeking to understand how spatiality existed to them at the time of the fieldwork and how they positioned themselves and others in their experienced realities. To avoid simplifying and reducing these children's worlds into fixed constellations, I have studied their manifold spatial relations without an attempt to create uniform descriptions or figures. In fact, topological portrayals are always patchy and scattered even if they involve some continuities and established formations – ambiguity and equivocality is their fundamental character. They include networks and disconnections, stable and flickering points, pile up matters that have seemingly nothing in common, and separate things that may first appear as parts of one system – to mention just a few characteristics of the topological narratives that, in my research, are actually products of "unmapping." What I have done, beginning from the child-led interviews and continuing throughout the analysis, is releasing children's narrations from the topographies of the maps and identifying instead socially embedded spatial connections and disconnections from their biographies. A couple of examples from Finnish 11-year-old girls' biographies serve as apt examples of how this analytical phase may unfold (see also Kallio et al., 2015).

In the mapping exercise, one of the girls had placed her aunts' home in the city-scale map. During the interview, she drew straight parallels with this place and some odd locations in Spain (shared vacation), Paris (the aunt's previous home), and Eastern Finland (family-owned summerhouse). Having thus portrayed how one of the important social dimensions in her world actualizes spatially, she then connected this "life with the dear aunt" with other strands that, we learned, crisscrossed her mapping platforms (e.g., other relatives, trips, locations, etc.). Without our in-depth discussion with her – and *led* by her – the markings would have remained separate and the topological connections between them imperceptible. If following

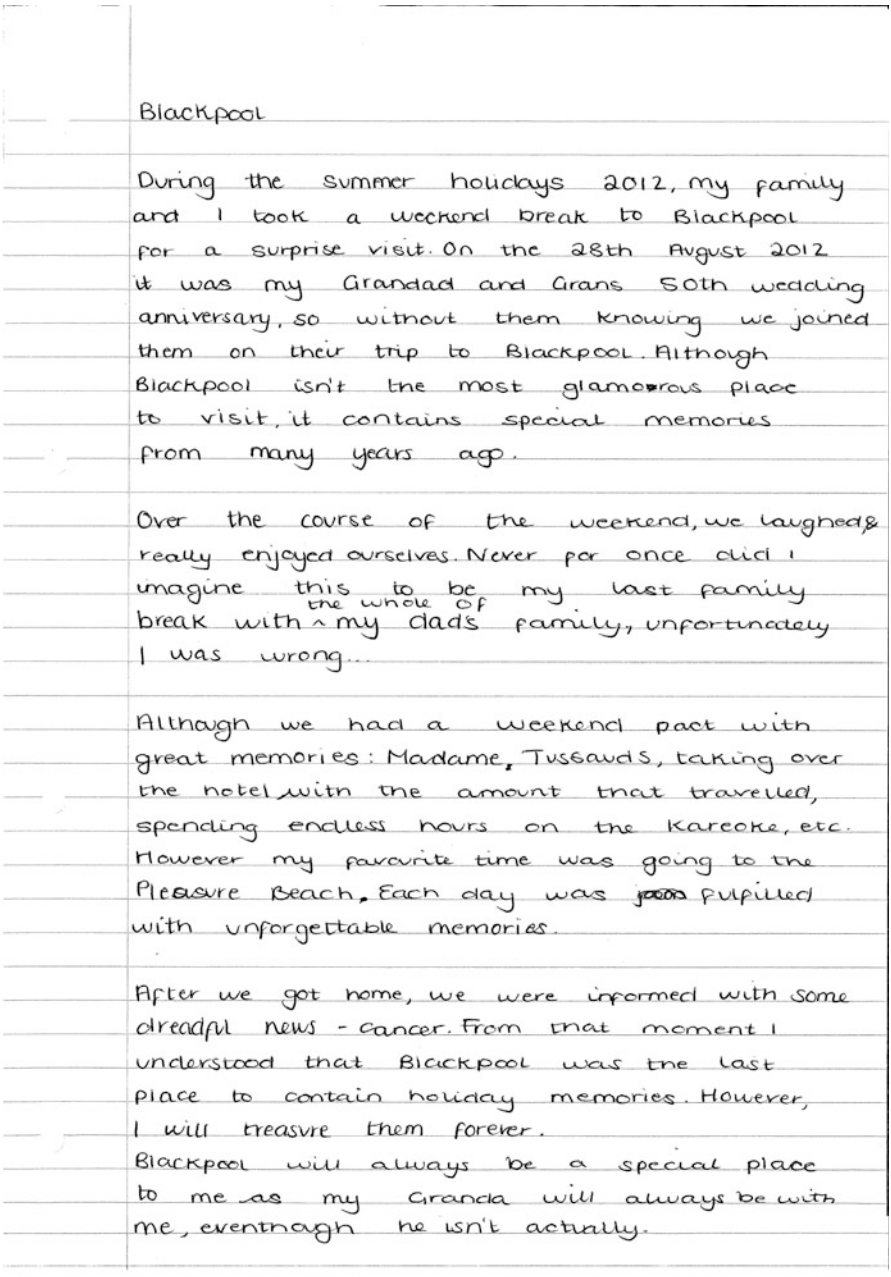
topographic cartography, we would have seen, instead, merely spots in different cities, countries, and continents that seem to be connected by physical proximity and distance only.

Another example can be found from the biographies of two circles of friends who were selectively enacting the mediated transnational world in the creation of an "us" (for geographies of friendship, see Korkiamäki & Kallio, 2017; for mediated realities, see Kallio, 2017b). This involved, first, bringing together elements from various divergent sources, including scalar multiplicity (e.g., TV series, family practices, school peer communities, hobbies, travels, role-playing games, popular music scene, cartoons, sports events, etc.), and second, embedding these elements in their everyday practices by transforming them to serve the friends' own ends. The created "we are us" embraced and looked like a chameleonic spatial assemblage taking different shapes in space and time. "Hot topics" and "looks" embraced by these circles of friends could alter even between our fieldwork periods. Yet this did not endanger the socially recognized existence of the group in the school community, which reveals its established nature. In topological analysis, it is essential to identify both of these dimensions: transformation and continuity intertwined.

As these examples illustrate, in geosocial methodology the spatial analytical layer stands for the identification of socially constituted spatial relations. In the previous examples, familial and peer relations lie at the heart of topological constitution, which obviously are among the most important social connections in many children's lives. Less case-specific perspectives can be achieved by analyzing common practices among the participants, tourism, for instance. Even if they may involve the same people – primarily family but also friends – other elements surface from the context.

In both of my sub-studies, the participants talked extensively about their travels to different geographical locations and social settings, be these short trips to close-by destinations (e.g., spending a weekend in a holiday resort, traveling with a sport team to tournaments held in other cities on Sundays, visiting friends and family), field trips with school (to rural, urban, and foreign destinations), various kinds of family holidays (including visits with relatives living abroad), as well as traveling with a friend and her/his family as a "kith family member" (on familial relations, see Kallio, 2016a). These descriptions draw attention to many kinds of topological elements, from the travels but also beyond them: for instance, how development and tourism are bound together through various relations (e.g., Saarinen, 2016) or how touristic experiences shape young people's worldviews when shared with friends, relatives, and broadly through social networks (Rinne & Kallio, 2017). I give a couple of examples from my study.

In the English study, places like Skegness and Blackpool were regularly mentioned. Both are well-known seaside resorts in Northern England, commonly visited by families over the weekend and during holidays (including families with various socioeconomic backgrounds). One of the older girls, Alana, told about her affectionate relationship with Blackpool. The significance of this place in her world became evident particularly through an essay, accompanied by a drawing, which she created after the mapping exercise and our interview with her (Fig. 3). To Alana,



Blackpool

During the summer holidays 2012, my family and I took a weekend break to Blackpool for a surprise visit. On the 28th August 2012 it was my Grandad and Grans 50th wedding anniversary, so without them knowing we joined them on their trip to Blackpool. Although Blackpool isn't the most glamorous place to visit, it contains special memories from many years ago.

Over the course of the weekend, we laughed & really enjoyed ourselves. Never for once did I imagine this to be my last family break with the whole of my dad's family, unfortunately I was wrong...

Although we had a weekend pact with great memories: Madame, Tussauds, taking over the hotel with the amount that travelled, spending endless hours on the Karaoke, etc. However my favourite time was going to the Pleasure Beach. Each day was ~~jooo~~ fulfilled with unforgettable memories.

After we got home, we were informed with some dreadful news - cancer. From that moment I understood that Blackpool was the last place to contain holiday memories. However, I will treasure them forever.
Blackpool will always be a special place to me as my Granda will always be with me, eventhough he isn't actually.

Fig. 3 (continued)

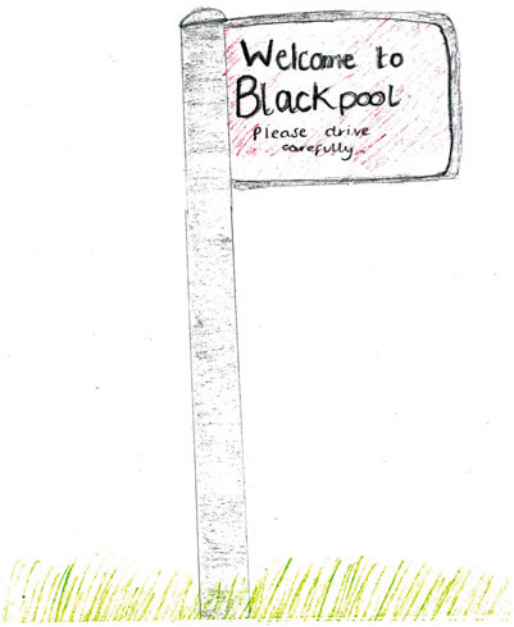


Fig. 3 (**a**, **b**) Alana's experiential Blackpool

Blackpool is connected with some dramatic familial events occurring after the holiday: the grandfather's deathly sickness that put an end to shared times with her dad's family. This gave a special meaning to the joyful moments she had experienced with her family in Blackpool, lending the whole city a special place in her world.

With another girl, Phoenix, belonging to the group of younger participants, we talked about Skegness that she had visited with her family a couple of years ago, to be exact with her grandparents and sister. She considered the trip "my first holiday" and thus gave it great value, introducing Skegness as a place "w[h]ere dreams come true" (Fig. 4). In this case, similarly to the previous one, the experiences offered by the resort gained special significance as they were shared with the family and with grandparents and sibling in particular.

Many comparable examples can be found in my research materials, related to touristic towns in the Mediterranean and amusement parks in bigger cities, for instance. Together they portray a topological space that, regardless of where the actual places are located, provides children access to an inverse reality: a space

Fig. 4 Phoenix's experiential Skegness

dominated by childness. In this "childish space," if you like, time and money are used primarily for doing enjoyable things together, and serious matters are playfully pushed aside or "suspended." The environments are organized accordingly: opportunities to being together are emphasized instead of providing children, youth, adults, and seniors separate services and places of dwelling, as typically is the case in urban space. Playing, fooling around, and engaging in fun activities are essential, as well as eating not-so-proper foodstuff at wrong times of the day, not to mention purchasing silly items that may seem out of place when taken at home. These are all part of the "amusing ordinary" where children's agencies and knowledges receive respect, unlike in many everyday environments dominated by adultness. Children are thinking and doing it right as they indulge and often lead the adults, into these playful worlds.

Quite a different dimension of the topologies of tourism can be identified through a narrative from another English girl, tenth grader Ikshita, who told about her relationship with Portugal. Her family is scattered around the world, and she has

rare possibilities to meet her relatives, even if they keep regular contact through Skype and other social media applications. Once, the whole family had come together in Portugal, for a shared holiday. This had had a tremendous effect on her perception of anything Portuguese: she loved the food, the nature, the culture, the people, etc. These experiences can of course be interpreted through the familial analytical lens, like those above. Yet, in this case, it is particularly fruitful to look into the geoeconomic and geopolitical underpinnings of her experiences and the following spatial perceptions.

In Portugal, the family was spending time in conditions specifically designed for enjoyment and relaxation, as is the case in Blackpool and Skegness. However, the family that came together in the Portuguese hotel, from all around the world, had particularly good resources to accomplish the holiday, including economic, cultural, and geopolitical resources, which stands in contrast with the previous examples. These conditions had allowed for them smooth opportunities to creating a pleasant and unforgettable experience that entwined the fabulous Portugal into their family history. The people responsible for tourist industry in the country and the broader region, or the resources offered to their use by various local and transnational actors, did not appear to the girl as elements enabling or conditioning the experience. Thus, she did not realize that many women had to choose between taking care of her and her own children during their stay (e.g., Costa et al., 2017) or that the people preparing seafood for them in the restaurant at an affordable price could be struggling with their own livelihood (e.g., Carneiro, Portugal, & Varejão, 2014). Neither did she need to meet challenges with language, as the people working in the transnational tourist industry in the Mediterranean learn English to serve the Anglophonic tourist.

These kinds of touristic experiences are often emotionally strong and thus very influential in political subject formation. Through them, children learn about their positions in the world. These implicit understandings include placing other people with reference to oneself and one's kind, and in the case of Western tourists, this often means fulfilling less privileged subject positions. As the critical understanding about the conditions of tourism is often ill-fitting with enjoyable touristic experiences, these mundane knowledges usually remain beyond deliberation, even if they may lead to unease in certain situations (e.g., feeling anxious when meeting people who live on the street). This way children's subjective experiences, shared with significant others such as family members, enhance their processes of geosocialization where, among other things, transnational inequities naturalize into the state of affairs. In the discussed case, love toward Portugal is built, not only through caring familial relations but also as based on the geoeconomic and geopolitical unbalance between tourists and the people enabling their enjoyment. Hence, topologies of tourism do not turn innocent while involving children; rather global inequalities are continued in these encounters.

In this section, I have illustrated the spatial layer of geosocial methodologies through the help of some empirical examples. I want to stress that the analyses included here are only examples; media and hobbies, for instance, offer alternative perspectives to youthful topologies (Kallio, 2017b). As an analytical strategy,

topological analysis includes, first, unmapping children's experiences from territorial attachments to socially established relations and, second, reframing them through topological spatialities that allow various kinds of overlapping and (dis) connected realities to exist simultaneously. The topological *polises* that thus start to become visible are at the same time subjective and shared, conditioned and conditioning, sustainable and transformable, and include mobile as well as enduring human, nonhuman, and more-than-human elements. What becomes politicized in these lived realities depends on the social practices of the people involved, i.e., what matters appear as particularly significant and generate activities with potential to change or struggle. Next, I will turn to the political dimensions of geosociality that have been mentioned already in this and the previous section, yet the analytical dimension itself remains undiscussed.

Exploring Political Realities from Subjective Perspectives: Political Analytical Layer

"Political layer" is the third analytical dimension of the geosocial methodological approach that I am developing in my research. In this phase of analysis, the topologies revealed through the spatial layer are scrutinized by paying attention to moments of attentiveness and, further, to the oriented stances, articulated attitudes, purposive activities, and intentional actions potentially growing from these experiences. Heightened attentiveness concerning any matter can be analyzed: events taking place near or far; things appearing suddenly or emerging from familiar things; current, past, or future activities; personal or public concerns; inspiring, oppressive, interesting, or boring happenings; and so on. The aim of this analytical move is to understand, from subjective perspectives, *how* the world is and becomes political to the people whose lived realities – or *polises* – are being analyzed.

Sometimes identifying political dimensions from biographical narratives, or from any qualitative research materials, is relatively easy. Consider the examples that I gave in the section introducing the social analytical layer, including themes such as racism, fascism, state relations, forced migration, socioeconomic differences and class, and violent conflicts and societies in war. Yet in situations where personal or collective challenges are not related to matters already broadly politicized, the geosocial analysis requires a particularly strong emphasis on the political layer. Here, specifically, disengagement from normative assumptions is important, which means keeping actively a distance between one's own political ideas and those brought up by the participants (cf. Rasmus' biography).

Bullying is one theme that came up many times in both sub-studies (See also Häkli and Kallio, 2018a). It offers a context where "the political" emerges from various kinds of mundane contexts, thus serving as a good example for illustrating what the political analytical phase is about. While sharing many features of racism, the difference lies in the reasons of harassment. Race is a socially established, broadly politicized contextual identity that one cannot choose. It appears as a

significant element of most *polises*, existing in the form of subject positions that people encounter through the dynamic processes of mutual recognition. As one of the older boys in the English study, with a Nigerian family background, declared, it was clear to him why he was being treated badly in his school: in the North England city where he lives, black people's racial subject positions are disadvantaged. This provided him the starting points to building awareness, forming an attitude, and taking action with regard to this broadly acknowledged feature of political life (detailed analysis in Kallio, 2018). Instead, his classmate, Emma, described bullying as something that is hard to understand from outside the context, as portrayed in her biographical story in Fig. 5. She told us how she had become withdrawn and subordinated after her cat got sick and was put down, as people around her did not empathize with her pain but, instead, ridiculed her mourning. By time, she had been able to generate agency, based on these experiences, which she finds is helping her to stick up for herself.

To people bullied for other reasons than race, gender, ethnicity, or religion, for example, the politics of the situation are often rather obscure, which makes their processes of political subject formation less apparent, also to other people – including researchers. In the Finnish study, we had extensive discussions with two fifth grade pupils (10–11 years) suffering from bullying in their school. They had both tried to solve the situation for years. Anton had shared his experiences with an older pupil with whom he had found the courage to tell about his situation to the school staff and his mother. Sara had first explained to herself why she was being bullied

In my life, there have been moments that I'll never forget. Good ones and bad ones. But the most memorable moment was when my cat was put down. I had just got home from school and I found out that my mum had taken my cat Haru to the vets as she wasn't well. She had cancer. At that moment I knew there was nothing we could do but let her go as peacefully as possible because she was already in so much pain. I found out the same day I had fallen out with two of my closest friends.

It was two days before my birthday. We all said goodbye and I was overwhelmed with sadness. It had to be the worst day of my life. We drove to the vets in Barnsley, and I held the cat carrier on my lap, she wouldn't stop meowing and it just made everything worse. I had to say goodbye to my cat. The cat I had owned for 5 years, she was my friend, part of my family. Once we were in the vets I couldn't breathe, it was like a nightmare that just wouldn't end. The vet took her in and injected her with the overdose of anaesthetic. As she went to sleep, she meowed one last time and then her tongue was sticking out as she went. I will never forget that moment. Seeing her face like that, it just made everything seem hopeless.

This experience changed my life so much. People bullied me because my cat had cancer, people made fun of me. I tried to ignore them but it never worked. I became enclosed, I hid in my room most of the time and I rarely spoke to anyone anymore. I had learnt to stick up for myself after this. I decided I had had enough of the people who bullied me or made fun o me, and because of that I am the person I am today. It changed me forever.

Fig. 5 Emma's experiences of bullying as a form of mundane political struggle

and after that sought for new ways to engage with the school community. Both kids felt that their attempts had failed. In Anton's case, bullying continued in the form of social exclusion and in other subtle ways that the school or the home could not prevent from happening. To him the classmates' continuing activities were a mystery: envy was the only reason he could think of for not being accepted. Therefore, he kept on trying to join in the group while constantly suffering from disapproval.

In Sara's school days, bullying was present more explicitly; even we could see how she was openly mocked during the breaks. Yet Sara had found a reason to why it happened and, based on this understanding, was prepared to correct the situation in the future. As it often goes in highly individualized cultures, she had found the problem from herself. She explained to us that she had "performed herself in a wrong way from the start," creating a role too different from those of other girls. The solution she had come up with was, hence, to wait until the seventh grade when she could move to a school where no one knows her and "perform herself better" so that people would like her more. Similarly, Anton was thinking about a fresh start in a different school environment.

These examples, picked from among many others, show how learning about the importance of equality in communal life may happen in relation to non-politicized matters as well. In Anton's case, the alarmed awareness toward bullying had led to professional plans: he was determined to become a police officer so that he could help others. He considered the responsibility of authorities to prevent and improve inequalities as the best response. Anton was already practicing this agency in a hobby where mutual respect and fair leadership are the leading principles (Kallio, 2017a). Sara, instead, had learned that people's opportunities to building identities and forming agency differ between social environments (Häkli & Kallio, 2018a). With her family, in the world of music, and in her circus hobby, she was recognized as a completely different person than in school. In these social contexts, she could perform comfortable identities that made her feel respected for *who* (sic) she feels she is (cf. Arendt on who/what, p. xx). In her next school, she hoped to be able to accomplish the agency developed in these contexts and thus find her place in the new school community. In her case, the process of political subject formation seemed to combine aspects of Foucauldian self-care and deCerteauian ruse: transforming without yielding up (cf. Kallio, 2008). Thirdly, Emma, whose caring agency for her cat had led to bullying, felt that she had strengthened as a person due to these experiences, which would help her later in life in situations where people might try to put her down.

The participants in my study shared many experiences related to situations or trajectories by which they had learned about the importance of equality, as a social element as well as a democratic principle. More often than not, encountering *in*equalities had made them attentive to this or that matter, while existing *equal* relations and practices had not often raised similar attentiveness. After becoming attentive toward certain inequalities, many children and young people develop attitudes and agencies led by the Arendtian understanding of humanity: to be a member of a democratic community is to act as an equal.

Equality is one theme through which mundane processes of politicization can be traced in empirical research with children. Other dimensions, pertinent particularly to the scholarship introduced in this volume, are children's amiable and concerned relations with their living environments and natural elements they know about and care for. In my recent study, the Finnish participants talked more about their takes on environmental issues. Many of them had become attentive toward pollution in their neighborhoods and on a broader scale (especially water systems, e.g., local lakes and Baltic Sea politics), environmental threats (related to nuclear power for instance, e.g., Fukushima disaster), urban green as an important yet sometimes endangered element of everyday living (e.g., privatization developments), and values related to wild nature.

One reason why such concerns may be closer to Finnish than English children's hearts can be found from the tradition of *mökkeily*, literally translated as "cottaging." It is a traditional way of spending free time outside the city, especially during summer holidays but also on weekends throughout the year. Finnish cottages are typically located in the woods by the water (lake, sea, or river), and they range from simple huts with no electricity or running water to full-scale all-season villas. They are often family-owned, including shared ownerships between different generations and siblings. In addition to these, resort-oriented tourism industry offers a broad range of cottages for short- and long-term rental (Kulusjärvi, 2016). Characteristic activities include sauna, swimming, sun bathing, barbecue, berry and mushroom picking, fishing and hunting – and most importantly, spending time together with the family in the "natural peace and quiet."

In contrast to the UK, where having these kinds of second homes at the countryside are considered luxurious and affordable only for people in privileged positions, in Finland the division of life between urban and rural dwelling is not so much a question of class (Hiltunen & Rehunen, 2014). More than half of the population has access to a second home, and many families are involved in cottaging activities in various locations. Similar activities are often included in school fieldtrips, municipal and congregational youth and social work programs, hobbies, and other recreational happenings. According to my findings, this lifestyle seems an important trigger to children's relationships with wild nature that, thus, intertwine with their familial relationships and mundane politics. The tradition of cottaging fosters what Bartos and Wood (2017) call "ecological well-being," which leads to mundane but sometimes also more formal practices of political agency – "green citizenship" at large (Wood & Kallio, forthcoming).

To sum up, by bringing the understanding emerging from the political analytical layer together with the findings coming from social and spatial analytic phases, geosocial analysis creates understanding about how topological realities, or *polises*, establish and on the other hand, what kinds of experiential processes people go through as they make sense of the political worlds where they find themselves living. This attempt, while being rather challenging, seeks to provide alternative knowledge about the spatial relations that condition and enable political life in the largely topographically organized societies and communities where children, among other people, live.

Potential of Geosocial Methodologies for Interdisciplinary Childhood Studies

The geosocial methodological approach introduced in this chapter draws from phenomenologically oriented theorization where the experiences constitutive of politics are considered primarily subjective and political life is seen to exist through social practices. What stands as political in this framework are matters signified, understood, negotiated, and struggled by the people who, as members of lived political communities, are involved in shared and contextual geosocial dynamics and practices. The relational worlds, or topological *polises*, where these lives are led are conditioned by large-scale geopolitical and geoeconomic forces that mobilize in various forms in people's everyday living environments. Political subject formation is, thus, a contextual process through which people come to be recognized as political subjects and potential actors in their experienced worlds. Concurrently, people may influence the constitution of their political realities from personal stances, more and less intentionally, by participating in mundane and formal political life together with their significant others. In all, the geosocial methodological approach highlights political agency as thoroughly contextual and socially embedded while relying on people's subjective capacities to experience their lived worlds.

To serve empirical research, theoretically informed methodological approaches, such as the one discussed here, need to be operationalized into analytical means. In my recent study with children and youth, I have used three analytical layers to access, conceptualize, and analyze their experienced political realities. Following the relational ideals of the geosocial methodological approach, these dimensions emphasize:

1. **Social relatedness** as the primary foundation enabling people's spatial–political experiences as well as their knowledge-building regarding their socially constituting worlds (*polis*) and themselves as their recognized members (*intersubjective being–becoming*).
2. **Topological relationality** that regards the multifaceted contextuality of political life, where entirely different kinds of spatial relations may exist concurrently to the people involved in the life of a *polis* (e.g., territorial, networked, place-based, translocal, mediated, connective, emotive).
3. **Experience-based politics** where "the political" stands for those elements of *polis* that are first recognized as particularly important within its sphere, then negotiated, contested, and struggled by the people (who thus act as *political being–becomings)*, and finally but only sometimes established as long-standing cornerstones of the everyday life of a given political reality (e.g., politicized identities, institutionalized practices, public administrative structures)

Through these analytical means, it is possible to trace political worlds as they appear to the people involved in a given political life, regardless of their societal skills and knowledge or generational positions and age. In practical terms, I have used mapping platforms to provide entry points for children to tell about their

experienced worlds and to share their understandings with researchers. Through discussions, as well as writings and drawings, I have then followed up the social relations and positions significant to these children, to understand their personal stances in the *polis* that they are portraying as lived space. From the narrative materials thus produced, I have unmapped their experienced realities, by identifying different kinds of spatial configurations. Concurrently, I have paid attention to their emerging political subjectivities and agencies that, at times, became visible as children talked about events, situations, activities, people, and feelings of particular importance. The pieces of narrative where something seemed to be "at stake" to the speaker proved most fruitful in this regard (e.g., experienced inequalities, environmental concerns).

How I see that the geosocial methodological approach contributes to existing methodologies in human geography and childhood studies is twofold. First, it begins from the idea that in every case, political reality is subjectively experienced and socially constituted and, thus, cannot be known from beyond the people involved in a given political life. This starting point brings a "third leg to the stool" (Mitchell and Kallio 2017, p. 5), complementing methodologies where large-scale geopolitical and geoeconomic frames are used to explain political life in a specific empirical context (e.g., Moisio & Paasi, 2013, cf. Millei, 2014, 2015). Moreover, it adds to feminist approaches that appreciate microscale analysis yet often set politicized identity categories, such as gender, race, and class (e.g., Massaro & Williams, 2013), or politicized contexts, such as militarism, migration, and activism (Benwell & Hopkins, 2015), at the heart of inquiry or as analytical presumptions. In the geosocial approach, all matters important in people's lives are seen as *potentially* political while considering none as *inherently* political.

The second dimension that I consider novel in this approach may be of particular interest to childhood researchers, including childhoodnature scholars. Argumentation for acknowledging children's knowledges in parallel with adult knowledges has prevailed for a long time, yet it remains that they are not, in several regards (Kallio, 2017c, cf. Harris & Wyn, 2010; Wood, 2017). Geosocial approach may be helpful in partly overcoming this continuing inconvenience. It does not distinguish between adults' and children's ways of knowing but, rather, argues for the subjectivity and contextuality of all spatial and political knowledge. The only truths that this approach admits are the mutual and discordant understandings that people share and juxtapose through social practices in the *polis*, as they recognize and are recognized by each other and as they act according to their beliefs and ethics. Politicization may take place in any situation where people contest the prevailing order or suggest new entries to the social fabric. This often occurs as the identities imposed on us in the mundane and institutional practices of everyday life do not seem fitting or when some events involve injustices that people do not want to accept. Thus, from a geosocial perspective, children can be seen as active players in the processes of politicization, just as adults. For example, as they do not adjust to roles offered to them by institutional authorities (like teachers) and mundane communities (like neighborhoods), or do not agree with the moralities (like regarding suitable appearance) and rules (like appropriate use of public space) of their living

environments, they bring forth critical knowledges that open up space for contestation and change. This agency can be found interesting, among other things, as a form of "green citizenship" (Wood & Kallio, forthcoming).

As to the limitations of geosocial methodologies, what I have developed thus far is just one starting point for creating a means to empirical topological inquiry. Some of the unresolved questions are, for one, how to bring together experience-based spatial–political knowledge from many individuals, which is needed in creating a better understanding about the emergence and continuity of *polises* as shared political spaces. Another important element, still completely missing, is topological representation. I have not yet found a way to "remap" or otherwise represent topological *polises* in other but narrative formats. Third, as people's spatial–political experiences are conditioned by geopolitical and geoeconomic frameworks, these should be taken into closer consideration when thinking further the analytical means. This includes dealing with the fact that, like other truths, geopolitical and geoeconomic understanding are based on geosocially formed knowledges. They are created, shared, agreed upon, and circulated by certain quarters, in some *polises*, and scientific discussions play an important role in these processes as one form of legitimization. How can we relate geopolitical and geoeconomic understandings, always biased, with other geosocial knowledges without emphasizing the already existing power relations that condition our lives? These questions, among others, deserve attention from researchers who are interested in developing further geosocial and related methodologies.

Conclusion

The childhoodnature research agenda fosters the building and sustaining of lasting relationships with environments including a variety of living things and argues for the joint efforts of people in achieving this, be they young or old, parents or sons/daughters, teachers or pupils, caretakers or those being taken care of. Children's ways of conceiving, interpreting, knowing, sharing, and acting are not juxtaposed with those of older people yet neither are they – or perhaps in my opinion, should not be – identified as *specific* forms of knowledge with unforeseeable potential. Rather, I think that children's knowledges – and I talk about knowledges in a broad, Foucauldian sense – are largely part of the societies and environments where people live with each other, and they persist in the dynamic relations between human and nonhuman elements and actors. It may be, however, that these knowledges are not typically identified as such and they do not receive due attention and appreciation. Children's agencies often fold into the fabric of everyday living as seemingly naturalized elements of social life.

Bartos and Wood's (2017) conception of *ecological well-being* is one productive way of identifying and supporting children's relationships with their environments, always involving social and natural elements. Their concept highlights interconnectedness between children's different roles in their mundane and institutional environments, competing power relations conditioning children's lives, and children's active agency in upholding and creating well-being for themselves and others. What

the political geographically grounded methodologies introduced in this chapter may add to the ecological well-being approach, and have to offer to the childhoodnature research agenda more broadly, are:

1. **Recognition as the key dynamism of political life.** Regardless of their generational positions and chronological age, people are political being–becomings who may influence each other by means of (ethical) recognition. Children play an important part in the intergenerational chains of recognition, both as political subjects under formation and as presently active political agents.
2. **Children live in a relational world.** Even if people's abilities to self-governing physical mobility may expand by age, the worlds in which children find themselves living are not constituted in a scalar manner (from micro to macro). Children's understandings about their lived realities, constantly transforming, form through social relations and engagements. In the contemporary world of intensifying transnational and translocal developments, this means that children's experienced worlds involve various overlapping and even contradictory, spatial relations and configurations that direct and impact on their agencies.
3. **Political life is shared and subjective.** Political elements of human life are specific and contextual; what grows to be politically significant in a given community or society depends on which matters and principles the people involved consider particularly important. During the early years, people are socialized into their political realities, yet they are not completely subjected by the prevailing conditions as even young children have capacities to relate with their social worlds and to act in contravening ways. By practicing this human agency, children can participate in political meaning-making processes and the related negotiations and struggles of politicization, as individual persons and together with other people.

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Part III

Cultural, Political, and Wild Perspectives of Childhoodnature

Closing the Gap Through Rewilding, Interacting, and Overcoming

19

Sean Blenkinsop and Peter H. Kahn Jr.

Abstract

This chapter serves as a short introduction to the section. Thus, aside from providing an overview of each of the chapters herein it offers an orientation that might assist readers in connecting ideas throughout the entire section. What does become clear is that the work for education and educators going forward is likely to be substantial, these are not chapters interested in tweaking what currently exists.

Keywords

Anthropocene · Environmental education · Wilderness · Nature-based programs

Sometimes changing an ethos, a metaphor, and an accepted way of things is easy. Take the word ice, take the word coffee, stick them together, and soon everyone is sipping on a cool summer drink. Childhoodnature is not that easy, particularly within a worldview that has separated them. But even if we want to bring childhood and nature into a unified whole – culturally, educationally, and politically – it is harder than the simple creation of a neologism suggests. And in their own ways, the four chapters in this section are examples of and suggestions about the work that needs to be done to close the gap between human children and the natural world.

All the chapters are clear in enunciating a problem, one that has implications across the spectrum of the human condition, including health and well-being, empathy,

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belonging, physical fitness, cognitive functioning, mental acuity, psychological health, and political engagement. Each chapter responds in its own way, from the local to the global, from the specific to the general, and from the practical to the political and philosophical. The chapters offer visions, philosophies, and actions in response to the complex challenges. What is also clear is that the work going forward is going to be substantial and that there are allies, compatriots, and grassroots organizations all over the place that it would behoove educators to partner with and learn from.

Several themes emerge over the course of reading these chapters. There is the sense of the importance of interaction, of having children spend significant amounts of time outdoors and engaging with the natural world and in having these interactions understood and named differently. There is a sense of the need for experience, for children to be immersed in, to be sensually engaged with, and to encounter diverse natural places and beings. This not only provides for the possibility of building relationships, but it also gives students an expansive baseline with regard to what wild and natural might mean, rather than having that baseline slide into overly manicured parks and indoor terrariums as the most biodiverse worlds they know. This discussion also leads into a return of the wild and wilderness in ways that respond to the critique of social construction but that also do rich work acknowledging an active, agential, vibrant, buzzing natural world. There is also a sense that the imagination is important for both learning, as in the range of affordances, and the work the child must to do turn sticks into brooms, cars, and dolphins, and also for the future, as in having the imaginative capacity and flexibility to go beyond the edges of the community and cultural norms in which they currently find themselves. And finally, there is a sense that this is not a small project these chapters are considering. This is about changing the culture and the relationship many humans have with the natural world. This includes potentially thinking about nature as teacher and partner, to changing the language and metaphors being employed, to rethinking education, the wild, and the human condition.

In their work, Charles and Louv offer a wild hope as the lynchpin to a "new nature movement" that might go beyond traditional environmentalism and the current educational status quo toward a better society. It is a society in which people flourish in an expansive way alongside diverse other-than-humans. Through their work with the Children & Nature Network, Charles and Louv offer research findings that reach into many areas of life – education, mental health, physical well-being, and more – and thus speak cogently to the role nature can play in all our lives. There's in an energetic vision, a political project, and a grassroots movement which ends by offering examples for families, educators, and communities who are close to home and easily enacted but who are capable of building the kinds of connections and resiliencies necessary to change the story and maybe more.

> To change a society, as the philosopher Ivan Illich wrote, "you must tell a new powerful tale, one so persuasive that it sweeps away the old myths and becomes the preferred story, one so inclusive that it gathers all the bits of our past and present into a coherent whole, one that even shines some light into the future so that we can take the next step (Illich, n.d.)." (Charles & Louv, 2018, in press)

In quoting Illich, they bring these four chapters into harmony: four different but complementary voices.

For their part, Sobel, Larimore, and Becker-Klein bring us a working example of a partnership created between a local nature center, its early childhoodnature-based program, and the nearby K-3 elementary schools. Their research involves a qualitative informal case study method; and their results point in the direction of five important benefits: (1) increased motivation and enthusiasm for school; (2) enhanced language development; (3) increased science, technology, math, and engineering (STEM) learning; (4) improved physical development; and (5) the development of executive function capacities. The authors see the public push toward "academification," "indoorification," and "digitalization" as wedges that pry apart childhood and nature. They also write of negotiations between nature-based programming experts (educators from the nature center) in partnership with school-based educators that can expand the curricular purview while shifting accepted epistemologies, how time spent in near daily immersion in the outdoors can bring forth the expanded range of learning possibility the natural world has to offer, how turning toward longer periods of child-directed/adult-facilitated play and problem-solving can move the culture of separation and allow the natural to embrace the learner, and how the increase in parental involvement and support of flexible administration can provide space for relationships to flourish. All of these actions become part of an educator's toolbox for closing the gap between childhood and nature.

The story expands with Kahn, Weiss, and Harrington who suggest that the childhood and nature gap is partly caused by the lack of direct experience that children have with an increasingly degraded natural world. The authors suggest that people construct knowledge of what is "normal" nature based on the interactions with nature that they experience in childhood. The crux is that with ensuing generation the amount of environmental degradation, if not destruction, increases, but each generation tends to take that nature as normal nature. They call this the problem of "environmental general amnesia," which they say helps explain how cities continue to lose nature and why people do not really see it happening, and to the extent they do, they do not think the loss is too much of a problem. Environmental generational amnesia also helps explain why typical solutions, like classroom environmental education, which focuses on teaching facts and conceptual knowledge, are not well suited for helping children really understand the problem "in their bones." Their solution is to have children interact with a nature that is more wild than not.

Against this intellectual backdrop, Kahn, Weiss, and Harrington systematically observed the interactions of young children in a forest school in Seattle, Washington. From their observational data, the authors generated what they call a "nature language." This language is comprised, like words in a dictionary, by what they call "interaction patterns": characterizations of essential features of interaction between humans and nature, specified abstractly enough such that countless different instantiations of each one can occur – in more domestic or wild forms – given different types of nature, people, and purposes. For example, *walking along the edge of water and land* is an interaction pattern. So is *climbing a tree*, *imitating animals*, and *imagining*

nature to be something other than it is. Intriguingly for this discussion of closing the gap, it becomes apparent that these authors are suggesting that compared to the urban world, the natural world offers a wider range of affordances to the young learner, which in turn allows the child to exercise an imaginative range that is often not available in a more domesticated environment. What also appears in this nature language is the arrival of a language that is action-based. Note the verbs that lead each interaction pattern; and then note that each verb is interconnected to another being as part of each descriptor. One wonders if this is not in fact the language of the childhoodnature world: a language that recognizes interdependence, action, and possibility at the same time.

In the final chapter of this section, Blenkinsop, Jickling, Morse, and Jensen step back from the more direct work in schools of the last two chapters to offer a more general philosophical response to the problem of the childhoodnature gap and suggest some pedagogical touchstones that might support the kinds of educators engaged in the aforementioned work. The authors also place education at the heart of this cultural change project, but it is an engaged, activist, and critical educator who is able to step away from the traditional human-teacher-centered educator role and question the assumed norms that form the framework for public education as it currently exists in much of the world. This chapter begins by exploring and rethinking three seemingly disparate strands, wilderness, education, and the anthropocene, for the purposes of having each offer comment on the human problematic of control which the authors suggest has contributed to the childhoodnature divide. Troubled by the anthropocentrism and the desire to control that have led to the devastation of the anthropocene, the dismissal of wilderness, and the limitations of public education, the authors then offer up six touchstones, forming a heuristic of sorts, for wild pedagogies. These touchstones then become challenges to return to and commitments to make that educators can respond to and draw upon as they continue the slow work of changing practice and troubling systems. To return to the metaphor of telling a new story, this chapter is about changing the actors and the ways of being in world so that new possibilities can be generated for how the story will end. Possibilities include a world where the wedges between children and nature have been removed, or at least reduced, and where childhoodnature makes sense not only as an idea but as the way in which we actually educate and live in the world.

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Wild Hope: The Transformative Power of Children Engaging with Nature

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Cheryl Charles and Richard Louv

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Abstract

The international movement to connect children with nature continues to grow. While thoughtful and concerned people, including scholars, have written and worried about children's disconnect from nature in their everyday lives for decades, the recent growth of the children and nature movement is heartening. With that growth come some positive results as well as challenges. One example of positive change is the increase in research related to nature deficit and the benefits of nature connection. While the number of studies with methodological improvements increases, important questions remain to be addressed. Even

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so, a review of the literature yields significant evidence-based insights and recommendations. Our chapter focuses especially on examples of evidence-based actions people are taking in all of the major settings where children live, learn, work, and play – that is, in their home environments, schools, and communities. We focus especially on those actions being taken to create positive, transformative experiences; support children's healthy physical, mental, and social development; strengthen communities through nature connection; and benefit the health of the Earth itself. Such experiences and actions are the foundation for achieving what we are calling wild hope – a way of being and living that is rooted in nature-based experiences and contributes to a healthy present and future for today's children and generations to come.

Keywords
Nature-deficit disorder · Nature-based experiences · Hope

Introduction

For many of us especially in Western cultures such as the USA, thinking about the future conjures up images from movies like *Blade Runner*, *Mad Max*, and *The Road*: a post-apocalyptic dystopia stripped of nature and human kindness. We seem drawn to that flame, but this dystopic trance is a dangerous fixation. Not that there are not reasons to be discouraged. Among them, an urbanizing society in which people retreat into silos of their own kind, hard times for those who have been left behind economically, environmental degradation and decades of nature-deficit disorder among many children and adults. Even so, Martin Luther King, Jr. taught us that any movement – any culture – will fail if it cannot paint a picture of a future that people will want to create and live in. His teachings exemplify why, more than ever, we need what we are calling a New Nature Movement, one that is centered on children but includes adults, one that incorporates but goes beyond the good practices of traditional environmentalism and sustainability, one that paints a compelling, inspiring portrait of a society that is *better* than the de-natured societies in which many people throughout the world live today (Louv, 2012).

For positive action to take place there is no practical alternative to hope. The time has come to envision not only a survivable world but a nature-rich world in which our children and grandchildren and their descendants thrive; a future that holds and nourishes wild hope. To us, wild hope means a belief in such a future, and a deep commitment to its creation. In this future, humans are nourished by primal connections to the primary sources that sustain all life and inspire the human spirit. Wild hope is a way of being and living, rooted in nature-based experiences, that will nurture children and the planet today and for generations to come. Wild hope is the heart of the New Nature Movement.

A consensus definition of nature will always remain elusive since people interpret the word nature based primarily on their personal relationships with the environment, rather than how any one discipline or ideology defines the word. We recognize

that there are historic and current philosophical perspectives in which nature is all that is; nothing, including humans, is separable. From such a perspective, children **are** nature (childhoodnature) and so the concept of connecting children with nature may perpetuate a separation.

When we talk about nature, we are referring to everything from nearby nature outdoors in urban, suburban, and rural environments to more distant nature in wilderness settings. One useful definition is this: "Nature is an outdoor environment with natural elements that may include rocks, soils, sand, water, animals, vegetation, and other natural materials. This nature may be found in built and unbuilt environments, from city parks to gardens to native landscapes. Nature-based learning occurs outdoors in cities, towns, neighborhoods, wilderness areas, farms, rural settings, museums, schools and other places that afford such opportunities" (Children & Nature Network, 2016). We realize that this definition is more descriptive than inspirational.

For an inspirational definition of nature, people have often turned to the poets. The preeminent nature poet, Gary Snyder, is drawn to poet John Milton's phrase, "a wildernesse of sweets." Snyder writes, "A 'wildernesse of sweets' is like the billions of herring or mackerel babies in the ocean, the cubic miles of krill, wild prairie grass seed. . .all the incredible fecundity of small animals and plants, feeding the web. But from another side, wilderness has implied chaos, eros, the unknown. . .. In both senses, it is a place of archetypal power, teaching, and challenge (Snyder, 1990)." When considering children in nature, we find ourselves hungering for such a rich description, one that does not include all matter as natural, or restrict nature to virgin forest – a definition with room for the divine. As we promote the power of connecting children with nature, and as we refer to the heart of that connection as wild hope, we believe that nature need not always be defined as pristine. A useful definition must, however, always recognize the mystery of the natural world, as a place where awe, wonder, and hope are nourished in all of us.

As an aspirational goal, we believe all children must have opportunities to experience the nature that exists outside themselves, whether in wilderness or in the more domesticated, yet still naturally abundant, living ecologies that remain where people live. We run the risk, with such an approach, of compounding what Peter Kahn calls environmental generational amnesia: how, as environmental degradation increases, each generation in its youth takes that degraded condition as the nondegraded condition – as the normal experience (Kahn, 2002). Yet, in a variety of natural settings, the data are clear and growing that children will benefit from nature-based experiences. The evidence indicates that such experiences can be transformative –cognitively, socially, physically, emotionally, and perhaps spiritually, and that they can strengthen the conservation ethic. We believe connecting children to the natural world is a necessary antidote to environmental generational amnesia and fundamental to the protection of the environment. This question remains: Will the growth of human nature deficit, and the rise of technological substitutes for nature experience, outpace our ability to ensure that future generations will sufficiently value the natural world around them?

Inchoate, self-organizing, the New Nature Movement is emerging around the world. At its center is the challenge of connecting children to the natural world. This

movement is based on traditional wisdom, but also on recent research that illuminates the power of both distant wilderness and nearby urban nature to improve human psychological and physical health, cognitive functioning, and economic and social well-being (Charles & Loge, 2012a, b). The movement reaches outward to connect all people and their communities to nature; it works to conserve and protect remaining wilderness, and also to regenerate or create additional natural areas where people live, learn, work, and play, and where biodiversity grows (Charles, 2012; Louv, 2012). Canadian professor Catherine O'Brien suggests one principle of the movement when she advocates that we not only "make our ecological footprints as light as possible," but "actually leave places better than when we came to them, making them places of delight (O'Brien, 2006)." This conviction is core to the movement: Opportunities for a positive connection to the natural world are a birthright. All children need nature. Not just the ones with parents who appreciate nature. Not only those of a certain economic class or culture or gender or sexual identity or set of abilities. *Every* child.

The New Nature Movement includes parents and educators who bring the enlivening benefits of nature to children in their growing years – at home, in their neighborhoods; who create natural learning environments in schoolyards and school gardens; who use natural areas to teach children not only about science and the natural world but about every subject; who introduce young people to natural areas in surrounding neighborhoods, rural regions, and wilderness.

Participants in the New Nature Movement include traditional conservationists and deep ecologists; physicians (particularly pediatricians) who prescribe nature experience and green exercise; eco-psychologists, wilderness therapy professionals, and other nature therapists; park rangers and docents who help families fulfill their "park prescriptions"; public health workers; and urban planners and designers who work to increase the amount and quality of nearby nature. Also citizen naturalists who salvage threatened natural habitats and create new ones; and community gardeners, urban farmers (including immigrants practicing what has been called "refugee agriculture"), organic growers, and "vanguard ranchers" who restore as they harvest. Deep green design professionals are broadening the concept of the new urbanism: biophilic architects, developers, urban planners, and therapeutic landscapers are transforming homes, workplaces, suburbs, inner-city neighborhoods and potentially whole cities into restorative regions that reconnect us to nature. As part of this movement, families, businesses, places of worship, and professional urban wildscapers are replacing open space with native species and pollinators (gradually creating what botanist Douglas Tallamy calls "a homegrown national park" – and, beyond national borders, what we call a "worldwide homegrown park") (Louv, 2012). Nature-smart leaders are advocating and creating walkable neighborhoods and promoting green exercise as an expression of active living.

Though we believe the pace of the movement must quicken, we do see progress in public awareness and tangible actions, nationally and internationally. Hundreds of local, regional, state, provincial, national, and even international campaigns have brought together businesspeople, conservationists, healthcare providers, educators, and others. These others include thousands of parents, teachers, law enforcement

officials, librarians, artists, pediatricians, liberals and conservatives, anglers, hunters, and vegetarians; people who not only consume but also restore nature. The movement is surprisingly diverse. Recent immigrants and inner-city youth are among the most persuasive advocates for nearby nature and outdoor experience – once they get a chance to have such experiences. Not all of the individuals and groups we have mentioned would necessarily see themselves as part of one movement (Louv, 2012).

In September 2012, the World Conservation Congress of the International Union for the Conservation of Nature (IUCN) passed a resolution declaring that children have a human right to experience the natural world, an essential ingredient if nature is to be protected from human excess – and a step toward seeking a similar declaration at the United Nations. At the same World Conservation Congress, leaders of national parks and protected areas throughout the world approved the "Jeju Declaration on National Parks and Protected Areas: Connecting People to Nature," committing themselves to create a global campaign that recognizes the great contribution of these natural treasures to the health and resilience of people, communities, and economies (Charles, 2012). The campaign was carried to the World Parks Congress in November 2014, followed by the Brandwein Institute's convening of Inspiring a New Generation: A North American Summit in November 2015. Building on all of this foundation, #NatureForAll was launched at the IUCN's World Conservation Congress in Hawaii in September 2016, and featured at the Children & Nature Network's International Conference in Vancouver in 2017.

Consider the collective power if these forces came together to craft a positive vision of a newer civilization based on a transformed human relationship with the natural world.

The Evidence Base: What We Know and Don't Know

A decade ago, researchers became increasingly interested in the impact of nature experience on human development. At that time, the relatively few existing studies looked at two broad areas, according to the Children & Nature Network (C&NN), which continues to build its database of annotated studies (www.childrenandnature.org/research/). These two early areas of focus were: (1) what are the indicators of children's disconnect from nature in their lives; and (2) what are the benefits to children cognitively, emotionally, physically, and socially from direct experiences with nature? The second area is where studies related to children's academic achievement and learning were categorized in the annotated bibliographies of research developed by C&NN (Charles, 2007; Senauer, 2007). In the early part of the decade, few researchers had conducted studies specific to *if, how, why, under what circumstances, and for whom* nature impacts children's learnings. Of those, none were longitudinal. Most were based on observations, analysis of qualitative data, interviews, and self-report. Some included comparisons of student achievement on standardized tests and grade point averages in nature-based learning environments versus those not so characterized, as well as other attributes such as enthusiasm for learning and positive behaviors.

Since C&NN began publishing its volumes of annotated research, the number of studies generally related to positive outcomes for children from nature-based experiences has notably increased. This trend appears to be continuing. For example, in 2007 the number of studies meeting criteria for quality sufficient to be included in C&NN's research library numbered less than 50. Now, more than 600 studies that have met the tests for publication in peer-reviewed journals are included in C&NN's growing research library. New studies are being published with frequency (see Senauer, 2008; Senauer Loge, 2009; Charles & Senauer-Loge, 2012a, b; Senauer Loge, 2011; Charles & Wheeler, 2012; Children & Nature Network, 2017; Chawla, 2015).

Most of the studies continue to be correlational, not causal, in examining the reported findings. However, there are improvements in methodology. There is now also a relative balance between qualitative and quantitative studies, and an increase in those using mixed methods, whereas a decade ago most of the studies of substance were based on qualitative measures. Improvements in methodology and an increase in quantitative and mixed methods are among the observations being cited by the group of researchers and practitioners who are part of the National Science Foundation funded project, the Science of Nature-Based Learning Collaborative Research Network, established through a collaboration between the University of Minnesota, Children & Nature Network, and North American Association for Environment Education. This Network is publishing a research agenda designed to help fill the gaps in understanding and increase the rigor in the evidence base specific to one dimension of the children and nature connection, the impact on children's learning (Children & Nature Network, 2016).

While there remain, therefore, some limitations to the evidence base, the findings support the benefits to children from nature-based experiences. Although there are gaps in our understanding, the patterns are consistent. That is, some benefits to children's learning are found from a variety of nature-based approaches and experiences. Strengths of the body of evidence to date are related to various scholars' efforts to document benefits to children's health and well-being, which can be associated with positive learning outcomes, from nature-based experiences. Findings related to enhanced student self-control, ability to focus, sense of well-being, sense of purpose, and overall enthusiasm for learning are among those attributes which would tend to support children's academic achievement and school performance.

In sum, it is fair to say that the current body of evidence is promising and generally consistent, despite its limitations. Much additional, well-designed, and rigorous research is needed, but, quoting Dr. Howard Frumkin, "we know enough to act" (Frumkin & Louv, 2007).

Research-Based Indicators of the Decline of Children's Physical Activity Outdoors and Related Concerns

Children in the USA today spend less time playing outdoors. A Hofstra University survey of 800 mothers with children between the ages of 3 and 12 found that: 85% of

the mothers agreed that today's children play outdoors less often than children did just a few years ago; 70% of the mothers reported playing outdoors every day when they were young, compared with only 31% of their children. Also, 56% of mothers reported that, when they were children, they remained outdoors for 3 h at a time or longer, compared with only 22% of their children (Clements, 2004). From 1997 to 2003, there was a decline of 50% in the proportion of children aged 9–12 who spent time in such outside activities as hiking, walking, fishing, beach play, and gardening, according to a study by Sandra Hofferth at the University of Maryland. Also, Hofferth reports that children's free play and discretionary time declined more than 7 h a week from 1981 to 1997 and an additional 2 h from 1997 to 2003, a total of 9 h less a week of time over a 25-year period (Hofferth & Sandberg, 2001; Hofferth & Curtin, 2006).

Children between the ages of 6 months and 6 years are reported to spend an average of 1.5 h a day with electronic media, and youth between the ages of 8–18 have been reported to spend an average of 6.5 h a day with electronic media – that is more than 45 h a week (Rideout & Hamel, 2006). One of the most recent and definitive studies of children's media use to date reported an increase of more than 1 h daily in a 5 year period, up to an average of more than 7.5 h daily (Rideout, Foehr, & Roberts, 2010), more than 50 h a week. Use of mobile devices by children under 8 years of age has doubled from 2011 to 2013, with seven of ten children reporting their use. Four out of ten children younger than 2 years of age are also using mobile devices, an increase from one in four during the same 2-year period (CommonSense Media, 2013).

Spatial experience corresponds to how children spend their time. North American children have a more restricted range in which they can play freely, have fewer playmates, and their friends are less diverse (Karsten, 2005). The percentage of children who live within a mile of school and who walk or bike to school has declined nearly 25% in the past 30 years. Today, barely 21% of children live within one mile of their school (Centers for Disease Control, 2006). In another survey, 71% of adults report that they walked or rode a bike to school when they were children, but only 22% of children do so today (Beldon, Russonello and Stewart Research and Communications, 2003). Children predominantly play at home, with their activities monitored and controlled by adults, compared to children a generation ago. In one study, only 3% of children have a high degree of mobility and freedom in how and where they play (Tandy, 1999). According to the work of Stephen Kellert, professor emeritus of social ecology at Yale, experience in a surrounding home territory, especially in nearby nature, is linked to shaping children's cognitive maturation, including the developed abilities of analysis, synthesis, and evaluation (Kellert, 2005).

The disconnection from nature experience also appears to be associated with the activities and priorities of child-related institutions and parents. In a major study conducted in association with Seattle Children's Research Institute, 51% of preschool-aged children were taken outdoors to play by one or more parents at least once daily. The rest did not have this opportunity (Tandon et al. 2015). In another major study conducted in association with Seattle Children's Research Institute,

children in preschool child care were sedentary 73% of the time. On average, 33 min per day were outdoors. Outdoor teacher-led time was less than 1% (Tandon, Saelens, & Christakis, 2015). This is worrisome for a variety of reasons, beginning with the evidence that there is a strong correlation between time outdoors and physical activity. Note that the American Academy of Pediatrics recommends a minimum of 60 min a day of moderate to vigorous physical activity for children (Daniels & Hassink, 2015). While the two studies above indicate that one-half of preschool-aged children do not get outdoors to play on a daily basis, whether in the care of a parent or a caregiver in a home-based setting, children in preschool day care tend to be overwhelmingly sedentary. They are not only outdoors very little, they tend to be physically inactive while indoors. Another study reports that 75% of preschool children in the USA are in some form of child care, describes barriers for achieving healthy physical activity for children in care settings, and advocates daily physical activity for children's healthy development (Copeland, Sherman, Kendeigh, Kalkwarf, & Saelens, 2012).

Why are children spending less time outside? One study found that 94% of parents surveyed said that safety is their biggest concern when making decisions about whether to allow their children to engage in free play in the out-of-doors (Veitch, Bagley, Ball, & Salmon, 2006). Similarly, of 800 mothers surveyed by a Hofstra University researcher, 82% cited crime and safety concerns as one of the primary reasons they do not allow their children to play outdoors. But 85% of the mothers identified their child's television viewing and computer game playing as the number one reason, and 77% cited adequate time to spend outdoors with their children (Clements, 2004). In a classic study by Singer et al., the issue of children's disconnect from free and exploratory play in nature in their everyday lives is widespread and global (Singer, Singer, D'Agostino, & DeLong, 2009).

"Access to nature, whether it is in the form of bona fide natural areas or in bits or views of nature, impacts psychological, as well as social functioning," says Frances "Ming" Kuo, a professor at the University of Illinois, adding that, "Less access to nature is linked to exacerbated attention deficit/hyperactivity disorder symptoms, more sadness and higher rates of clinical depression. People with less access to nature are more prone to stress and anxiety, as reflected not only in individuals' self-report but also measures of pulse rate, blood pressure, and stress-related patterns of nervous system and endocrine system anxiety, as well as physician-diagnosed anxiety disorders (Kuo, 2010)."

Research-Based Indicators of the Positive Connections Between Health and Learning and Nature Experiences Among Children and Adults

The studies cited above are best understood when contrasted with the positive benefits of nature engagement. The physical benefits are obvious; more outdoor play, of any kind, will tend to increase children's physical activity levels.

Other benefits are subtler and no less important: the psychological, cognitive, social, and creative gifts that nature experience offers children. Children tend to be smarter, more cooperative, happier and healthier when they have frequent and varied opportunities for free and unstructured play in the out-of-doors. Green plants and play yards reduce children's stress. Free play in natural areas enhances children's cognitive flexibility, problem-solving ability, creativity, self-esteem, and self-discipline. Students score higher on standardized tests when natural environments are integral to schools' curricula. Effects of Attention Deficit Disorder are reduced when children have regular access to the out of doors. "Natural spaces and materials stimulate children's limitless imaginations and serve as the medium of inventiveness and creativity," says Robin Moore, an international authority on the design of environments for children's play, learning, and education (Louv, 2008).

Health care providers are beginning to recognize the therapeutic attributes of nature, for attention disorders and depression in adults and children. For example, a UK study released in April 2007 shows the benefits of "green treatment," or ecotherapy – including walks in the woods and gardening. According to the study, 71% of people with mental health disorders reported that taking a walk decreased their depression and tension. Mind, the UK's leading mental health charity, called for a shift to such treatments, augmenting traditional therapies. "Mind sees ecotherapy as an important part of the future for mental health. It is a credible, clinically-valid treatment option and needs to be prescribed by GPs, especially when for many people access to treatments other than antidepressants is extremely limited," said Mind's chief executive Paul Farmer (Hareyan, 2007). While most research in this arena has been done on adults, a growing body of evidence suggests the positive power of nature engagement during the most vulnerable years of human development.

Many studies and reports pertain to children at play. Playtime – especially unstructured, imaginative, exploratory play – has long been recognized as an essential component of wholesome child development (Burdette & Whitaker, 2005; Ginsburg, 2007). Unstructured play, indoors or outdoors, allows children to initiate activity rather than waiting for an adult to direct them, use problem-solving skills, their imagination, negotiating skills with peers, etc. – all of which is very beneficial to children's learning and development. The outdoors, especially environments with plants, animals, and other natural elements like rocks and water, invite children to act on their natural curiosity and, with the endless range of things to explore and question, provide a uniquely engaging environment for unstructured play. Among the added benefits, children's natural curiosity leads to scientific learning – not only specific details of nature but scientific method. For example, the outdoors invites questions such as, "What's that green stuff growing on the trees? It looks like it's always on the same side of the trees; why is that?"

Nature experience has been linked to better performance by children in school. Sponsored by many state departments of education, a 1998 study documented the enhanced school achievement of youth who experience school curricula in which the environment is the principal organizer. This study was followed by two-related studies, conducted by the USA's State Education and Environment Roundtable,

both of which produced results consistent with this original study (Leiberman & Hoody, 1998, 2000). Factoring out other variables, studies of students in California and nationwide showed that schools that used outdoor classrooms and other forms of nature-based experiential education were associated with significant student gains in social studies, science, language arts, and math. One study found that students in outdoor science programs improved their science testing scores by 27% (American Institutes for Research, 2005).

In inner-city housing projects in Chicago, investigators found that the presence of trees outside apartment buildings predicted less procrastination, better coping skills, and less severe assessment of their problems among women (Kuo & Sullivan, 2001), greater self-discipline among girls (Faber Taylor et al. 2002), less crime (Kuo & Sullivan, 2001), and less violence and better social relationships (Kuo & Sullivan, 2001). Similarly, green plants and natural vistas were linked with reduced stress among highly stressed children in rural areas, with the results the most significant where there are the greatest number of plants, green views, and access to natural play areas (Wells & Evans, 2003).

Proximity to, views of, and daily exposure to natural settings has been associated with children's ability to focus and enhances cognitive abilities (Wells, 2000). Children who experience school grounds with diverse natural settings are more physically active, more aware of nutrition and more civil to one another (Bell & Dyment, 2006; Dyment & Bell, 2008). Based on surveys of teachers in schools that had schoolyards with both green areas and manufactured play areas, children were rated as more physically active, more aware of nutrition, more likely to engage in more creative forms of play, and they also played more cooperatively in green areas (Bell & Dyment, 2006).

Children with attention-deficit disorder are described by their parents as showing fewer ADD symptoms and being better able to focus immediately following outdoor activities such as camping and fishing, compared to indoor activities such as doing homework and playing video games. According to the researchers at the University of Illinois, the greener a child's everyday environment, the more manageable their symptoms of attention-deficit disorder (Faber Taylor, Kuo, & Sullivan, 2001; Kuo & Faber Taylor, 2004; Faber Taylor & Kuo, 2006, 2008, 2011).

Adults, as well as children, benefit from "recess" in natural settings, which has implications for the health of parents, teachers, and children. Environmental psychologists Rachel and Stephen Kaplan have linked contact with nature to restored attention, the promotion of recovery from mental fatigue, and the restoration of mental focus. They attribute these beneficial qualities to the sense of fascination, of being immersed "in a whole other world," and to other influences of the natural world (Kaplan & Kaplan, 1989; Kaplan, 1995). Researchers in England (Pretty, Peacock, Sellens, & Griffin, 2005) and Sweden (Bodin & Hartig, 2003) have found that joggers who exercise in a natural green setting with trees, foliage, and landscape views feel more restored and less anxious, angry, and depressed than people who burn the same amount of calories in gyms or other built settings.

Studies of medical treatment suggest that nearby nature offers healing properties in hospital settings, with implications for both adults and children. An

early study, in 1984, showed that patients in rooms with tree views had shorter hospitalizations (on average, by almost one full day), less need for pain medications, and fewer negative comments in the nurses' notes, compared to patients with brick views (Ulrich, 1984). In another study, patients undergoing bronchoscopy were randomly assigned to receive either sedation, or sedation plus nature contact – in this case a mural of a mountain stream in a spring meadow and a continuous tape of complementary nature sounds (e.g., water in a stream or birds chirping). The patients with nature contact had substantially better pain control (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003).

Research-Based Indicators of Benefits to Mental, Social, and Community Health

"There is growing . . . empirical evidence to show that exposure to nature brings substantial mental health benefits," according to "Green Exercise and Green Care," a report by researchers at the University of Essex. "Our findings suggest that priority should be given to developing the use of green exercise as a therapeutic intervention." Among the benefits: improvement of psychological well-being; generation of physical health benefits by reducing blood pressure and burning calories; and the building of social networks (Pretty, Hine, Sellens, South, & Griffin, 2007).

In some cases, greening neighborhoods may help reduce domestic violence. In a Chicago public housing development, researchers compared the lives of women living in apartment buildings with no greenery outside to those who lived in identical buildings – but with trees and greenery immediately outside. Those living near the trees exhibited fewer aggressive and violent acts against their partners. They have also shown that play areas in urban neighborhoods with more trees have fewer incidences of violence, possibly because the trees draw a higher proportion of responsible adults (Kuo, 2010).

Exposure to other species can help children develop empathy. We have known for decades that children and the elderly are calmed when domestic pets are introduced in therapy, or included in rehabilitative or residential care. We also know that children can learn empathy by caring for pets. Some mental-health practitioners are taking the next step: using pets and natural environments as part of their therapy sessions. Cherie L. Spehar, a Licensed Clinical Social Worker and Play Therapist, who has served as executive director of The Child Abuse Prevention Center in Raleigh, N.C., recommends to therapists, "Bring nature play into your sessions, as it is a resource rich in opportunities for practicing kindness. Introduce them to every form of life and teach respect for it (Spehar, 2012)."

Greater biodiversity in cities can increase social and family bonding. Scientists at the University of Sheffield in the UK report that the more species that live in a park, the greater the psychological benefits to human beings. "Our research shows that maintaining biodiversity levels is important . . . not only for conservation, but also to enhance the quality of life for city residents," said Richard Fuller of the Department of Animal and Plant Science at Sheffield (Science Daily, 2007). In related work,

researchers at the University of Rochester, in New York, report that exposure to the natural environment leads people to nurture close relationships with fellow human beings, to value community, and to be more generous with money. By contrast, the more intensely people in the study focused on "artificial elements," the higher they rated wealth and fame. One of the researchers, Richard M. Ryan, noted, "[We've] found nature brings out more social feelings, more value for community and close relationships. People are more caring when they're around nature (Mapes, 2009)."

Natural playgrounds may decrease bullying. In Sweden, Australia, Canada, and the USA, researchers have observed that when children played in an environment dominated by play structures rather than natural elements, they established their social hierarchy through physical competence; after an open grassy area was planted with shrubs, children engaged in more fantasy play, and their social standing became based less on physical abilities and more on language skills, creativity, and inventiveness. Such play also provided greater opportunities for boys and girls to play together in egalitarian ways. And children are more likely to include children of other races and backgrounds in their play (Louv, 2016).

Speculatively, more experiences outdoors in settings with vegetation and other natural elements can offset the dangerous psychological impact of climate change. Professor Glenn Albrecht, director of the Institute of Sustainability and Technology Policy at Murdoch University in Australia, has coined a term specific to mental health: *solastalgia*, which he defines as "the pain experienced when there is recognition that the place where one resides and that one loves is under immediate assault." Albrecht asks: Could people's mental health be harmed by an array of shifts, including subtle changes of climate? If he is right in suggesting this is so, and if climate change occurs at the rate that some scientists believe it will, and if human beings continue to crowd into de-natured cities, then solastalgia will, he believes, contribute to a quickening spiral of mental illness (Albrecht, 2005).

Research-Based Indicators of Benefits to the Earth from Positive Human Connections

Positive direct experience in the out-of-doors and being taken outdoors by someone close to the child – a parent, grandparent, or other trusted guardian – are the two factors that most contribute to individuals choosing to take action to benefit the environment as adults (Chawla, 2006, 2009; Chawla & Derr, 2012).

In a classic study, Thomas Tanner, professor of environmental studies at Iowa State University, conducted a study of environmentalists' formative experiences, what it was in their lives that had steered them to environmental activism. "Far and away the most frequently cited influence was childhood experience of natural, rural, or other relatively pristine habitats." For most of these individuals, the natural habitats were accessible for unstructured play and discovery nearly every day when they were children (Tanner, 1980).

In 2006, Cornell University researchers Nancy Wells and Kristi Lekies went beyond studying the childhood influences of environmentalists; they looked at a

broad sample of urban adults, ages 18–90. The study indicated that the most direct route to adult concern and behavior related to the environment is participating in such "wild nature activities" as playing independently in the woods, hiking, and fishing before the age of 11 (Wells & Lekies, 2006). Children do need mentors, however. In other surveys of environmental leaders, according to University of Colorado environmental psychologist Louise Chawla, most attributed their commitment to a combination of two sources in childhood or adolescence: many hours spent outdoors in "keenly remembered" wild or semi-wild places, and a mentoring adult who taught respect for nature (Chawla, 2006).

Actions Underway: Families, Schools, Communities

By increasing the opportunities for children, families, and communities to increase their everyday experiences in nature, positive influences may ripple outward in ways we cannot immediately measure or see. Research to date strongly suggests that nature contact yields surprisingly broad benefits. This contact may be increased on a small scale – by increasing the number of plants in the workplace or trees outside the apartment building – or on a larger scale by growing the size and reach of urban parks, riparian corridors, yards planted with native species, and the creation of wildlife habitats in a city or by protecting, expanding, and increasing the wilderness areas and access to them.

With so much evidence about the benefits to children, youth, families, and whole communities from direct experiences in nature, what does it take to move to action? We think that scholarly publications like this help as a way to provide and support a rationale. Publications, public speaking, public campaigns, and policies all contribute. Most important, while standing on the evidence, it comes to individual, and collective, actions. Actions on every scale can make a positive difference. Here are a few examples of ways people are making a difference in the lives of children. Each is a model and inspiration for others. We have picked three settings where most children spend most of their time – family, schools, and communities.

Families

Nature clubs for families are an organized way for families to meet at a specified time and place to explore nature together. They are sprouting around the world. It takes one or more parents or others with a passion to plan a schedule of events and invite others to join. They might meet weekly, monthly, or at other times. Typically, they will come together at a nature-based public park or recreation area for several hours and engage in some planned activities combined with supervised free play and exploration for the children. The benefits are palpable.

One of those is Columbia Families in Nature, founded by Chiara D'Amore, in Columbia, Maryland in the USA. Chiara and her husband have two young children. They share a deep conviction that it is good for children's health and well-being to be

outdoors in nature, and that, also important, by doing so they will tend to care for the Earth itself as they grow and mature. Chiara was already thinking about establishing such a nature club because of its values to her family, her neighbors, and others in her community. She also was on a path to study for a graduate degree. It did not take long to figure out that there would be value in combining her purposes to connect local children and families to nature, and to study in a formal sense what the impacts might be. The result is a comprehensive study which resulted in Chiara earning her doctor of philosophy degree from Prescott College in Arizona, USA (D'Amore, 2015).

Chiara used a variety of methods to obtain her research data. While she focused primarily on Columbia Families in Nature, she included data from a total of 47 nature clubs for families from both the USA and Canada. Positive results included families spending more time in nature, reports of enhanced individual and family well-being, stronger social connections, and increased actions to benefit the environment.

There are many resources for parents and other family members who may want to start a family nature club. C&NN offers resources in several languages, including Chinese, Spanish, French as well as English.

In Brazil, Alana, a nonprofit organization with a mission to "honor the children," has founded and supports Criança e Natureza, part of its campaign to create a children and nature movement throughout the nation. One of their initiatives to connect children and families with nature is inspired by the Children & Nature Network's nature clubs for families. However, in Brazil, the idea of a club does not resonate, so family groups simply are encouraged to get outdoors to play and learn together, including in urban environments where most of the population of Brazil is living. Criança e Natureza offers films, workshops, and other resources to show Brazilian families how this can be done, and why it matters for children's health and well-being.

Similarly, family nature clubs and nature education are spreading in China. Nature Play Western Australia (www.natureplaywa.org.au) is one of four state-based organizations developed to connect children and their families with nature in that nation. As an indicator of international interest, people from more than 200 nations have visited the Website of the Children & Nature Network, and from more than 100 nations have downloaded resources that are available from the site.

Schools

Positive change is emerging in education today, in many parts of the world. Two we will feature are those serving early childhood-aged children and those for older children and youth.

Nature-based preschools and forest kindergartens are not a new idea. They have been popular in Scandinavian countries for decades, and their work continues to inspire educators and parents throughout the world. In North America, while their numbers remain small, nature-based early childhood programs are increasing. According to the North American Association for Environmental

Education's early childhood initiative, the Natural Start Alliance, there are now close to 250 nature-based preschools in the United States, up from only a few dozen about 5 years ago (Depenbrock, 2017). As one example, in the small state of Vermont in the USA, there are now nearly 30 nature-based preschools and forest kindergartens where children spend from a few hours a week to full days in the outdoors with nature as their classroom. Among those contributing to the growth of these nature-based early childhood experiences are Antioch Professor David Sobel, author of *Childhood and Nature: Design Principles for Educators* (Sobel, 2008) and other important works, and educator and mom, Eliza Minnucci. In 2013, Eliza founded the Ottauquechee School Forest Kindergarten Program in Quechee, Vermont. She and her colleague, Meghan Teachout, took their public school students outside 1 day, every week, all year. Claire Warden of Scotland is another of the world's leaders in establishing and guiding the growth of nature-based early childhood schools and programs. Founder of her own nature-based preschool in Scotland, Claire is also the founder of the Nature Pedagogy International Association.

We are pleased to see a resurgence of schoolyard habitat projects, a growing number of school and community gardens, and projects underway to naturalize school grounds by taking out pavement and planting vegetation in carefully designed play and learning environments. Robin Moore is one of the pioneers guiding these efforts and has developed guidelines to assist (Moore, 2014). While there have always been some talented and courageous teachers who have opened the doors to take children outdoors to learn in the first classroom, nature itself, for the last several decades up until very recently, especially in the United States, the trends have kept children indoors, even without recess, and without the opportunity to learn in context in direct connection and immersion in nature.

Exceptions are underway, and they are only examples of similar exciting initiatives. Denver, Colorado, is the home of many things – blue skies, diverse wildlife, and the wondrous peaks of the nearby Front Range. Beginning as long ago as 1992, a parent and landscape designer began an effort that ultimately has led to a unique partnership with the Denver Public Schools and has resulted in the transformation of close to 100 schoolyards from barren asphalt to green landscapes for learning. Lois Brink founded Learning Landscape, in partnership with the Denver Public Schools. Now, more than 20 years later, the results continue to build, from indicators of increased physical activity on the part of students to stronger community engagement and pride.

Similarly, efforts have been underway in the San Francisco Bay Area to green and improve the nature-richness of school grounds for decades. As recently as 2015, the San Francisco Unified School District reported having completed the greening of 70 of its schoolyards, with more to be completed.

Another indicator of the growing efforts to transform barren playgrounds into vegetated school grounds is the work of the International Green Schoolyards Alliance. The Alliance held its 2017 conference in Berlin, Germany. The events were hosted by Grün macht Schule and the Berlin Senate Administration for Education, Youth and Science Outdoor Laboratory.

The Denver Public Schools and the San Francisco Unified School District are examples of two school systems that are working to enhance the nature-based attributes of schools' physical grounds and environment in support of children's health and well-being. While the evidence continues to grow, it is sufficient to indicate that the benefits are numerous – from academic achievement to social skills, from physical health to self-esteem, from a sense of community pride to a connection to caring for the environment.

Nature-Rich Communities and Cities

Some cities are taking on the challenge of becoming nature-rich environments. The National League of Cities Institute for Youth, Education, and Families in the USA and Children & Nature Network launched the Cities Connecting Children to Nature (CCCN) initiative in November 2014. The project surveyed representatives and partners in 100 cities to identify promising strategies as well as current policies. Leadership academies were held to share and disseminate results. Currently seven cities in the USA are going even deeper, immersed in designing and implementing ways in which to connect all their citizens, with a special focus on those of low-income without easy access, to nature-rich environments.

The Salzburg Global Seminar and the International Union for the Conservation of Nature jointly released a call to action in 2017, stating that, "People across the world share a responsibility to create livable cities that enhance children's wellbeing and integrate nature." The Salzburg Statement on the Child in the City asked "leaders and stakeholders to ensure that all children enjoy the right to safe, free play in a nature-rich space within a ten-minute walk of where they live" (Salzburg Global Seminar, 2017).

Another inspiring example takes the spark and passion of one young woman in an urban environment who wants to connect people of all ages to nature. Janani Eswar founded GRIN, Grow in Nature, to connect urban people, including families, to nature in Banglalore, India. Janani is an inspiring example of people throughout the world who see the need to connect us all with nature in our everyday lives.

Conclusion

To change a society, as the philosopher Ivan Illich wrote, "you must tell a new powerful tale, one so persuasive that it sweeps away the old myths and becomes the preferred story, one so inclusive that it gathers all the bits of our past and present into a coherent whole, one that even shines some light into the future so that we can take the next step (Illich, n.d.)."

So, today, how do we shine that light? We must continue to support the birthright of all children to a healthy environment and their place as one of many species within the natural world, and to teach the responsibilities that come with that right. We can work to reduce climate disruption and biodiversity collapse by opposing policies that

destroy people and the rest of nature, and by making the case that human beings protect what they love and love only what they know. More than ever, building generations of healthy, resilient children – who grow up to care for themselves, one another and the Earth itself – will depend on helping children and adults fall in love with the natural world (IUCN, 2010).

We can emphasize the healing powers of the natural world: for mental and physical health, for the capacity to learn and create, and for the reduction of violence. We can promote family nature clubs, and similar approaches, as ways to seek meaning and solace in a difficult and alienating time. We can offer a little Vitamin N for the soul through places of worship. We can encourage pediatricians, psychologists, and other healthcare professionals to prescribe nature. And we can support and encourage teachers to integrate nature-based experiences throughout the school curricula (Louv, 2016).

We can also pursue what we refer to as "natural cultural capacity," illuminating the wealth of ways that different cultures connect to nature. We can reach out to people in the food movement, to community organizing groups in urban and rural neighborhoods, to military families and immigrant organizations. We can create and renew nature-rich cities to serve as incubators of biodiversity and habitats of health. Local institutions, such as libraries, zoos, aquaria, and nature centers, can become centers of bioregional awareness and nature-connection for children and families. We can help build a new generation of nature-based schools, increase the number and quality of natural schoolyards, and redouble our efforts to honor Natural Teachers as individual agents of change. With the support of education and business, we can nurture the development of careers that connect people to nature, new jobs irreplaceable by technology. And as the human species continues to urbanize, we can strengthen our international efforts and seek solidarity in a movement that will grow, regardless of national politics.

When children are transformed by the healing, generative, and abundant gifts of healthy natural environments, they are more likely to grow into adults who will create those healing and transformative opportunities for their own children and others. If the children and nature movement is to grow during future generations, it must not be exclusively about children; it must be part of a larger New Nature Movement that touches all lives and every community that is currently evidencing the characteristics of nature-deficit disorder, regardless of nationality, race, ethnicity, income, or set of abilities. The evidence is growing that the results of this movement will help contribute to a peaceful and healthy future for all people, all species, and the environment that sustains all of life.

The New Nature Movement has miles to go before it can declare anything approaching victory for children or adults. But it has already made inroads in policy and, more importantly, has planted the seeds for ongoing, self-replicating social change, and has brought together unlikely allies in common purpose – a shared yearning to reconnect children within the natural world of which they are inherently a part. Reconnecting children to nature, as the core of the New Nature Movement, represents one of the few issues that bring people together across political, religious, economic, cultural and racial lines, and across national borders.

Nature connection is not a panacea for every challenge to physical, mental, and emotional health. Nor can that connection assure, by itself, the protection of nature or the creation of a just society. But by aspiring to a nature-rich future, we can help counter the post-apocalyptic vision of the future, and we can assure that more children, families, and communities are filled with the abundance and regenerative powers of wild hope.

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Nature Cements the New Learning: Expanding Nature-Based Learning into the K-5 Curriculum

21

David Sobel and Rachel Larimore

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Abstract

The increase of nature-based preschool programs in the United States, including nature preschools and forest kindergartens, has led to a growing interest in providing nature-based early childhood education (NbECE) at the elementary level. This chapter focuses on the successful expansion of nature-based early childhood education from an exemplary nature-based preschool at Chippewa Nature Center (CNC) into the Kindergarten and First Grade curriculum in

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Bullock Creek Public Schools in Midland, Michigan. The maturation of the CNC Nature Preschool program, and the conscientious outreach by program directors, has led to the "naturalization" of a local public school district.

We illustrate changes in public school administrator attitudes and decision-making about nature-based programming. In addition, we show how this growth in NbECE has led to improvements in child outcomes at the preschool and K-1 levels, particularly related to motivation and enthusiasm for learning, language development, STEM (Science, Technology, Engineering, and Mathematics) learning, physical development, and executive function.

Keywords
Nature-based early childhood education · Nature-based preschool · Forest kindergarten · Language development · Executive function

The Nature-Based Early Childhood Movement

The implementation of nature-based early childhood education, particularly nature-based preschools, is a rapidly growing trend in early childhood education with only 10 programs in the United States in 2010 and now more than 250 programs nationally (Merrick, 2016). This sharp increase in nature-based preschool programs in the United States, including nature preschools and forest kindergartens, has led to a growing interest not only in articulating the benefits of these programs but also in expanding the nature-based pedagogy to the elementary level. This qualitative case study focuses on the successful expansion of Chippewa Nature Center's (CNC) exemplary nature-based preschool program into the Kindergarten and First Grade curriculum in Bullock Creek School District in Midland, Michigan.

The purpose of this case study is to both document the maturation of the CNC Nature Preschool program and show how conscientious outreach can lead to the "naturalization" of a local public school district. The Bullock Creek School District now has four Nature Kindergarten classes and three Nature First Grades spread between two elementary buildings. Additionally, this nature-based approach has percolated upward into the upper elementary grades through collaborative programming and weeklong programs at CNC.

This has led to both changes in administrator attitudes and decision-making about nature-based programming and improved student outcomes. This successful program evolution is in contrast to many of the trends in public education over the past decade. Nationally, disturbing trends in early childhood (pre-K to third grade) have been:

1. The **"academification"** of early childhood programming. Kindergarten is the new first grade. Preschool is the new kindergarten. This translates into less emphasis on social emotional school readiness and more emphasis on early literacy and numeracy (Almon & Miller, 2009).
2. The **"indoorification"** of early childhood programming. This means children are indoors in confined spaces more of the time, and outside in natural play and learning settings less of the time. This translates into more seat time, less free or

guided play, and the decrease in opportunities for gross and fine motor development (Louv, 2010; Rideout, Foehr, & Roberts, 2010).
3. The **"digitalization"** of children's lives. Young children spend 8 h a day engaged with screens, (television, electronic media, cell phones) and 0.5 h per day outdoors. This translates into less social interaction with other children, less physical movement and the erosion of connectedness with the natural world (Rideout et al., 2010).

The CNC Preschool and the Bullock Creek Public Schools are consciously bucking these trends. Building on the relationship between nature-based programming and healthy child development, these early childhood programs are focused on:
(a) Increasing **motivation and enthusiasm** for school through program design that aligns with children's interests
(b) Enhancing **language development** through grounding literacy in natural learning experiences
(c) Creating the foundation for **STEM (Science, Technology, Math, Engineering) learning** through providing opportunities for problem-solving and sustained inquiry
(d) Providing opportunities for a full range of **physical development** through regularly scheduled hikes and the creation of naturalized play areas
(e) Developing **executive functions** (working memory, cognitive flexibility, inhibitory control, and self-regulation) through thoughtfully designed outdoor activities and challenges

This case study will demonstrate how the techniques pioneered in the CNC preschool are successfully being implemented in K-3 programming in the local public schools. This naturalization of early childhood programs is a mainstream form of childhoodnature – the weaving together of children's lives with the natural world as opposed to the emergent paradigm of children alienated from the natural world. We hope that this case study can be used as a model for a similar rejuvenation of early childhood education in school districts around the country.

Chippewa Nature Center Preschool as Exemplary Program

The Chippewa Nature Center (CNC) Preschool has become a model of an exemplary nature preschool in the last decade. The program has grown from 24 students enrolled for the 2007–2008 school year to an anticipated 140 students in the 2016–2017 school year. CNC's program meets the definition of a nature-based preschool, and it also receives high ratings on traditional early childhood program assessment metrics such as High Scope's Program Quality Assessment and five-star ratings on Michigan's quality rating improvement system.

In a previous report, *Nature-based Preschool Education* (Bailie, Becker-Klein, & Sobel, 2015), the authors summarized initial findings on how the Chippewa program positively impacts preschool children. (Please see CNC Preschool Profile in Appendix A.) In that report, we indicated that parents, local early childhood educators, and local school administrators were impressed with the benefit to children of nature preschool children.

Theoretical Background

Nature-Based Preschools

Nature-based early childhood education (NbECE) is a broad term that encompasses any program model that provides young children ages 0–8 extensive daily outdoor time over the course of a school year, and the curriculum's organizing concept is nature (Larimore, 2016; Sobel, 2014). Under this larger umbrella of NbECE are programs such as nature-based preschools, forest preschools, forest kindergartens, and nature kindergartens. For this study we defined nature-based preschools as high-quality, licensed early childhood programs for 3–5-year-olds, with at least 25–50% of the class day held outside each day, including time beyond the designated play area, nature infused into the indoor spaces, and with nature as the driving theme of the curriculum (Bailie, 2010; Green Hearts, 2014; Larimore, 2011a, b; Moore, 2014). We distinguish this program model from forest preschools, sometimes referred to as forest kindergartens, by their longer periods of time outdoors (70–100%) and very limited use, if any, of indoor space (Larimore, 2016; Sobel, 2014).

The implementation of NbECE, particularly in nature-based preschools, is a rapidly growing trend in early childhood education. This rapid growth led to a first national conference for nature-based preschool professionals in 2012, the formation of a professional association created by the Natural Start Alliance in 2013, the creation of a certificate in Nature-based Early Childhood Education at Antioch University New England that same year, and many regional professional associations in the last 2 years. Despite the rapid growth in program numbers and the creation of professional networking organizations, there has been little research on the learning and teaching that occurs within these nature-based programs. Our goal with this study was to fill this gap.

Language and Literacy

Given that nature-based preschools implement a unique pedagogy, or program model, it is important to review research related to the preschool program model's influence on child outcomes. Studies have found that child-centered/play-based programs are generally more supportive of academic outcomes than programs focused on academics (Dale, Jenkins, Mills, & Cole, 1995; Stipek, Feiler, Daniels, & Milburn, 1995) and are significantly more supportive of motivation-related measures, such as willingness to attempt more challenging tasks (Stipek et al., 1995). Follow-up studies have found that vocabulary development in the early years is particularly indicative of later success (Dale et al., 1995). In addition, language, and literacy skills seem to be positively correlated to science experiences (Conezio & French, 2015; French, 2004).

STEM in Early Childhood

Similar to NbECE, science teaching and learning in early childhood has been receiving growing attention in recent years with science integrated into early

learning standards on a national and state level (Greenfield, 2010). Science in early childhood not only includes content knowledge but also development of science and engineering practices, which involve both knowledge *and* skills (NRC, 2012), and development of dispositions toward science (Brenneman, Stevenson-Boyd, & Frede, 2009; Katz, 2010). When given the opportunity, young children generally enjoy and think they are good at science (Mantzicopoulos, Patrick, & Samarapungavan, 2008). The relationship between content knowledge, practices, and approaches to learning was succinctly captured in the National Science Teachers Association (NSTA) position statement on early childhood science that stated, *"learning science and engineering practices in the early years can foster children's curiosity and enjoyment in exploring the world around them and lay the foundation for a progression of science learning in K–12 settings and throughout their entire lives"* (National Science Teachers Association, 2014).

Physical Development

Many early childhood educators are concerned that the greater emphasis on seatwork in early childhood programs is having a negative effect on children's physical development. Hanscom (2016) documents the substantial increase in children requiring occupational therapy to address problems with physical development, attributing these problems to the increasingly sedentary lives of children, and suggests outdoor play as an antidote. In a recent study, researchers at the University of Victoria in British Columbia compared growth in physical development in nature-based and conventional early childhood programs and found children in the nature group had significantly more locomotor skills (Temple, Mueller, & Smith, 2015).

Executive Function

Research over the past few decades has pointed to the development of executive functioning in young children as a more important and productive goal than the development of early literacy and numeracy skills and may be a better predictor of long-term academic and social success (Blair & Razza, 2007; Cameron et al., 2012; Nayfeld, Fuccillo, & Greenfield, 2013). Therefore, focusing on the development of these executive function skills may be more appropriate early childhood program goals than academic ones. Executive function includes the subcomponents of working memory, inhibitory control, self-regulation, and cognitive flexibility (D'Amore, Charles, & Louv, 2015).

Translating the Nature Preschool Approach into Public School Kindergarten and First Grade

Nature Preschool, Nature Kindergarten, and Nature First Grade are program models that provide young children, ages 3–4, 5, and 6 respectively, extensive daily outdoor time unless the weather is dangerous, and nature is curriculum's organizing concept.

Chippewa Nature Preschool

Chippewa Nature Center (CNC) is a private nonprofit just outside the city limits of Midland, Michigan, a town of approximately 40,000 people. CNC's nature-based preschool started in 2007 as one classroom using an existing building on the nature center grounds. In 2009, the program moved to two classrooms in a newly built LEED Gold-certified building, a certification verifying the buildings energy efficiency, which is complete with extensive natural light and a rustic wood-paneled interior. In 2016 the program expanded to include the original 2007 program space. The preschool is situated on 1148 acres of diverse habitats including woodlands, wetlands, rivers, and upland fields. The main building includes two fenced-in natural outdoor play areas surrounded by a rustic rail fence, which enclose the preschool in the front and the back, while the original site includes one-fenced play area.

The three classrooms house 8 class sessions and currently serve 140 students. The program is tuition-based but provides financial assistance to approximately half of the students, including funding through Michigan's Great Start Readiness program for at-risk 4-year-olds. Each class has 16–18 children with three teachers with a diversity of backgrounds in both early childhood and environmental education. Family involvement is a priority at CNC events for the whole school throughout the year, as well as parent education opportunities.

Children in the half-day program at CNC's Nature Preschool start their day outside in a natural play area. After spending 45 min to 1 h in unstructured play, the class meets at the "stump circle" for a large group time before exploring one of the many ecosystems and destinations available at the nature center. The exploration beyond the play area ranges from searching for frogs at the pond to searching for missing letters in the forest. In other words, these activities vary between learning *in*, learning *about*, and learning *with* nature (Warden, 2015). After the hike, the class returns to the preschool building where the children transition to snack time which is served family style, followed by an hour of choice time where they can choose among the activities available in the classroom, small group time for a more focused activity, and a final large group meeting. The indoor space and the structure for large and small group time are guided by Creative Curriculum®, the curriculum CNC uses in conjunction with the nature-based approach. (See description of program in Appendix A.)

Bullock Creek Schools

Based on 4 years of successful preschool operation, and responding to parents who started to ask when a nature-based kindergarten would be opened, Chippewa Nature Center began exploring collaboration with the Bullock Creek Public Schools. In 2011, first author Larimore approached Charlie Schwedler, Bullock Creek Superintendent, about developing a partnership to extend the nature-based approach into the elementary school. The two established a Nature School Exploration Committee, made up of a combination of eight administrators, teachers, and board members to consider implementation of a nature-based kindergarten. The goal was a kindergarten program that implemented the key nature-based elements including daily

Fig. 1 Logo for Nature Kindergarten programs in Bullock Creek Schools

outdoor experiences, hands-on, real-world learning, and intentional integration of nature as a tool to achieve curriculum goals.

The original plan generated by the Committee was to implement one section of kindergarten in August 2012 at Floyd Elementary, a Title I school with approximately 70% of the students receiving free and reduced lunch and located about 6 miles from CNC. This location was appealing because of its 30-acre, primarily wooded property. However, since parent response was so great, three sections of nature kindergarten were offered that fall. In year 2 of the program, the district added a nature kindergarten section at Pine River Elementary, the elementary school located across the street from CNC. Since its implementation in the 2012–2013 school year, the Nature Kindergarten program has grown to include one transitional kindergarten section, four kindergarten sections, and three First Grade sections which began at Floyd Elementary School in the 2015–2016 school year (Fig. 1).

Nature Kindergarten and Nature First Grade in Practice

What does a Nature Kindergarten and First Grade look like in practice? (The following description is substantially taken from Larimore (2015), *Growing with the Children: Bringing Nature-Preschool Practices to Elementary Schools*.) To start, the students go outside for a substantial part of every class day. (Rain or shine, fall, winter, spring, except in dangerous weather.) These excursions may have a science focus, relate to reading they're doing in class, or focus on math. No matter the activity, the children are experiencing their school property throughout the school year and building a connection with the outdoors. Once a week, a CNC educator visits the kindergarten classes to lead the day's outdoor hike. This allows for the modeling of outdoor activities that the kindergarten teachers might not be comfortable with, as well as sharing content that might be outside the classroom teacher's knowledge.

Indoors, the teachers integrate nature into daily lessons. At the beginning of the school year, the teachers and CNC educator work together to develop the scope and sequence for the year based on seasonal events and the state-mandated curriculum requirements. This planning time includes selecting books for reading times that relate to the seasonal theme. Math lesson planning includes seasonal ideas for taking math outdoors and ideas for natural materials that can be used as manipulatives.

Writing assignments are outlined that allow children to reflect on the outdoor experiences. In other words, the teachers plan with intentionality on how to integrate nature into as many of the classroom activities as possible.

In September, for example, the teachers spend 2 weeks focusing on insects. Outdoor time includes dressing a student up as an insect to discuss the main characteristics of an insect; searching for insects using basic equipment like nets, sheets, and bug boxes; and later in the unit, collecting loose parts (e.g., leaves, sticks, acorns) for building their own insects.

Indoors, their outdoor experiences help the students create a thinking map to compare and contrast insects, such as a bee and a butterfly. Books that focus on insects and insect life cycles are used in both the large group and small group reading times. Work stations include matching photos of stages of the insect life cycle with the appropriate words, sorting images of arthropods into insects or noninsects based on the number of legs, cutouts of body parts that they put together to create their own insect, drawing their own insect, and other similar independent work stations. The general theme of insects – selected in September because of the plethora of insects outside to see and touch – gets integrated into virtually every aspect of the classroom (Fig. 2).

Even the indoor classroom environment has a natural look with the traditional primary color posters of letters and numbers replaced with posters of Michigan animals corresponding to a particular number, letter posters that include images of Michigan plants and animals, and calendars that feature images of the Michigan outdoors. While there are still typical chairs and tables in the room, the plastic chairs

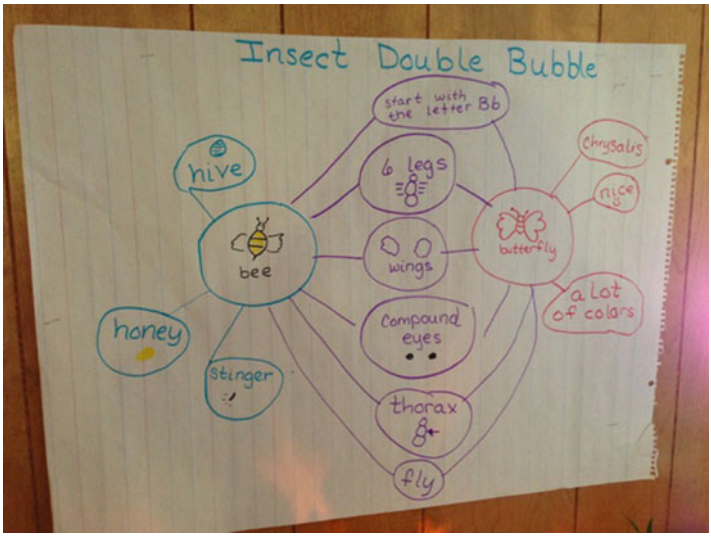

Fig. 2 Thinking map of differences between bees and butterflies

at the group meeting area have been replaced with tree stumps. Chunks of wood have been drilled with holes to hold pencils and markers. When possible, conventional components of the program are reimagined. Sometimes, the classes have their holiday party outside. How many schools do you know in the Upper Midwest that would have a party outside in December?

Research Methods and Data Collection

Research Methods

This current study emerged as the continuation of a previous study (Bailie et al., 2015) that investigated the reliability and validity of the Teaching Strategies Gold assessment tool for comparing child outcomes between a nature-based preschool and traditional preschool model. That study found the tool not to be reliable and led to the identification of more pressing research lines of questioning which are addressed in this current study. In addition, the authors found evidence of successful expansion of the nature-based approach into the elementary school and wanted to explore these phenomena more carefully. For this study, we chose to focus on the following research questions:

- What were the elements of collaboration and implementation that led to successful expansion of the nature-based approach from preschool to kindergarten and first grade?
- Are there benefits from the nature-based programs identified by the elementary teachers and administrators and are there consistent patterns in the observed benefits?

Data Collection and Analysis

Data were collected over 9 months through classroom and outdoor observations, review of program documents, and interviews with Chippewa Nature Center administrators and teachers and Bullock Creek Nature Kindergarten, Nature First Grade, upper elementary school teachers, and administrators. The goal of teacher and administrator interviews was to explore more deeply their perceptions of the impact of the nature-based approach in both preschool and the elementary grades on students and teaching.

Four preschool teachers, six elementary teachers, many parents, two CNC administrators, three Bullock Creek administrators, and four intermediate school district administrators who work directly with early childhood efforts in the county were interviewed either individually or in small groups. Interviews used a semi-structured format allowing researchers to pursue new emerging ideas and lasted 30–60 min. The interviews and focus groups were audio recorded, and the researchers took extensive field notes during the focus groups and interviews. Given the first author's relationship to the interviewees, she was not present during the interviews. Upon completion of fieldwork, the interviews were coded to illuminate key emergent issues and answer the research questions.

Findings: Administrative Practices that Led to Successful Implementation

One of the goals of this study was to identify administrative practices that led to and supported the success of implementation of nature-based approaches in the elementary school setting. We identified administrative practices at CNC's preschool program itself and then identified successful implementation practices in implementation in the Bullock Creek Schools.

Preschool Program Development

From an analysis of interviews and historical documents, we extracted four practices that appear to have guided the successful development of Nature Preschool within the Chippewa Nature Center and the Midland community.

First, *CNC staff worked with the local early childhood community from the beginning to establish Nature Preschool as an integral part of the community's preschool offerings.* This started through a partnership with a local nonprofit to share operational duties, which continued for the first 3 years of operation. In addition, administrators served on countywide early childhood committees and staff attended professional development with other preschool programs. This outreach to the community from the beginning said, *"We're a little different, but we want to be part of what makes this a great community to live in."*

Second, *nature center administrators saw preschool as an integral part of the nature center's mission from the beginning.* CNC's Executive Director, Dick Touvell, along with the Board of Directors and administrative staff, made sure the preschool wasn't a stand-alone entity, but rather a way to broaden and deepen the center's audience and membership.

Third, *CNC Preschool secured public and private funding to assist low-income families who otherwise might not be able to attend the program*. It's easy for nature preschool to appeal to and serve a middle-class audience. It's hard to attract low-income families who can't afford the "luxury" of a nature-based program. Funding through Michigan's Great Start Readiness Program for at-risk 4-year-olds, Midland County's Great Start Collaborative for at-risk 3-year-olds, and private funding from individuals and groups like the Dow Chemical Company allowed for CNC to provide some level of assistance to half of the children in the program.

Fourth, *CNC administrators took a slow and steady approach and made a deliberate decision to grow the program incrementally.* While the program was at capacity in year 2, it took 3 or 4 years for the Chippewa Nature Preschool to become established, highly desired by the community, and recognized by other early childhood professionals. Only once the program was stable after 4 years did the CNC preschool director start to pursue expansion into the public schools.

Expansion into the Public Schools

A natural question of nature preschool parents is, *"This is great, but what happens when my kid goes on to public school?"* The partnership between CNC and Bullock Creek was, in part, a response to this question. In light of the fact that other NbECE programs may face this same question, we identified five key strategies used to naturalize the programming in Bullock Creek Schools:

1. *School Leadership. Local public school officials were invited to visit and understand nature preschool once CNC preschool was established.* Larimore recruited the local school superintendent to participate in preschool planning efforts, visit the nature preschool early on, and begin dialogue about integrating a nature-based approach in the public schools.
2. *External Funding. Recognizing that Nature Kindergarten and First Grade would require additional staffing, professional development, and evaluation, CNC staff assisted Bullock Creek in securing external funding to support the change process.* The funding also supported a weekly visit by a CNC naturalist to model the nature-based approach during the daily outdoor time.
3. *Nature Center/Public School Partnership. CNC conducted extensive nature education programs at all elementary levels – field trips, weeklong programs, and naturalist programs in the elementary schools – with Bullock Creek Schools.* In addition to supporting the Nature Kindergarten and First Grade programs, the funding supported two field trips to CNC for every elementary classroom in the district, weeklong programs at CNC for every Third, Fourth, and Fifth grade classroom in the district, and monthly naturalist visits for every elementary class at Floyd Elementary school. This programming grew parallel to the growth of the CNC Preschool and developed trust and working relationships with school officials.
4. *Professional Development. CNC offered extensive professional development to public school teachers*. Early on, public school teachers attended the CNC Nature Preschool Institute, a 4-day workshop on the nature-based approach. As the elementary school programs were implemented, CNC provided tailored professional development for the Nature Kindergarten, Nature First, and a few upper elementary teachers. In addition, time was dedicated to on-site curriculum planning between CNC staff and public school teachers.
5. *Parent Education and Involvement. CNC staff placed a premium on parent education and involvement*. Recognizing the unique approach to early childhood education, CNC staff worked, in collaboration with Bullock Creek teachers, to educate parents about what to expect – children out in all weathers, muddy clothes, wanting to bring animals indoors, etc. In addition, regular family nights, parent-teacher conferences, and ongoing parent communication developed strong parent engagement. This parent engagement led to enthusiasm about Nature Kindergarten, including regular communication with the superintendent and attendance at school board meetings, and contributed to the change in the local public schools.

That same parent engagement and enthusiasm continues to be a force for change in the school district. The current superintendent of the Bullock Creek district provided a prime example as he recounted a recent conversation with a parent:

> I was at a basketball game last week, standing by the entrance. A high school friend of mine asked, 'What about Nature Second Grade?' When I asked why he was asking, he said, 'I've just seen that my daughter is so inquisitive – flipping things over, so interested in learning. My three older kids are not like this. She wants to discover more. She wants to learn more.

The partnership between CNC and Bullock Creek can serve as a model for the naturalization of the K-3 curriculum and practices in other school districts throughout the United States.

Findings: Benefits to Children of NbECE Programming in Preschool, Kindergarten, and First Grade

Our research found that parents, teachers, and administrators reported benefits to children that naturally sorted into five distinct themes. These same themes described outcomes for children both at Chippewa Nature Center and for children in the Bullock Creek Schools. These five themes are (1) increased motivation and enthusiasm for school; (2) enhanced language development; (3) increased science, technology, math, engineering (STEM) learning; (4) improved physical development; and (5) development of executive function capacities.

Motivation and Enthusiasm for School

Changes in kindergarten in the last two decades to emphasize academic skills and standardized tests have led to a reduction in children's physical movement and creative cognitive opportunities. In *Crisis in the Kindergarten: Why Children Need to Play in School*, the authors summarize:

> Kindergarten has changed radically in the last two decades. Children now spend far more time being taught and tested on literacy and math skills than they do learning through play and exploration, exercising their bodies, and using their imaginations. Many kindergartens use highly prescriptive curricula geared to new state standards and linked to standardized tests. In an increasing number of kindergartens, teachers must follow scripts from which they may not deviate. These practices, which are not well grounded in research, violate long-established principles of child development and good teaching. It is increasingly clear that they are compromising both children's health and their long-term prospects for success in school. (Almon & Miller, 2009)

However, teachers and administrators at the preschool and kindergarten levels consistently reported that parents regularly comment on how their children are engaged, happy, and enthusiastic about attending the nature-based programs.

At the Chippewa Nature Preschool, one parent's comment was illustrative of general parental enthusiasm and child engagement:

> At the end of each day children run to tell their parents of the adventures they had. "Mom, I found 10 worms today!" or "Guess what, Dad, we saw a dead deer carcass today!" Regularly we hear parents raving about how their child wowed dinner guests with natural history trivia. The ability to recite nature facts is not our primary goal, but it shows children's desire to learn and their ability to absorb information.

One of the major goals of preschool education should be to develop a *"readiness to learn"* and an excitement about school. In all the parent interviews we have conducted, this excitement about school is a recurrent theme.

At the Bullock Creek Schools, parent and teacher comments were similar. One upper grade teacher, who was also a parent of a Nature Kindergarten student, suggested the general parent sentiment:

> (I) had a daughter in the very first Nature Kindergarten and she is in third grade now. (My husband and I) loved the organization of it, loved inside and outside learning happening. . .My oldest daughter did the traditional kindergarten, and at the end of both of their kindergarten years, one who had nature-based and one who did not, both came out ready for first grade. My Nature Kindergarten daughter loved coming to school, loved her teacher, and she continues to enjoy the outdoors.

Another teacher, who was also a Nature Kindergarten parent, echoed these sentiments:

> My son is in Nature Kindergarten right now. My daughter loved it (three years ago.) For both of my kids, it lets them still have that creativity, where usually (the curriculum is) so structured. Nature Kindergarten brings that out in them. I don't see that it is distracting from learning. My son loves the outside, so his ability to talk about nature is phenomenal. It was quite a difference when my daughter transitioned into first grade. That was tough! They sat there all day, and she honestly did not like school that much in the first grade. . .great to know that next year he will have Nature First Grade as well.

In fact, parent advocacy was one of the primary drivers of the implementation of Nature First Grade in 2015–2016. Parents saw the difference in the school experience for their kindergartners and wanted the experience to continue for their first graders and expressed that interest to the teachers, principals, and superintendents on a regular basis. The new superintendent (as of summer 2015), who was previously a middle school administrator, has changed his attitude about Nature Kindergarten this past year:

> (When it started) I wasn't sure about the nature-based approach. My own kids, who are now in first and third grade – we could have put them in the Nature Kindergarten. Instead we chose the traditional approach. Now, I regret that decision. If I could meet with every parent considering kindergarten, I would try to convince them that there's lots of positives in that approach. If I knew then what I know now, I'd put my own kids in Nature Kindergarten.

In addition to enthusiasm in the interviews, the Floyd Elementary principal noted kindergarten attendance was 90% in the 1st year of the nature program, 88% attendance in the 2nd year, and 95% in the 3rd year. If children are enthusiastic about school, they're less likely to find reasons to be absent. Quality early childhood education develops a "readiness to learn" and an excitement about school, and

motivation and enthusiasm for school was a recurrent theme in the interviews we conducted.

Language Development

In both settings, teachers and parents commented on the increased vocabulary and the increased receptive and expressive language of children in these nature-based programs.

At the Chippewa Nature Preschool, one of the questions that emerged from the study was,

Is it possible that the nature-based program at CNC actually enhances language development as much as or even more than conventional, high-quality, indoor programs? And what might be the mechanisms for this language enhancement? The answers to this question suggested three different possible impacts of the nature-based approach.

The Development of "Scientific" or Nature-Based Vocabulary

Across the board, everyone agreed that CNC children have a greater scientific word bank available to them. A quick sampling of the kinds of words that parents and teachers indicated children use are:

> Hibernation, vernal pools, talons, abdomen, thorax, decomposition, carcass, exoskeleton, metamorphosis, agitating—just like in my washer.

And here's an example of word sophistication beyond normal expectations for children this age:

> Two bright-eyed four-year old girls sat patiently waiting for the speech therapist to ask her next question. The therapist's focus for the day was the "b" sound, so she placed an image of a bird on the table in front of the girls. She then pointed and asked, "What's this?" The two four-year olds proudly answered, "Woodpecker!" They were correct. The therapist was confused—most four year olds would have said bird. What the therapist had forgotten was that she wasn't working with typical four year olds. She was working with students in Chippewa Nature Center's Nature Preschool. (Larimore, 2011b)

English-Language Learners (ELL) Do Better in a Nature-Based Context

Because of the materials-based aspect of nature learning, children who are learning English as a second language may be more successful in a nature-based than a traditional preschool. Simply, the word to referent relationship is clearer when the spoken/written word is presented in conjunction with the real thing rather than with an image of the thing. This was illustrated with the language development of a Korean child who came to the CNC program with hardly any English:

> For our English language learner, he didn't talk a lot in the beginning, but he really connected to grasshoppers and that opened the door to language and to making friends. He would collect and count dozens in a day, and making friends further helped his vocabulary. He would only say, "grasshopper," and then one day he said, "Kennedy,

I have 3 grasshoppers." A whole sentence! Now his expressive language is exploding, because he was interested in the grasshoppers and could connect to other children through them. He felt successful and felt like he belonged. He collects a lot– now it's worms, and he wanted a zipper bag for his tadpoles. I don't think he had any experience with nature before he came here, because his family is not connected with nature.

Language Learning, Beyond Just Science Vocabulary, Is Enhanced Through Nature

There was disagreement about this hypothesis among early child professionals when asked this question. Our speculation is that because outdoor social nature play is "deeper," in other words, lasts longer and is more sustained by the children, that there may be greater language expression and reception by the children. The contrary point of view was that child-initiated play is less likely to increase vocabulary because there are fewer adult-directed vocabulary lessons. We speculate that because the children encounter a greater array of natural history surprises – turkeys in the woods, birds landing on them while sitting quietly, the swarm of ants when you stumble upon an ant hill, and new flowers which weren't in the same place last week – there may be more triggering of questions and more receptivity to teacher language.

To assess the validity of this hypothesis, we are currently engaged in continued research to assess vocabulary growth among CNC students using the Peabody Picture Vocabulary Test and other measures of early childhood language development.

At the Bullock Creek Schools, the focus changes from the preschool emphasis on language development and letter and number learning to a greater focus on early reading and writing in kindergarten and first grade. However, the same principles apply. These principles are that (Fig. 3):

(a) Reading and writing should emerge out of the context of a rich language development experience which includes learning songs, finger plays, outdoor-guided movement, and social discourse during nature play.

Fig. 3 Vocabulary development with nature words

(b) Reading and writing is most enhanced when it is grounded in real-world experiences. Reading about frogs is much more exciting after the children hold frogs in their hands. Looking through natural history books is more compelling when a child is trying to identify something she found in the forest.
(c) Vocabulary development is encouraged when words are presented in concert with actual things and phenomenon. Children are likely to remember the unfamiliar word "chrysalis" when the word is presented in conjunction with the beautiful green and gold package attached to the milkweed leaf.

The principles are illustrated in comments from a current Nature Kindergarten teacher:

> I'm surprised at the amount of their vocabulary—it's amazing—and they're just getting this at school. Bears going thru torpor, frogs brumating. Insects–it's not just a bug—they know the body parts, and the functions of the body parts. Then this relates back to writing. In winter, when we're reading the All About Book, the children are recalling body parts and then they don't just talk about it, they write about it.

This comment is echoed by a Nature First Grade teacher. She comments on the vocabulary of the children as they come to her from Kindergarten:

> Their vocabulary is so much broader and expanded. Some of the words they know already as first graders, a lot of adults don't even know. If we have parents come sit through nature conversations, adults will say I didn't know that was that, or that word. I could feel right away at Open House, when I met with parents, there was an excitement about the nature program. They just embraced it.

One of the keys to the engagement in literacy is the bridging between the outdoor experience and text. One of the Nature Kindergarten teachers explains how this happens:

> It's not just we read about it, we watch videos–they're looking with their own eyes. When we find something outside that they've read about. . .their interest skyrockets, and the concept comes alive for them. It's not that they saw a picture, they touched it, they were able to see it. Those experiences they don't forget. 'Is this a tadpole or not?' Nature cements the new learning.

This same teacher describes how the nature/literacy connection has been effective with children with emotional and learning challenges:

> We've had one girl for two years. When she first came to the school, she'd hide under tables, spit, scream. She had no diagnosis but she was eventually diagnosed ADHD. But nature time was her time to shine and she became a leader during outdoors time. So we started to call her "Nature Girl." Whatever happened during the day, whatever challenges she had, there was always nature time. That gave her confidence. She's in first grade now and doing awesome, she's reading above grade level. That nature piece gave her solidity. We capitalized on her leadership during nature time.

To summarize this relationship between nature and literacy, it's instructive to see the parallel experience in one of the nature-inspired Kindergartens implementing Forest Days in Vermont. As in Michigan, the emphasis on early literacy has upped the stakes. Kindergarten literacy standards are much more demanding than they were 10 years ago. Just within the *Reading Informational Texts* section of the Common Core State Standards, there are ten individual standards that students are expected to meet before the end of the Kindergarten year. These expectations range anywhere from the following:

CCSS.ELA-Literacy.R1.K.1 – With prompting and support, (children) ask and answer questions about key details in a text

CCSS.ELA-Literacy.R1.K.10 – (Children) actively engage in group reading activities with purpose and understanding

Eliza Minnucci, Vermont public school Kindergarten teacher, says that because her students have become enthralled with being in the woods and figuring out what they're finding, they are compelled to engage with nonfiction texts (field guides) to answer their questions. They are reading with "purpose and understanding." She describes that:

> Prior to Forest Fridays, finding the right non-fiction texts that were engaging and meaningful to my students was daunting. Forest Fridays provided real-life connections and inspiration for these students to engage with non-fiction texts. I recently spent a considerable percentage of my classroom budget on more non-fiction books and pamphlets that provide information about the flora and fauna in our woods because of my students' intense interest. (Sobel & Hopeman, 2014)

Both Michigan and Vermont teachers and parents are clear that these real-life experiences are much more potent, much more engaging, than just reading about these same processes in a book. When the reading and the real-world experience align, the learning is enhanced. Both the CNC Preschool teachers and the Floyd and Pine River Kindergarten and First Grade teachers consistently work to find literature for classroom reading that connects with experiences the children have encountered outside.

STEM Learning

Parents and early childhood professionals who visit both CNC and Bullock Creek Schools consistently comment on the striking examples of problem-solving and self-directed inquiry that they observe. In the current atmosphere of concern for encouraging a disposition to science, technology, engineering, and math learning, it makes sense to look at how those dispositions are cultivated in nature-based early childhood programs.

In the film "School's Out: Lessons from a Swiss Forest Kindergarten" (School's Out, 2014), there's a scene where a group of children are trying to design a pathway so a ball will travel a curved path down a hill, rather than run straight down the hill. The underlying question is: *How can we change the direction of travel so the ball follows the curve to our desired destination?* What an excellent engineering

challenge! The boys scavenge branches from the surrounding woods to create barriers to deflect the path of the ball. The ball hops over the barrier. They need to figure out how to slow the speed of the ball and create higher barriers. The boys are deeply invested in solving this very real-world problem.

At the Chippewa Nature Preschool, two related examples were identified. One visiting early childhood administrator made a comparison between what she sees at CNC and other early childhood programs:

> There could be more inquiry-based language outside, and a greater length of engagement of outdoor play at CNC compared to indoor programs. They are examining under a rock for 30 minutes. In high quality programs inside and out we have open-ended activities, but the Chippewa children appear to do more problem solving. They are trying to figure out how to move rocks. How do we move these rocks? I wonder what rope might do, we can tie rope to the rock. It's not moving, what else could we do? It's problem solving, it's inquiry, it's hypothesis. I don't see as much testing inside the classroom, it is more pretend play.

Whereas the above experience was self-directed, the teachers at CNC also create experiences that lead to inquiry. This past year, the teachers arranged to have a road-killed deer carcass placed in the woods so they could watch what happened to it. They visited it regularly and also set up a motion sensor trail camera to record visitations to the carcass. The teachers described:

> Right after the deer was dumped, we saw it was newly dead, and we visited it about once a week to see what it looked like as it decomposed. They were asking many questions. Why is it disappearing? What's eating it? We watched it all the way down to a pile of fur and bones strewn through the woods. They got to see coyotes dragging it away, scavengers like hawks and skunks pecking at it.
>
> This process opens up the dialogue. We don't have a (predetermined) word list. Instead the words emerge out of the process. We use technical terms like decomposition, decomposers, predators, prey – all scientific words that usually don't come up till 5th or 6th grade. And the children start to understand cycles because they've seen them. They're developing their own definitions based on those experiences.

This combination of self-directed and teacher-initiated scientific inquiry lays the foundation for an interest in STEM learning in the elementary grades.

In the Bullock Creek Schools, STEM learning, especially in the city that hosts the corporate headquarters of the Dow Chemical Company, is a highly valued commodity. Doesn't it make sense then, to identify educational approaches that support a disposition toward science and inquiry learning in the early years?

In a grant proposal to support the expansion of Nature K and 1st Grade in the Bullock Creek Schools, administrators made this case.

Using Nature to Connect Children to Science, Technology, Engineering, and Math

Research has provided evidence that outdoor time improves recall of information and creative problem solving, and indications are that it also impacts outcomes in math and science learning. If we expect children to pursue careers in science,

technology, engineering, and math (STEM) disciplines, they need to have real, hands-on "wow" moments that build an emotional connection. The first three years of the program demonstrated that Nature Kindergarten supports excellence in teaching and learning, thereby enabling students to realize their full potential.

High quality education is about being relevant to students, building skills rather than being able to regurgitate facts, and inspiring a love for learning. This is especially true when building a love for science, technology, engineering, and math. Nature Kindergarten with its hands-on, real-world approach does just that, and now we'd like to extend this program to the first grade.

This sounds convincing, but what are the actualities of this kind of practice? Parents and teachers provide the living and breathing examples. The examples that follow are examples of both child-initiated and teacher-directed science activities integrated with literacy, math, and engineering.

Teeter-Totter. When administrators say "technology" they usually mean "computers," but in early childhood, good old-fashioned building things and taking them apart is just as important. Creating a disposition to engineering and technology in early childhood comes out of making string telephones, folding paper airplanes, and figuring out how to construct a catapult. A Nature K teacher describes a child-initiated "technology" problem-solving activity. *"They made a* ***teeter totter*** *on V's in a tree, but the branch kept breaking. They realized they needed a stronger branch–they figured it out together. They got a longer and thicker stick. They do a lot of problem solving, and self-problem solving. It is self-taught, they are having to think things out and plan things."*

Build Shelters Like Animals. Building structures inherently appeals to students, and again, there's lots of engineering learning embedded in figuring out how to make structures stand up. Rather than forbidding picking up sticks and stick play, it's valuable to encourage using sticks as "loose parts," as building materials. Another Nature K teacher describes, *"We go out in fall, and I challenge the children to build shelters like animals, but bigger structures. . .big enough for children to get inside of. They chose a skinny tree, propped up six or seven sticks, and then it would fall down. What's happening? Let's look at other structures, I suggested, let's compare. They realized it was the size of the tree. They chose a different tree –fatter and more slightly bent. They rebuilt and it was successful!"*

Magnets. One of the first grade teachers was concerned that the nature-based approach was too play oriented and not rigorous enough to fulfill the curriculum demands of first grade. *"I have to be honest. At first I was skeptical, and I was afraid we weren't hitting that core curriculum hard enough for first grade, I didn't feel like we were challenging them cognitively. For me, there were a lot of games involved and they were learning games, but I don't know if kids were truly getting it.*

But then we also did a unit on ***magnets,*** *and she (CNC staff member) came up with great games where they had N and S around their necks and they played elbow tag where they could repel or attract each other. That game was really meaningful to them–they understood that. You could take it back into the classroom. That part was interesting. If we can keep tweaking the games (to make them connect to the curriculum) then every year we will get better and better."*

Tapping a Sugar Maple Tree. One of the true tests of the effectiveness of curriculum is whether children bring things from school back home. Do they talk about and try out things they learned in school in their backyards? After the maple sugaring activities in school, one parent described this transfer of learning:

> Yesterday they (my children) were trying to tap a tree. They tried screwdrivers and hammers – neat to see them trying to do that at home. They got a little leakage from the screwdriver. They were able to find the maple tree, because my son learned that the branches go like this, the opposite way. Together with their knowledge of that they were able to find the right tree. They did great.

The results of this approach seem to be bearing fruit. The current superintendent reports that the scores on the state science curriculum tests at *"Floyd Elementary were twice the state average, and even higher at Pine River Elementary,"* though it's unclear whether these results are caused by the nature-based approaches.

But it's clear that the teachers and administrators think they're heading in the right direction. The current superintendent articulates how the nature-based approach is getting children invested in STEM learning. *"We're raising the level of their interest in science. Our K-5 instruction has had so much emphasis on the 3 R's that it has pushed science and social studies to the side. Now we're bringing science to the front with the 3 R's integrated. This helps students think about things in science. We're building a desire in a student for why we use the Pythagorean theorem, why we use different approaches."*

Physical Development

Many early childhood educators are concerned that the greater emphasis on seatwork and worksheets in early childhood programs has a negative effect on children's physical development. In her recent book, *Balanced and Barefoot*, pediatric occupational therapist Angela Hanscom documents the substantial increase in children requiring occupational therapy to address problems with physical development. She attributes these problems to the increasingly sedentary lives of children and the emphasis on sitting and being quiet in early childhood classrooms. Her solution? Greater movement diversity on a daily basis:

> When children are restricted in seated positions for many hours, such as baby devices and. . .by unrealistic rules for older children to sit for long periods. . . it is hard for them to develop and maintain adequate strength and control. . .. Therefore, it is important for your children to experience frequent play opportunities that challenge them to move their bodies against the forces of gravity. . .
>
> (T)his can be achieved through plenty of outdoor play. Lifting heavy rocks to build a dam, climbing trees, scaling a rope ladder, digging at the beach, pumping on a swing, and biking are all great examples of children playing and challenging their strength at the same time. (Hanscom, 2016)

This sentiment was echoed by one of the Midland elementary principals when he said, *"Our children are not programmed to sit through one hour of church, much less seven hours of school."*

At the Chippewa Nature Preschool, teachers and administrators have all commented on the value of the program for increasing the gross motor development and the physical endurance of children. In a previous report (Bailie et al., 2015), we reported that the superintendent of Bullock Creek School District noted how much farther children could walk by the end of the school year after participating in nature walks. CNC parents described children's ability to be outside longer because they hike every day.

During one 30-min observation of an outdoor play period at the beginning of the CNC school day in November, we observed this diversity of gross motor activity (Figs. 4 and 5):

- Balancing on one foot, with boots on the wrong feet
- Children running and chasing each other
- One child rolling up in a jump rope held by another child
- Riding on scooters
- Shoveling sand onto slide and then trying to climb up
- Jumping off stumps
- Scooping and dumping while operating a miniature truck
- Child persisting in trying to balance on one foot
- Rhythmic banging on aluminum sheet frame
- Balance walking on tree trunks on the ground
- Throwing and kicking a ball
- Flopping in and out of the hammock
- Play fishing modeled by teacher
- Running up and down a dirt hill
- Mixing and pouring in mud kitchen

Similarly, on an outdoor hike that started out as a coyote game and turned into wild turkey stalking, one author observed children quietly crouching behind trees to watch the turkeys, get down on all fours and crawl through the woods to stalk the turkeys, run fast in open areas to catch up with the turkeys, creep through a thicket and protect their eyes from lashing branches, lie down like coyotes to take a rest after all that running, and pretend to nibble on sticks/food because they weren't able to catch the turkeys. It was the kind of active movement diversity that occupational therapist Hanscom prescribes as essential for healthy physical development.

In a recent study, researchers at the University of Victoria in British Columbia used the Test of Gross Motor Development Second (TGMD-2) to compare growth in physical development in nature-based and conventional early childhood programs. Researchers found that, *"the Nature Kindergarten group improved their loco-motor skills significantly more than the Regular Kindergarten group. These findings suggest that time in the outdoors at school promotes loco-motor skill development"* (Temple et al., 2015).

Fig. 4 Diversity of gross motor activity during nature play

Fig. 5 Children as coyotes stalking wild turkeys

It appears that CNC educators are providing the opportunities for active whole body activity that will lead to healthy physical development in these 3- and 4-year-old students.

At the Bullock Creek Schools, physical development is normally the domain of the Physical Education teacher. But in this era of rapidly increasing obesity rates, and

an understanding of the relationship between physical and cognitive development, it behooves elementary school teachers to think about integrating physical development into the design of their programs.

The Bullock Creek Nature K and first grade teachers understand that the increased movement and exercise components of being outside each day improves the capacity of children to focus, pay attention, and engage with the cognitive challenges of literacy and math. They also understand that it decreases problematic behaviors and increases the engagement of children with special needs.

The example cited about the young child who hid under tables and screamed is illustrative. The teacher commented, *"The nature piece gave her solidity."* By which she meant that being able to move and explore outside helped to ground her. And as another Nature K teacher commented about many of the children, *"For the fidgety little ones, nature makes a difference."* If you doubt the truth in this, visit a normal elementary school for a day and see how you feel after 6 h of mostly sitting in your seat, except for going to lunch and out to recess (if the school still allows recess).

The Floyd Elementary School principal confirmed this same relationship when he said:

> Now that we have Nature Kindergartens, we're finding that the absenteeism rate for these children has decreased. They're coming to school more. The Nature Kindergarten has allowed us to do full inclusion for our ADHD students. Rarely do we get a referral when kids are outside at nature time. And our autistic and hypersensitive students don't have issues outside and we've noticed a diminishment of hypersensitivity back in the classroom. (Bailie et al., 2015)

One Nature K teacher illustrated a specific example of the benefits for a special student:

> Last year I had a student who had special needs. He received OT and PT and speech. Walking on an uneven bumpy trail was difficult for him, but by the end of the year, he was much more able to walk and have motor planning to get over logs. The OT says that, handwriting is still a struggle, but there was an improvement in that even. I attribute it to being outside, doing daily physical practice, like picking up seeds off the ground, and having fun and playing while doing those things.

A Nature K teacher extended this idea to all her students saying:

> When kids are moving, not when they're sitting, you see them learning in a different way. . .. It's easy to say sit down and write and read this, but that is not what is best for kids. Outside where they are moving, the moving is huge. They get that by being out in woods, where they all climb over a log in the woods. They get daily opportunities to develop gross motor skills and that increases their fine motor development.

This greater emphasis on physical movement and being outside in all weather is also spreading into the upper grades, both through student advocacy and teachers' understanding of the relationship between movement and learning.

Fig. 6 Outdoor classroom setting for 5th grade

This has led to the implementation of a Salmon in the Classroom project in third grade, a Government program connected to the nature trail, and the fifth grade creating their own outdoor classroom (Fig. 6).

Though constrained by her concerns about her students' test performance, one 5th grade teacher described:

> We took trees that were down and cut them into benches and created an outdoor learning area. I used it in fall, in spring, and a little bit in the winter. I have a vision I want to be like Nature K, but I have to follow my gut with the testing.

This tension between what the teachers know is best for students and a concern about test scores in a recurrent theme with these upper elementary teachers. Fifth grade teachers commented, *"[The nature-based approach] brings back the excitement of school. For example, boys learn so much better hands-on. A lot of them struggle with writing, but when we get them out there, they are writing because they are outside. It's that learning in action again. When a lot of them are contained to a classroom, they are not focusing on what is going on. . .I notice when we hang the bags (math challenges) in the tree and we are moving between the exercises, that the students as a whole, they tend to be able to attend to the task."*

This emphasis on the importance of daily physical activity (not just during Gym class) has led to a commitment to having children outside in winter, even in challenging conditions. Teachers have created classroom sets of Oakiwear rain suits, hats, boots, mittens, and warm layers to make this possible. The Floyd Elementary principal described that, *"Last year there were some days that were really cold. Bay City schools were closed – but our K kids went outside that day. The real temperature was 15 degrees but there was no wind chill advisory, so the children were outside. And sometimes even when it's below 15 degrees, the children are outside."*

The commitment to being outside for daily physical activity, not just in Kindergarten and first grade, but for all K-5 children, was expressed by one principal who said, *"Just to have them go outside, that makes all the difference in the world. Wouldn't it be great for the school to have raingear for all the kids to be outside in rainy weather?"*

Executive Function

Much research over the past few decades points to the development of executive functioning in young children as a more important and productive goal than the development of early literacy and numeracy skills. Executive function, it turns out, may be a better predictor of long-term academic and social success than early reading and writing. Therefore, focusing on the development of these executive function skills – working memory, cognitive flexibility, inhibitory control, and self-regulation – may be more appropriate early childhood program goals than learning letters and numbers.

Since these are squirmy concepts to wrap one's head around, let's define these subcomponents and translate them into illustrative childhood games.

Working memory is the ability to briefly hold information in mind for the purpose of completing a task. (Children's Game: Concentration)

Inhibitory control and self-regulation is the ability to stop thoughts and actions at the appropriate time, set priorities, and generally have a considered response rather than give in to impulses. (Children's Game: Simon Says)

Cognitive flexibility is the ability to respond appropriately to changing situations and apply different rules in different settings. (Children's Game: Red Light, Green Light)

(D'Amore et al., 2015)

At the Chippewa Nature Preschool, the teachers described a variety of ways in which children were developing these skills. One teacher said:

> The first thing that comes to mind is risk assessment. Our kids are assessing their own risk daily. Do you feel comfortable doing that?...Today we were out climbing on fallen logs. We had a child that climbed up to the top but wasn't sure how to get back down. I watched her, she put a foot down (but found it not safe) and then found a different ledge. That child at the beginning of this year would have reached out for help. She has learned how to control her body and have self-confidence.

We then pushed a bit further and asked, **"Can you give us explicit examples of activities that you conduct that actively help children develop the sub-components of working memory, inhibitory control, and cognitive flexibility?"** We were surprised at the array of very specific activities that clearly target these skills. Here's a sample below.

Code Word. (Working memory and inhibitory control) Every day the teachers develop a code word to release the children from the circle to go to the gate. This occurs after group meeting as a transition to go on the hike. They choose a science word, like *"insect,"* and then they say a variety of words that sound like the word, but aren't the word. The children can only leave when they hear *"Ready, set, insect."*

First the teacher says, *"Ready, set, go,"* and the children have to restrain the impulse to get up. Then, *"Ready, set, ant"* which also doesn't count because ants are insects, but the code word is the actual word. Then the teachers will use a word that sounds a lot like the code word. *"Ready, set, inside,"* or, more subtly, *"Ready, set, inspect."* The children have to attend to the subtle distinction between the sound of *"inspect"* and *"insect."* Kids start suggesting words – sometimes it's unrelated like *"pizza,"* but other times it rhymes, which suggests that they're developing language differentiation skills.

Freeze Song. (Cognitive flexibility) The teachers play a game called "Freeze Song" while outside. First they play music from a portable music device. When the music plays the children dance, and when the music stops they freeze. It's like the movement pattern in Musical Chairs. Then the teachers switch the pattern. (In executive function terms this is known as rule switching.) When music is playing, children have to freeze. When the music is silent, they dance.

Trail Walks. (Inhibitory control) The teachers described a great deal of inhibition control that occurs on the trail. When children see a squirrel, their first impulse is to run after it. Rather, the teachers explain that if the children want to get close to see the squirrel, then they have to get really quiet and walk very, very slowly toward the squirrel. Similarly, the teachers often have children play Red Light, Green Light on the trail.

Since it is evident that a variety of CNC program components help children develop executive function skills, we plan to quantify children's executive function growth in the next phase of our research through the Head, Toes, Knees, Shoulders metric. In this game children are first taught that if the leader says touch your head, you touch your head. And if the leader says touch your toes, then you touch your toes. Then they play a silly version of the game. When the leaders says touch your head, you touch your toes and vice versa. Then the Knees/Shoulders pair is also taught and switched. This metric has been normed and used at other early childhood settings in Michigan. Therefore, we're interested in seeing how children at CNC compare to children in other early childhood programs in the state.

At the Bullock Creek Schools, though this tends to be a new topic of discourse in elementary school circles, the teachers and administrators did indicate ways in which they saw nature-based programming influencing executive function in students.

Parallel to the observations of the CNC teachers, Nature K teachers identified ways in which nature programming led to self-control:

> *There are times when we try to get out and use senses and view different animals. Looking for birds we have to be very quiet. They want to shout, "I see that bird!" But they learn to control that. Or, they want to pick everything. They think "I want this beautiful flower," but they also want to look at that flower tomorrow. That is the difference and that is stronger* (impulse control) *and that could carry over to other situations.* ***If*** *they have learned: I am not going to pick this flower and I can watch it grow, they will do it in other situations. I hear them say they saw this bird at Grandma's house. That's a sign of a carryover and more motivation.* (Working memory)

This teacher also commented on the increasing stamina of her children:

> We decided on extra outside time in the afternoon. As a result, their indoors attention spans grew. By early November, their stamina in the later afternoon improved. Around 2:15 or 2:30, their attention spans were longer than at the beginning of the year because of outdoors time.

In regard to one special needs child, another Nature 1st grade teacher said:

> One student this year came as a homeschooled student with basically nothing. Limited socialization, attentional focus, impulse control. Home wasn't doing her any justice. At the beginning of the year, I said to Mom I anticipated holding her back because she was so far behind. But nature has had an important impact on her. She has made huge gains, due in part to not only experiences in nature and knowledge, but also the socialization she finds in nature with other students. She didn't have any of that. For her to come and be socialized in that way, in stump circles or on the trail, it's had an impact on her learning.

Also parallel to the CNC teachers, the Nature K teachers identified children's ability to measure risk and to become physically self-sufficient was shaped by their nature experience:

> Kids will test climbing in trees, and then they'll wonder–how am I going to get down? Some will help each other get down, others will wonder what to do, and we go and walk them down. I don't always go and offer them an easy out. If they went up there, then it's good to let them figure out how to get down. It's not like on the playground, where all the distances are all the same. Here you have to stretch your legs a little further.

In the Nature Kindergarten and first grade, both teachers and students stretch a little further. The teachers move out of their comfort zone, out of the climate-controlled classroom, and out into the unpredictable world of the nearby natural world. One teacher said, *"The stocking cap messes my hair up, but I love how my kids interact outdoors."* The students have to learn to walk farther, negotiate disagreements, learn which plants you can nibble and which you can't, how to stretch their legs to reach that next branch. All in all, stretching is a good thing.

Future Implications

This case study is focused on one unique community, and thus hard to generalize to broader contexts. However, it does provide insights into logical next steps as NbECE scholars develop and implement a research agenda. This study identifies administrative characteristics other communities would be wise to consider when developing nature-based education partnerships but also identifies several areas where additional research is needed.

First, the issue of motivation and enthusiasm for school engagement needs to be explored further. Are other nature-based settings seeing similar positive shifts in

attendance? What about the long-term connection to, engagement with, and motivation for school and learning? Does time in a nature-based setting support a love of learning that continues well beyond the earliest years? If so, that would give cause for *all* early childhood programs to move quickly toward a nature-based approach. Such a finding would also beg the question as to how much nature engagement is needed to support that love of learning.

There was some mention in this case of the nature-based approach supporting dual language learners; however one limitation of this study was the few numbers of these students. Future research is needed to explore more deeply the ways DLLs are supported through nature-based approaches. Another area unclear in this study was if the nature-based approach supports general vocabulary development, both receptive and expressive, beyond science-specific words, and is worth exploring more deeply. Yet another line of questioning is how this science vocabulary and academic motivation supports science learning. If science vocabulary is in fact richer in children who attend nature-based programs, how does language development relate to other science learning such as development of science and engineering practices? Research to begin answering these questions is the logical next steps in NbECE.

Conclusion

The partnership between Chippewa Nature Center's Nature Preschool and the Bullock Creek School District can serve as a model for the naturalization of the K-3 curriculum and practices in other school districts throughout North America. The themes teachers and administrators identified related to child development are logical starting points in future research. As the NbECE movement continues to grow, it is vital we continue to document the organizational best practices supporting the naturalization of curriculum but also the impact that change has on young children's development in the moment as well as long-term. This work is just beginning.

Cross-References

- ► The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment
- ► The Nature of Childhood in Childhoodnature
- ► Wild Hope: The Transformative Power of Children Engaging with Nature

Appendix A: Chippewa Nature Center Preschool Profile

The Chippewa Nature Preschool is located at the Chippewa Nature Center. This nature preschool started in 2007 as one classroom using an existing building on the nature center grounds. In 2009, it expanded to two classrooms in a new "green"

Fig. 7 Chippewa Nature Preschool play area

two-story preschool building that is cedar sided, with windows that reach up above the second story to offer natural light to the hallway and classrooms that are on either side. A lovely wooded path leads parents from the parking lot through a natural play area to the nature preschool (Fig. 7).

Situated on 1148 acres of diverse habitats including woodlands, wetlands, rivers, and upland fields, two-fenced in natural outdoor play areas, surrounded by a rustic rail fence, enclose the preschool in the front and the back. Classes start their day outside in one of these two natural play areas. Features of the play areas include a rowboat, stage, and log seating for dramatic play, an outdoor Plexiglas easel in a wooden frame, and a storage shed built into the fence that contains a myriad of garden and sandbox tools and tricycles. A hill with a built-in slide has a central focus in the front area (Fig. 8).

Other features of the play areas include rain barrels, mud kitchens, gardens, sandboxes, log benches, logs to balance on in various stages of decay, building frames, loose parts, and other rocks and stumps that dot the landscape. More than 15 miles of trails extend their way out of the play areas including a boardwalk and pond that line one of the sides of the preschool building.

After spending at least 30–45 min in unstructured play in one of the natural play areas, the class meets on the logs (or circle of tree cookies) for a group time before going out on the trails to one of the many habitats and destinations available at the nature center. The children go outside every day in all weather.

The focus of the hike observed was of the forest ecosystem. The class hiked through the woods. Along the way, the children encountered some turkeys. The children and teachers became extremely quiet and approached the turkeys, stalking them. The children became part of the forest floor by lying down and covering

Fig. 8 Chippewa Nature Preschool meeting area

Fig. 9 Children becoming part of the forest

themselves with leaves and then remaining there very still for a minute. Afterward, they continued on their hike playing some running games along the way (Fig. 9).

After the hike, the class returns to the preschool building and heads inside. Upon entering the preschool building, there is a warm and inviting atmosphere with knotty pine paneling, several large windows, and leather and wood rustic couches in the reception area. The center hallway rises up two stories containing windows that let in the natural light. Windows adorn the hallway on both levels allowing natural light to penetrate the classrooms from above and parents to view their children in the classrooms from below. The cubbies are located in the hallway under the windows. The classrooms are beautiful state-of-the-art spaces with wood furnishings primarily from Community Playthings and natural materials throughout. Each classroom has a full kitchen. Opposite the hallway is a row of windows that look outside to several bird feeders and out to the boardwalk and pond (Fig. 10).

Fig. 10 Chippewa Nature Preschool indoor classrooms

The 2 classrooms house 4 classes with 16–18 children each and 1 lead teacher and 2 assistant teachers per class. The teaching teams have diverse backgrounds (in both early childhood and environmental education). Inside the classroom the children have snack, choice time (for an hour) where they can choose the activities that are available in the classroom, small group time for a more focused activity, and large group time for a story or song and to say goodbye.

Parents are encouraged to volunteer in the classroom by signing up on a calendar. There are three to four preschool family nights throughout the year, as well as family programs at the nature center. The teachers also send home activities for the children to do with their families to get outside when at home.

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Wild Pedagogies: Six Touchstones for Childhoodnature Theory and Practice

22

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Abstract

This chapter explores a set of educational ideas situated under the umbrella term wild pedagogies. The goal is to introduce educators interested in pedagogies related to childhoodnature to some key touchstones. The chapter starts by introducing three interlocking and overlapping conversation that are important to understanding where wild pedagogies come from and how it can be understood. The last half of the chapter is dedicated to introducing the reader to the touchstones themselves. The hope here is that the touchstones can act as supportive, challenging, and reflection-inducing mechanisms for all educators no matter where they might be in the process of changing, even wilding, their practices.

Keywords

Childhood · Wilderness · Environment · Education · Wild pedagogies

Introduction

This chapter begins from the twin premises (i) that the modernist relationship to the natural world must change and (ii) that education is a necessary, even fundamental, partner in the project. The concept of *childhoodnature* is a response to the first premise. Understanding children as being nature and using this new conceptual term to indicate the interconnection thereof is a step away from the idea of an independent isolated human observing from afar a passive separate entity, called, among other things, nature. Such a concept opens up tangible, yet difficult, lines of response for our second premise, and in this chapter, we describe such a response gathered under the term "wild pedagogies."

Wild pedagogies, as described below, are a way of thinking about education such that the interconnection, interdependence, and relationality of childhoodnature is not a theory without practice but a lived curriculum pointed toward, and moving in the direction of, the change being sought. This chapter encapsulates a much larger, ongoing, and constantly evolving project: a project that is "wiggling" in a considered direction, yet without a known endpoint – as is the evolutionary nature of anything that we cannot control, that is, in this sense, wild. And it is a situated project, whereby the particular realities, contexts, and stakeholders are constantly changing. This project, then, is alive and will forever be incomplete. It must resonate with educators and children in real time, places, and spaces as they adapt this project to meet arising needs. In this way, wild pedagogies make sense as practices that align with the places, people, participants, politics, and possibilities within which each of us live.

Wild pedagogies have arisen from a convergence of ideas about wilderness and its inherent wildness, education, emerging environmental realities, and a growing desire for change – educationally, environmentally, relationally, and culturally. This work is in part about reclaiming language, recognizing and reimagining extant practices, and revitalizing and reconstituting ideas that run against the grain. We begin this chapter by exploring three pathways; first, wilderness and the wild;

second, education; and third, the emerging Anthropocene. These three introductory pathways contain important points of resonance and convergence that serve to provide the context for our response: wild pedagogies.

In considering the question of "why wild pedagogies?" we bring together ideas about wildness and easing ideas of control, to frame a refreshed pedagogical approach and to describe six *touchstones* for the practice of wild pedagogies. These touchstones are intended as a practical guide to help educators think through actions on the ground as they shift their practices and celebrate approaches that reflect wild pedagogies. In the conclusion, we speculate that this project is a call to gather like-minded people involved in education and concerned about nature and the environment. We suggest these touchstones can serve as a set of commitments, challenges, and reminders of the work still to be done. And they can also act as a kind of gathering place to which wild pedagogues of various ilk might return on a regular basis. The point is that this work is not about control nor is it meant as a rigid framework, but rather as an agent of change, community, and commitment.

However, before launching into the touchstones, we will dig a little more deeply into ideas about the wild.

On Wilderness and the Wild

When we speak about the wilderness and the wild, we literally mean real places and existential experiences within/through/of these places. In this world of postmodern skepticism and deep individualism, childhoodnature appears unwilling to give up on the reality of wild places, encounters, and the potential for co-emergences. Notions of human as nature are integral to understandings of what wilderness is, or might be. And we need, again, to refresh and reimage an understanding of wilderness and our relationships within and of nature.

William Cronon began his famous paper, "The Trouble with Wilderness," with an invocation, "the time has come to rethink wilderness" (Cronon, 1996, p. 69). And he did. At the time, rethinking wilderness was long overdue, and his paper highlighted many problems with what wilderness had become – both as real places and as a concept. Rethinking wilderness means examining the concept and its relationships with culture, places, and other-than-human-beings. Concepts aren't static though; they live, shift, and vary between interpreters and their places of arising. Rethinking should be an ongoing process. We should be sharing our evolving, even wild, insights. Concepts, too, aren't simple and they are never about just one thing. They are comprised of a number of components, carry histories and baggage, and are shaped by the context from which they arise (Deleuze & Guattari, 1994). So, part of the wild pedagogies project is to take up Cronon's invocation and to again rethink wilderness and do this in partnership with myriad voices.

Cronon's analysis pointed out that for far too long, one component – the absence of people – has disproportionately dominated the shaped understandings of wilderness. In rounding out his analysis, he pointed toward eighteenth-century usages that described wilderness as "'deserted,' 'savage,' 'desolate,' 'barren'—in short, a

'waste'" (Cronon, 1996, p. 70). These usages were contrasted with later sentiments, such as Thoreau's assertion that "in Wildness is the preservation of the World" (Cronon, 1996, p. 89). The juxtaposition of such varying conceptions led Cronon (1996, p. 69) to conclude that wilderness is "quite profoundly a human creation" and only included a particular cultural grouping at that. Troublingly, though, by boldly asserting that wilderness is a human idea and a vastly unreliable one at that, Cronon provided a generation of skeptics the ammunition they needed to distance themselves from wilder places and from the idea of wilderness altogether. Often this polarizing debate has led to dualistic choices. On one hand there have been cynical assertions that "there is no wilderness," while on the other hand, there have been idealized visions "of a wilderness out there somewhere." For many, these two choices prove to be incomplete when considering their own experiences of being and moving within wild landscapes.

Consider, for example, watching an invasive Eastern gray squirrel (*Sciurus carolinensis)* being chased by a bulldog/Rottweiler. At the same time, the dog's owner looks on from a vantage in a scrupulously manicured and fenced off-leash area, at a small downtown park in Vancouver. Somehow this is different from watching wolves track a caribou elder across soggy blackfly-infested barrens, more than 200 miles from the nearest road. Yes, both have histories of human engagement and manipulation, both have wildness being expressed in various forms, and both are being interpreted through cultural lens and potentially telling stories that the humans involved want to hear. Yet, it seems that the terms on which all these are negotiated are different. If that is the case, then maybe wilderness needs to be reimagined, not in terms of dualisms but as part of a complex continuum negotiated between, and among, a multitude of players in places.

There are other windows into wilderness. Some trace the word to the Old English "wildoerness" (Foreman, 2014) from which it is argued that "wil" is linked to wild, or willed, "doer" is linked to beast, and "ness" is linked to a place or quality. Putting these together suggests that wilderness is a place of wild beasts, or more evocatively, self-willed land. Descriptively, then, *self-willed* might be an apt quality of a rethought, or reimagined, idea of wildness. In turn, this wildness might be a central component of a reimagined conception of wilderness. Putting it another way, it could be said that the idea of a self-willed land recognizes that places, and their inhabitants, have teloi – or end purposes of their own – that buck human attempts to control them.

What does seem clear is that a reconceptualized wilderness could be helpful in describing an intersectionality, or shared arising, between real places, cultural constructs, and the freedom of the local populations to become what they will. A path toward wilderness – its reality and the ideas it conjures – is, however, still not quite this rationally sanitized. In reality it is much more visceral. There is often an aching recognition, deep in human sinew, that wilderness – in idea and place – needs to be refreshed and reclaimed. And, a good starting place might be with wildness, the self-willed, uncontrolled, heart at the core of wilderness.

This analysis also provides a starting place for another resonant intersectionality. For example, it seems to also ask, what could education gain by allowing children

more freedom in their development? What gains could be made if we rethought educational attempts to control the outcomes of childhood education and development? What could it mean to give children's innate wildness more space to flourish? How is this wildness different from "out of control?" And how can re-wilding education be paired with a responsibility for children's own self-regulation?

On Education

On this second path, we consider the stifling sense of control sometimes felt by educators within traditional mainstream educational settings. While traveling on this track, we wonder about possibilities for a wilder pedagogy, loosed from the usual domesticating forces of formal (Western) education. The resonant notes arising from this path and the previous one might then play out in the interplay between wildness, education, and control. Here we speculate that many people initially drawn to wild pedagogies might share similar experiences. In their educational lives, they know that significant learning – learning that has actually been in some way transformative – can be encountered outside of formal education or at the very margins of their schooling by brave, insightful, and rebel teachers.

We suspect, too, that those drawn to wild pedagogies know that bringing outside education into the mainstream is easier said than done. Many education students understand this, particularly those who come with experiences and pedagogical opportunities outside of teaching in formal settings. Some may have been outdoor and environmental educators, interpreters, involved in social justice issues or local community educational projects, teaching in diverse cultural settings, and/or have worked abroad with organizations committed to bringing about fairness, justice, and equity. What can unite such pedagogues is a passion for making a difference and a sense that the current mainstream system is at best incomplete. Yet, these students often struggle with a teacher education system that has pushed to the side most of what they value. As it turns out, most of their most transformative experiences don't (do not) fit neatly into the prescribed teachable subjects.

Perhaps the keyword is "prescribed." Here, student learning and student-teacher learning must serve the ends of the education process based on predetermined outcomes – and preferably those that are measurable. There is a great deal of research that suggests curricullum content and pedagogical strategies are bent to align with testable outcomes, as learning that is less amenable to testing is edged out (See, for example, Astbury, Huddart, & Théoret, 2009; Au, 2011, pp. 25–45; Jickling, 2009, pp. 163–173; Jickling, 2015, pp 149–161; Smith, 2016.). Even in education faculties, enormous efforts are made to prescribe and control education. For many environmental educational theorists, these are the outward manifestations of an ontological position of separateness combined with the colonizing politics of anthropocentrism and human exceptionalism.

Yet despite curriculum control, testing pressures, and these deeper cultural constructs, many committed teachers find ways to resist, to create space for what they consider meaningful transformative, even wild, teaching. Without sliding into a

completely unstructured free-for-all, many environmental educators are finding ways to act in solidarity with the marginalized, to bring the voices of the voiceless to their students, and to enact pedagogies that are less objectively oriented and more co-constructed, less expertly known and more spontaneous, less universal and testable, and more place responsive. In short, they are wilding their practices.

On the Anthropocene

The third pathway for our inquiry is the one we currently appear to be traveling as a species engulfing most things we encounter and leaving a mess in our wake. Here we are talking about the Anthropocene, where the defining epochal characteristics are primarily human induced. Again, we are interested in control. In this instance, in spite of the scale of human impact, it would be a mistake to think that we, collectively, are controlling this or that we could ever control change at such a scale. Indeed, the defining characteristic of the future may well be the recognition both of our embeddedness in planetary systems and our *lack* of control. The point here is that Earth's current geostory is essentially being written by these planetary systems; humans are essentially bystanders; Earth has become an agent, a subject; and humans will need to need to find new ways to work with her (For a discussion about Earth's agency in the writing of a new geostory, see Latour, 2014.).

The Earth is changing rapidly. Atmospheric carbon dioxide has now exceeded 450 parts per million and is rising. At present, there is no evident path to the reductions necessary to avoid what we humans consider "catastrophic" climate change. Species loss is equally dramatic. Some reports, such as a recent publication in the journal *Science* (Pimm et al., 2014), suggest that current extinction rates are as much as 1000 times greater than background rates. That is, these extinction rates are human-caused, as are the current dramatic increases in the Earth's average temperatures. Science is typically a conservative enterprise. Some hard-nosed paleontologists tell us that these rates do not yet qualify as mass extinctions (Barnosky et al., 2011). But ominously, they *are* prepared to predict that the loss of all species that are now considered "critically endangered" *would* propel the world into a state of mass extinction. Other scientists argue that we – and that means all beings on Earth – are in fact living in a new geological epoch, a new geostory, the Anthropocene (See, for example, Editorial, 2011, p. 254; Crutzen, 2002, p. 23.).

Whether we are actually in a new geological era that can be called the Anthropocene, or on the brink of it, seems moot. We raise these possibilities, however, for two reasons. First, the world has changed, will continue to change, and will not return to situation normal. That is, we will not return to global temperatures or species abundance and fluctuations that fall within the kinds of background levels experienced even a short time ago. Second, given this change, any educational conception and delivery that result in inculcation into present cultural norms, or slipping and sliding around these norms, will do nothing to change the current trajectory. And as Margaret Somerville poignantly asks, "what does the Anthropocene do?" (Somerville, 2017, p. 18). Education must respond

radically to the problems of our time. This leads to the old trope; we cannot solve problems by using the same kind of thinking that created the problems in the first place. And, to push this farther, we cannot solve these problems by *being the same people* that created the problems. We don't mean for this to sound despairing; rather it signifies, to us, that we're in a time calling for bold experimentation (Jickling, 2013).

It is all well and good to declare that we must stop global warming, protect biodiversity, or even change our modernist ontology, but what would that actually entail? How would environmental educators in the era of Anthropocene, to follow the theorizing of Bruno Latour (2014), for instance, begin to *renegotiate* the educational relationship with other-than-human-beings? What might education become if it was understood to be a co-emergent endeavor where the human was decentered and agential others were co-teachers. Jo-Anne Ferreira (2007, 2009) warns environmental educators against setting such lofty aspirations as educational goals, arguing that this sets educators and students up for failure. Yet, even though, as she points out these may not be achievable goals, we wonder if positing them at a distance might still be useful. In introducing Ferreira's question, we are not trying to be contrarians or deniers. Rather, we are actually interested in creating openings for getting the required educational work done and for moments of change and resistance to flourish and gain a foothold. And even with this larger project as a backdrop, education may be better suited to nurturing critical, imaginative, and innovative thinkers who can dive into these issues and make social and environmental progress. This acknowledges that the future will not and should not be controllable and wild educational responses recognize this reality and work accordingly.

With the rest of this chapter, we outline the idea of wild pedagogies by describing six touchstones that we consider necessary to any attempt to radically alter our current educational ecology in a more environmentally and socially equitable way. Each of the touchstones will be placed into context with regard to enacting an educational process that might lead to such change.

Why Wild Pedagogies?

An aim in using the term "wild" is to challenge dominant cultural ideas about control – of each other, of nature, of education, of truth, and of learning. It rests on the premise that an important part of education can include intentional activities that provide a fertile field for personal and purposeful experience without controlling the outcomes: hence wild pedagogies. As described previously, this wild entrée in wilderness riffs off of the Old English meaning of self-willed land, and so in this sense, wildness invites considerations about control.

What is there about wild experiences that people value; and what are the core elements? Within such values, are there critical parts for educators to attend to? And if such values can be framed as wild pedagogies, how might they be welcoming, relevant, and flexible for people across disciplines? What might self-willed pedagogy or self-willed education look like?

In the following section, we offer our conceptual and ontological understandings that relate to education and challenge ideas of control. While wilderness areas – and also what some would call hybrid spaces – are often the crucible for reflection on these issues, it is important to note that wild pedagogies also take place in urban settings. The six touchstones shared below are our start toward finding adequate answers to the above questions.

Six Touchstones for Childhoodnature Educators

Agency and the Role of Nature as Co-Teacher

> Raven: 'Well, see, you speak your way, they [different members of the natural world] speak different ways, like thousands of different ways. Billions. It's like the birds with those signals, like when you see a bird flapping up in the sky and a flock of birds how they all move at the same time, it's because they tell each other like through mental speaking.' (Blenkinsop & Piersol, 2013, p. 54)

For Raven, a grade four student at the Maple Ridge Environmental School, the idea that the natural world "speaks" – in a multitude of ways – and that it has agency and the capacity to teach her things is a truism. It is also a possible starting point for the renegotiation of the relationship between humans and more-than-humans called for by political scientist Bruno Latour (2014). With the potential emergence of an Anthropocene, a new era of negotiation is upon us, a time when humans must engage in a different kind of relationship with the rest of the planet (Michel Serres, 2014). And, it is likely children – young ones like Raven who have been immersed within the natural world for much of their lives – will play key roles as interpreters for this process. If this is correct, then early childhood educators will also play a crucial role in allowing children to encounter the natural world and its denizens on an ongoing basis: to experience themselves as nature. These educators will, at the same time, be challenged to recognize their own limitations in hearing and interpreting the encounters their students are having. Given this assertion, what might the educational implications be?

We suggest that any educational plan that aims to move toward a radically revised relationship within the world will, at its core, seek to recognize nature's agency. In reality, Earth has always been an agent of history, but in a role that has often been overlooked and denied in modernist thinking and culture. At a time when wildfires are scorching Earth and hurricanes are flooding her, Earth's agency is now more visible and often dramatic. But, for the more careful listener, the natural world also speaks more softly, too, as illustrated in Raven's story, above.

Education can work to encounter this agency in nonhierarchical, equitable, and, indeed, different ways. One way in which we might do this is to begin to consider more-than-humans encountered on a daily basis to be part of the pedagogical team. If we take seriously the notion that the natural world is filled with active and vibrant

participants, of which we are one species, then our relationships and attention toward possibilities for educational partnerships change. In adopting an idea of nature as co-teacher (see, e.g., Blenkinsop & Beeman, 2010), educators might become open and available not only to the joy of the wild but also to a wider range of facts, knowings, and understandings that places have to offer. Such attention involves carefully listening to available voices. And it will, at times, involve actively decentering the taken-for-granted human voice and re-centering more-than-human voices (see, e.g., Haskell, 2017). No longer is the environment an important backdrop upon which learning happens, nor is it simply something to be interpreted solely by adult humans. This is a time where the environment can become an active member in teaching and learning.

The ways that early childhood educators respond to this discussion of agency and pedagogical partnership will have implications. Their responses will shape the ecologies of their classrooms, especially through expanded ideas about "classrooms" and the pedagogical approaches nurtured in these expanded contexts. Any co-teaching dynamic necessarily involves providing space for each to work, building strong partnerships, and finding ways to reach all learners. So while students might recognize that they share space with more-than-human beings, teachers will need to work toward enabling engagement, learning, and negotiation with these beings in an equitable and complex manner. Early childhood educators will also be challenged to hear the students in ways that might be unusual, in much the same way that Raven needed to be heard by the adults in her life.

What then must the curriculum include and how can early childhood educators prepare? This process of re-wilding pedagogy involves rethinking the very concept of teacher and examining every aspect of practice with a critical – *nature has agency, and this idea is really unusual for most educators* – lens. Early childhood educators will likely find that they must change metaphors, traditions, and systems that they often use. There is an ever-present danger that those historical ways of educating normalize the hierarchical separation of humans from all else and they silence the voices of children and others. They assume passivity – or lack of agency – on the part of the natural world.

With this discussion as background, educators might want to consider questions such as:

- How did my practice today involve the natural world as a co-teacher?
- How did we as a class contribute to the potential flourishing of each other and the particular beings close to us?
- Were we able to learn with, through, and from members of the natural world?
- How will I make sure that I listen to the experiences of my students and allow them to interpret things for me that I might hear myself?
- Were other voices heard and heard in their own ways?

At first glance, these questions might be hard to answer in very urban environments. Yet, nature can be encountered in less-manicured corners of school grounds, vacant lots, and urban parks (Næss & Jickling, 2000). However, while cityscapes can

be richer than first thought, there is ample opportunity to also view them with a critical eye (Derby, Piersol, & Blenkinsop, 2015).

Wildness and Challenging Ideas of Control

In this paper we offer these key touchstones hoping that they might facilitate an educational pathway toward an, as yet, unknown radical ecology. In using the term "ecology," we are suggesting that what is required is nothing short of a radical reworking of the relationships that we have with/in/of the world – a revised way of being within the world as suggested by the concept of childhoodnature. And, what is desperately needed is an educational system that can promote and support such change.

We believe any resultant ecology will, in part, emerge from the process itself. That is, by the acts of doing, making, and changing, we will come to better understand the ends we are seeking. And, by supporting young children's engagement in such processes earlier in their educational life, we will be assisting in the building of the relationships and resiliences necessary to see a project of this kind through to fruition. The processes, then, must try and emulate the imagined possibilities and adhere to principles implied in such an ecology. We are not entirely in control of the outcome because it is not possible to see the outcome – and further, we recognize that any radical ecology *arrived at* will, and must, continually be in a state of flux. This implies a constant generation and regeneration, as in any vibrant ecosystem. We suggest that integral to the processes themselves is an element of wildness – a sense of the unknown and the spontaneous, beyond our meager control. This, too, has significant implications for educators.

In supporting the move toward any radical ecology, childhood educators must recognize the incomplete and unpredictable nature of the overall process. No one can completely know what the final outcome will be, nor are there definitive or correct answers. In recognizing the range and self-willed nature of those involved (both the children and the more-than-humans), educators can come to understand that they are partners in this radical endeavor. In other words, in recognizing nature's agency and inviting negotiation on a level playing field, educators will be respecting the legitimacy, wildness, and self-willed nature of all those involved. They will also be mindful of their own limitations. This requires a radical rethinking of the ways in which we go about education because much of the Western educational project implicitly involves distance and a heavy hand of control.

Such control appears in many ways in education. Children are told what to do, where to go, and even what to think. Universal and measurable standards are created based on a set of concrete truths (Au, 2011; Smith, 2016). Schools function to define and legitimize the places in which learning can occur and students are controlled via set timings, locations, and modes of operating. Knowledge is understood to be definable and amenable to fragmentation into deliverable parts independent of the context in which it is immersed. For childhood educators, then, and those others

interested in shifting ecologies, there must be consideration given to what modes of operation are being used for student well-being and, also, which are reifying particular problematic forms of control. More deeply, epistemological and ontological conceptions – the ways of knowledge and being in the world are enacted for children – will have to change. No longer is the human teacher the sole arbiter of the truth. Meaning will become more fluid as it is seen as a shared endeavor, and time spent immersed in the natural world may become identified as an important category of learning, time well spent, and even life well lived.

In moving toward a new ecology, we are suggesting it is important to understand the world as relational, complex, spontaneous, and deeply connected. For educators involved in a continual process of questioning metaphors, practices, and understandings of what it means to learn, the relevance of learning *with* rather than *about* the natural world will gain a particular salience. It might involve overcoming our current educational system's reliance on defined outcomes, known standards, and measured results (Wals, 1990). "The answers" will become more fluid, flexible, and diverse. This challenge of releasing control will require educators – and more generally, humans – to decenter themselves as experts, professionals, and lone contributors. These will be first steps in taking the real risks of employing alternative conceptions of education.

Educators might consider questions such as:

- How did I take risks in my practice today to move away from the full control of assumed ends?
- Was there room for the unknown, spontaneous, and unexpected to appear and be taken seriously in our work today?
- Was I able to decenter myself in the teaching today?
- Was the natural world able to self-represent, make itself known to us, in its own ways?
- How did we learn with/in/of the natural world today?

Complexity, the Unknown, and Spontaneity

This touchstone builds on the previous two in which the childhood educators are challenged to reconceptualize their relationship with/in the world, change their working metaphors, and jettison cultural norms that are anthropocentric and anti-relational. In doing so, we open up possibilities for complexity and spontaneity that can continue to drive the process. For what might arise, unpredictably and unplanned, from the interaction and inquiry generated through the collaboration of learners with each other and with nature. This suggested touchstone involves actively embracing the unknown, learning to deal with an incomplete complexity, and allowing space for the spontaneous. All three of these components involve a kind of stepping back from the center, an undoing of the human as center of the world – as arbiter of everything – in order to allow other ideas, possibilities, spaces, beings, and imaginations to emerge.

A short interlude on Icebergs:

It is our last day of a long raft trip on the Tatshenshini River and two of the authors have spent the day in heavy fog rowing on a body of water so large that at times the banks were invisible and it was easy to lose track of the current while imagining oneself lost on the rolling swells of an open ocean. With landmarks obscured it is hard to anchor movement, flow, and direction of travel such that one's perceptions are unraveling by the time we arrive in camp. The camp itself, situated on a small island in Alsek Lake, surrounded by massive and ancient glaciers does nothing to relieve that perceptual uneasiness as we are confronted by the beauty, complexities and cacophonies of a massive jumble of icebergs.

As adults, discombobulations, new discoveries, and experiences that challenge what we think we know, such as in the anecdote above, are surprisingly rare. Yet for the young, who have fewer convictions and commitments, it is important to recognize how much more common they are. It is in the spontaneous nature of this encounter with floating blocks of ice that an educational metaphor might be drawn. At the perceptual level, there is the beauty and immensity of the encounter. However, with varying learning histories about iceberg, it is also apparent that people's ideas, understandings, and knowings of ice are largely about being crushed, cleaved, and flipped over in concert with the bergs themselves.

We hope wild pedagogies can provide opportunities for the implicit to be made explicit, the taken for granted to be questioned, learners to acknowledge complexity, and to see the "ice below the surface." Just as the concept of iceberg was overturned by the encounter described above, wild pedagogies might also allow for spontaneous encounters that are both novel for young learners. We believe that such encounters can challenge implicit ways of knowing and being, disrupt cultural truths, and challenge the known – even the known of the 2-year-old. Childhood educators can then increase the recognition that there is more complexity than is visible and that knowledge is always incomplete.

Educators might consider questions such as:

- What did I do to embrace spontaneity and complexity in my teaching today?
- Did the learners encounter the interconnected, complex, and incomplete nature of knowledge today?
- Did I provide sufficient time for students to be alone and encounter the places they were in?
- Was I able to support learners' journey into the complexity of knowledge and not reach for the easy, seemingly final, answer?
- How will I offer experiences tomorrow for my young students that help them build their understandings of the world?

Locating the Wild

The Norwegian eco-philosopher, Arne Næss, was asked about what teachers can do in urban areas, and how teachers can meet some of the challenges in taking children outside. He replied:

> Some people have hundreds of good joyful experiences that cost nothing. In the schoolyard itself, you find a corner where there is just one little flower. You bend down—you use your body language—and you say: 'Look here.' And some answer: 'There is nothing there.' And then you talk a little about what you see: 'This flower here, it's not the season for it. How can it be there this late in the year? And look at it. It certainly has need of a little more water; it's bending, look at the way it bends. What do you see when it's bending like this?' I call teachers who behave like this 'nature gurus.' It is a little more like an Eastern kind of education. More in terms of personal relations. Try to make them see things they haven't seen before. Use your body language. And even inside the schoolyards you find nature's greatness. (in Næss & Jickling, 2000, p. 54)

As Næss points out, there is potential to encounter the wild in a range of settings. Wild pedagogies are not just about some long trip in a distant backcountry. And, given that a vast and growing majority of us live in super-urban, urban, and suburban places where the wild may not be easily and immediately apparent, this touchstone presents both fertile ground and difficult work. One difficulty in bringing the young students to a place where they can encounter the wild is the realization that there are no educational guarantees. There is no simple solution for how to facilitate children's encounters with the wild, the self-willed, and self-arising others that surround us (Griffiths, 2006). There is, equally, no simple way to nourish that curling, reverberating, upending version of wildness that exists within.

The wild is everywhere and is often better recognized by the sharp eyes of those closer to the ground. And yet we also note that the encroachment of the wild into the psyches of students often appears to be more common in the wilder, more self-willed places. In spite of the incredible efforts of many urban environmental early childhood educators, the murmur of wild can be easily distanced by the noise, smell, plastic toys, demands for cleanliness, and dominion of other overbearing human constructions (Derby et al., 2015).

Encountering the wild provides educators with opportunities and difficult challenges. The anti-colonial literature of Tunisian scholar Albert Memmi, for example, offers a troubling analysis of a colonized world (Blenkinsop, Affifi, Piersol, & Derby, 2017). Such an analysis implicates all environmental educators and early childhood educators as well, in a complex project that is not simply about providing opportunities for students to encounter the wild. It also requires helping children to not slide into the privileged and alienated discourses in which they are often immersed. Watching small children happily creating shelters and engaging in imaginative play afforded by the natural world is important. But, it is also important to recognize and respond when the language of domination and nature as solely of utility to humans leaks into the play. Offering young children fodder for their imaginations – which allows them to create worlds that are not reliant on colonial tropes – is challenging work.

Childhood educators interested in wild pedagogies will likely need to challenge themselves by ongoing process of decolonization while, at the same time, allowing children the possibility of encountering an active, agential, dynamic, and wild other. This educational project becomes genuinely challenging as educators begin to recognize how language, ways of being, educational structures of schools, and urban settings are often oriented to expressly draw students away from the wild –

relentlessly re-confirming dominant human-centered and human-exceptionalist narratives.

Educators might then consider questions such as:

- How well did I notice and respond to anthropocentric and colonizing moves that I, or others, made today?
- What might my next steps for my own process of decolonization be? And how am I being an ally for the children I work with and the natural world that works with me?
- How did I make it possible today for students to potentially have encounters with the wild and/or self-willed communities?
- What did I do to provide moments for the wild within and without to be encountered and acknowledged, today?

Deep Time and Practice

This touchstone is about process. The kind of work described in all previous touchstones requires time. It takes time for educators to incorporate new habits and overlay the sediments of old habits. For pragmatic philosophers, habit change is a process of deep self and cultural examination. This means that childhood environmental educators, who are revisiting their own habits, are going to need time, too. Existing habits have been developed through a lifetime of navigating existing cultural waters; they are deeply engrained and resilient. Yet, they are also problematic in light of this project of changing relationships with the natural world. Educators are going to have to find ways to set aside time to first recognize such habits exist – to make them visible for critique and revision – and then to engage in a process of self-(re)creation so that they can enact new pedagogies and ways of being an educator.

Time is also required for childhood educators and their charges to build relationships with beings, things, and places. Many adults are deeply alienated from the wilder world, and many children have very little free time with which to play. Collectively, we have a limited range of experience with other-than-humans. Thus, to develop new relationships that reach to a deep cultural level, adults and children will require such experiences. Time spent – and lots of it – immersed in, dialoguing with, and learning with the natural world. All of us involved in education will need the time and opportunities necessary to build and maintain real and significant relationships with the more-than-human.

Closely associated with time is practice, and we use this term in at least two ways. The first involves educators developing their own practice in a way that can deepen their own relationships with local places and beings. At the heart of this point is making time to encounter the wild more, themselves. This means more than just encountering the wild within but also the actual wild "outside" – wild landscapes, animals, and wild situations. Part of this practice is learning – or relearning – how to travel competently across landscapes and being prepared to deal with inclement

weather and other situations. Beyond this basic practice of preparedness, this work can also be likened to meditative practice, even discipline, which requires listening more deeply to potential co-teachers as a first step toward a radical reworking of relationships.

Our second meaning involves educators developing the will and ability to rework their own practices – their own pedagogies. This will require reflexivity. It is about taking risk, implementing possibilities, examining the successes and failures thereof, and then continuing the process. Students and teachers must be given the opportunity to engage with new practices. They need time to try on their discoveries, to enact the new ways of being they are exploring. Wild pedagogues and their students will also need time to exist in that interstitial space – between old habits of relationship and potentially radically new ones.

Educators might want to consider questions such as:

- Did I leave enough space and time in my teaching today, to allow my students and myself to engage with natural places and beings nearby?
- Were we, together, able to find ways to step out of the linear time of the modern school system and encounter time working in different ways?
- How am I maintaining and nurturing my own practice of immersing in, and building relationship, with the places and beings I encounter? Have I become a little too complacent, assuming rather than engaging?
- Was I able to notice, respond to, and support students who were trying out new habits?
- Am I noticing my practice, trying new things, reflecting on what has been attempted, and creating the kinds of support that allow me to continue to expand as a teacher?

Cultural Change

This touchstone may be considered the most controversial as it requires teachers to become consciously political – even to become an activist and ally. Such a stance has often been seen as being anathema to the professional early childhood educator. It has been readily acknowledged that education is value laden, though how to respond to this realization remains contested. Most obviously, fear arises when educators begin to impose their own political or religious views onto students in ways that affect their ability to choose for themselves in a secular and inclusive state.

However, seeking to avoid the political in education has always been problematic. It is quite clear that any choice being made in the classroom by teachers is political and has implications. To paraphrase philosopher Martin Buber (2002), we choose the world that is being brought to the students. Let us be clear, to teach to a supposedly impartial norm is, by default, to acculturate the children to a specific paradigm and set of beliefs and practices – usually those of the dominant culture. This implicit curriculum, then, offers children, often unconsciously, the politics of the status quo – the position of the center. And, as with any centrist reality, it is not

until the margins respond that the unseen appears. This approach which rests on unquestioned assumptions can typically represent the real authorities in our cultures. These are the norms that are not understood, or even seen, by the fish swimming in those waters. And for early childhood educators, the implication is that they are involved in filling the pool into which their learner fish will slip. The question for the wild pedagogue here is what water would I like them to be swimming in and who is helping fill the pool?

There will always exist a tension around limiting the politics of education – to avoid the descent into unrestrained politicization of education, particularly in an era of ideologues and demagoguery. Having said this, there remains one set of value choices that cannot be avoided, and these are the content and pedagogical choices that are made – certainly in prescribed curricula – but also in the choices the educators make every day. These boil down to choices about what content and pedagogies are most worthwhile. And despite what seem at times to be Herculean efforts to control these choices, teachers' choices can still make a difference.

If indeed the Earth is rapidly shifting from the Holocene to something being called the Anthropocene (Crutzen, 2002) – and there is plenty of evidence to support this observation – then this shift does not augur well for the future of Earth. As David Orr (2017) suggests, the trajectory we are on in all things, including education, is in the direction of producing evermore clever vandals of the planet. We contend, then, that as educators we need to trouble the dominant versions of education that are enacted in powerful ways that bend outcomes toward the status quo – toward being the same kinds of people that have enabled the Anthropocene and disabled the Earth. Disrupting current trends means, fundamentally, being differently.

This touchstone is genuinely wild, for we cannot know in advance what the outcomes will be or how future learners will enact their learning. Though, what is intended is that wild pedagogies will change education – how it is conceived and enacted – and this will disrupt the invisible center. And, it may even result in learners who are more loving, caring, and compassionate and who can be competent healers, restorers, builders, and midwives to a decent, durable, and beautiful future.

Educators might want to consider questions such as:

- What opportunities appeared for the wild to encroach?
- Were there situations that arose that allowed students to consider their current relationships with the natural and potentially move to change them?
- How was I consciously political today?
- How was I able to focus on necessary change for the whole society?
- Where are my habitual ways of doing things still limiting possibility?

Conclusion

This chapter focused on locating education, as an active, rebellious, in need of change, enterprise that will play an important role in what the world might look like as we stare into an uncertain future. By offering six touchstones, we hope to

draw together a growing group of like-minded educators who are committed to change, to the possibility of wilderness, and to a renegotiated relationship with all the beings, animate and less so, which make up our neighbors on this planet.

Thus, wild pedagogies are explicitly and deliberately about enabling change. In choosing content and pedagogies, there is an aim – humbly submitted – in the work to enable *being* differently. Being differently is to change the relationship humans currently have with the natural world, from a dominantly human-centered orientation into one that is much more equitable and interactive. Herein lies some hope for stopping the massive destruction being wrought upon the Earth (This paper is an early offering and yet just a small part of a much larger project: Jickling, Sean Blenkinsop, Timmerman, & Sitka Sage, 2018).

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Child-Nature Interaction in a Forest Preschool

23

Peter H. Kahn Jr., Thea Weiss, and Kit Harrington

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Abstract

In 2012 there were only around 25 nature preschools and kindergartens in the United States; now there are well over 250. It is a national movement that is gaining momentum. It is an exciting time because in principle these schools have within them the kernels to transform the world through increasing children's direct interaction with nature and a more wild nature than that exists in most urban children's lives. In this paper we begin to characterize forms of child-nature interaction that occur in one specific nature preschool, Fiddleheads Forest

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Preschool in Seattle, Washington, USA. Based on our observational data, derived through a randomized time-sampling methodology, we modeled child-nature interaction using what we call *interaction patterns*: characterizations of essential ways of interacting with nature described abstractly enough such that the pattern can be instantiated in different ways, across diverse forms of nature. Specifically, we use a nature language to describe (with photographs) eight interaction patterns: *leaning on and hanging from supple tree limbs*, *climbing high in small tree*, *looking at wild animals*, *imitating animals*, *imagining nature to be something other than it is*, *making boundaries on earth*, *pushing the edges of boundaries*, and *waiting attentively in nature*. Through an interaction pattern approach, we seek to provide insight into what is actually happening on the ground at a forest preschool and how that provides a key solution to the problem of environmental generational amnesia.

Keywords
Nature preschools · Interaction patterns · Environmental generational amnesia · Rewilding

Introduction

The good news is that, over the last decade, research studies have been providing more and more evidence that interaction with nature benefits people physically and psychologically.

The benefits are wide-ranging. Studies have shown, for example, that interaction with nature can reduce stress (Berto, 2014), reduce depression (Taylor, Wheeler, White, Economou, & Osborne, 2015), reduce aggression (Younan et al., 2016), reduce diabetes (Bodicoat et al., 2014), reduce obesity (Lachowycz & Jones, 2011), reduce ADHD symptoms (Kuo & Faber Taylor, 2004), improve immune function (Rook, 2013), improve eyesight (He et al., 2015), improve mental health (Bratman, Hamilton, & Daily, 2012), and increase people's social connectedness (Holtan, Dieterlen, & Sullivan, 2014). There are extensive reviews of this literature, including those by Frumkin (2012), Frumkin et al. (2017), and Hartig, Mitchel, de Vries, and Frumkin (2014). In one study, for example, Bratman, Hamilton, Hahn, Daily, and Gross (2015) assigned adults to one of two areas for a 90-min nature walk. One area was a natural setting on a beautiful university campus. Another was along a busy urban street. They investigated whether nature experience would influence rumination (repetitive thought focused on negative aspects of the self), a known risk factor for mental illness. They found that the nature walk (in contrast to the urban walk) decreased (a) self-reported rumination and (b) neural activity in the subgenual prefrontal cortex which has been linked to rumination in both depressed and healthy individuals.

It is increasingly clear, then, that a vibrant natural world is not only good for the ecological sustainability of this planet but good for us individually, as communities, and as a species. Of course, through the lens of evolution, how could it be otherwise? For tens and even hundreds of thousands of years, we came of age with a vibrant,

diverse, wild natural world, and the architecture of the human mind and body is optimally calibrated to many aspects of that world still (Kahn, 1999, 2011; Kellert & Wilson, 1993; Shepard, 1998; Wilson, 1984). Still, the emerging scientific evidence is good news because in today's world science is often the currency for ideas to be accepted.

Unfortunately, the good news stops short. For, in our view, the plain fact is that science will likely have little effect by itself in changing our destructive relationship with nature. There are different reasons for this. An obvious one is that extracting resources from nature can lead to many critical short-term economic benefits that override longer-term costs. For example, a coal miner can help destroy a mountain top and pollute the waters as he destroys his own lungs over time; but if that is his only way of putting food on the table each day, then he may be unlikely to change his occupation. Another reason can be framed from the perspective of the tragedy of the commons (Hardin, 1968): that in public areas of shared resources, individual people collectively over-extract resources (and destroy natural areas and entities) to maximize their own self-interest in the short term, contrary to the common good. This tragedy is still relevant today (Dennie, 2011), as has been highlighted in the area of climate change (Gramopadhye, 2013).

Short-sighted self-interest may help explain the continued destruction of nature. However, the deeper and perhaps more insidious reason – of *environmental generational amnesia* – rarely gets noticed.

In this paper, we first explain how environmental generational amnesia originates in childhood, through the child's construction of knowledge. Next, we offer a general solution to the problem based on the importance of children interacting with nature and with a nature at least slightly more wild than lies within their current purview. To do so, we elaborate on our working model of human-nature interaction, which is based on the idea of *interaction patterns*: characterizations of essential ways of interacting with nature specified abstractly enough such that the pattern can be instantiated in many different ways, across diverse forms of nature and diverse natural entities. Then we use our interaction pattern approach to begin to characterize child-nature interaction in a forest preschool. We hope that this last section does two things. One is to provide insight into what is actually happening on the ground at a forest preschool. Another is to provide the reader with emerging evidence that our interaction pattern approach has veracity and is generative and in principle could provide a key solution to the problem of environmental generational amnesia.

Before beginning, it is also worth noting for the purposes of this volume that we use the term child-nature interaction instead of *Childhoodnature interaction* because of our ontological commitments. As we understand the term Childhoodnature, it is used to signify that children *are* nature, not separate from it. The larger question is part of a long-standing one in the field: Are humans a part of or apart from nature? In our view, humans are both. Clearly we are nature: biological and with an evolutionary history, interwoven with all. But somehow in our evolutionary history, perhaps from the Neolithic period forward, our minds became "modern" – increasingly reflective, generative, creative, and technological – and are embedded within complex cultural systems. As such, we as humans have also become unleashed from

natural rhythms and balance, and one of the central challenges of today is to bring modern mind within a more natural framing. In our view, *child-nature interaction* allows us the ontological room for this work.

Environmental Generational Amnesia

One of the central theories of child development is based on a constructivist psychology, wherein a central principal is that children construct knowledge of the world through interaction with it (Langer, 1969; Piaget, 1952/1963, 1952/1965, 1983). You can see this principle play out even in infants. For example, you might see an older infant who can reach for small objects and pick them up with one hand or the other hand and thus has consolidated this form of a grasping scheme. But then one day you might see her try to pick up an object that is too large for either hand. You might see her try with one hand and then with the other and then back again, clearly frustrated. In constructivist language, she is disequilibrated. Her existing way of understanding and acting on the world is no longer as effective as she would like. She might then continue to interact with the ball, seeking a solution, and at some point discover – construct – a new way of acting on the ball that coordinates what had been two independent grasping schemes (with her right hand and left hand) into a single psychological organization. The resulting behavior is that she uses both hands together to pick up the ball. It is an enormous developmental achievement that occurs through the child's interaction with the physical world. In turn, within this theoretical tradition, children construct not only physical knowledge but social and moral knowledge through their social and moral interactions with people (Kohlberg, 1969; Turiel, 1983) and environmental knowledge through their interactions with the natural world (Kahn, 1997, 1999; Kahn & Lourenço, 2002; Severson & Kahn 2010).

But now here is the question: What happens when children grow up and construct knowledge in natural environments that are ecologically impoverished?

One answer emerged in an early study by Kahn and Friedman (1995) who interviewed 72 inner-city black children (low SES) in Houston, Texas, on their environmental views and values. In this study, one of the surprising findings was that the majority of children understood about the problem of air pollution insofar as they could describe it in general terms and sometimes referred to places that were polluted; but these same children often believed (a statistically significant difference) that Houston itself was not polluted. Yet at the time of the interviews, Houston was the most polluted city in the United States. Thus the question emerged: How could children who knew about air pollution in general not know that their own city was highly polluted? The likely answer is that these children grew up in the highly polluted city and had had little if any direct experience of less polluted environments, and thus they constructed a deep phenomenologically grounded understanding of what is *normal* air. Thus Houston polluted air was neither experienced nor understood as polluted but just normal.

This is not just about inner-city children in Houston. It happens to all of us. It is not just about air pollution. It happens with most all of nature. All of us construct a

conception of what is environmentally normal based on the natural world we encounter in childhood. The crux is that with each ensuing generation, the amount of environmental degradation can and usually does increase, but each generation tends to take that degraded condition as the nondegraded condition, as the normal experience. It is a condition called *environmental generational amnesia* (Frumkin et al., 2017; Hartig & Kahn, 2016; Kahn, 1999, 2002, 2011; Kahn & Weiss, 2017). (This section draws from a few portions of Chap. 11 of Kahn's (2011) *Technological Nature: Adaptation and the Future of Human Life*.)

Evidence for environmental generational amnesia comes from diverse sources. In one experimental study, for example, Evans, Jacobs, and Frager (1982) established two groups of participants. One group, long-term residents, had lived in the Los Angeles area 5 years or more. A second group, new arrivals, had just moved to the Los Angeles area within the previous 3 weeks. Results showed that long-term residents of the Los Angeles area, in comparison to the new arrivals, judged that smog was less of a problem in the area and less often spontaneously mentioned smog as a problem. In addition, while both groups of participants were equally sensitive in detecting the presence of substantial amounts of smog in photographs, for low levels of smog, long-term residents in comparison to the new arrivals were less likely to report that smog was present. Taken together, these results offer evidence for environmental generational amnesia insofar as they support the proposition that people who live with a certain level of air pollution for an extended period of time become desensitized to that pollution and less readily recognize that such pollution exists.

It might be assumed that at some point the environmental conditions become so diminished that a population of people can readily "wake up" from their amnesia and recognize the harmful conditions of their environment. Yet the historical record suggests otherwise. As a case in point, consider the human and environmental history of Easter Island (Diamond, 2005; Flenley & Bahn, 2003; Tilburg, 1994). Humans arrived on Easter Island by 900 AD and found an environment rich in resources for people to thrive. Yet within about 800 years, the land was completely deforested, with all of its tree species extinct, wildlife had decreased, land birds had disappeared completely, wild fruits no longer grew, erosion had led to decreased crop yields, and there was no firewood with which to keep warm on the Island's winter nights. People starved. There was a population crash. Cannibalism emerged "Oral traditions of the islanders are obsessed with cannibalism; the most inflammatory taunt that could be snarled at an enemy was 'The flesh of your mother sticks between my teeth'" (Diamond, 2005, p. 109).

You would think that people on Easter Island would have seen the environmental harms emerging and been able to change course. But as Diamond (2005) argues, it is much more likely that it was a gradual process across generations: "the changes in forest cover from year to year would have been almost undetectable: yes, this year we cut down a few trees over there, but saplings are starting to grow back again here on this abandoned garden site. Only the oldest islanders, thinking back to their childhoods decades earlier, could have recognized a difference. Their children could no more have comprehended their parents' tales of a tall forest than my 17-year-old

sons today can comprehend my wife's and my tales of what Los Angeles used to be like 40 years ago" (p. 426). Diamond calls this psychological phenomenon "landscape amnesia." It is people "forgetting how different the surrounding landscape looked 50 years ago, because the change from year to year has been so gradual" (p. 425). Diamond says that landscape amnesia is a "major reason why people may fail to notice a developing problem, until it is too late" (p. 426).

Others have described versions of this amnesia. Pauly (1995), for example, has written of the "shifting baseline syndrome" of fisheries: "Essentially, this syndrome has arisen because each generation of fisheries scientists accepts as a baseline the stock size and species composition that occurred at the beginning of their careers, and uses this to evaluate changes. When the next generation starts its career, the stocks have further declined, but it is the stocks at that time that serve as a new baseline. The result obviously is a gradual shift of the baseline, a gradual accommodation of the creeping disappearance of resource species" (p. 430). Along similar lines, in terms of humans adapting to disease, Dubos (1980) has argued: "Any disease, or any kind of deficiency, that is very widespread in a given social group comes to be considered as the 'normal' state and consequently is accepted as a matter of course within that group" (pp. 250–251).

What, then, are solutions to the problem of environmental generational amnesia? Kahn (2011) has suggested numerous approaches, including (a) keeping alive accounts and stories of rich interactions with nature from past generations, (b) imagining the future so as not to be blinded by present conditions, (c) embracing complex discourses of societal issues, and (d) being cautious in believing that new technologies can or will save us, because throughout history new technologies have brought new problems even if they have solved existing ones. But the solution Kahn proposes that seems to us most powerful focuses on having people, and especially children, interact with nature and increasingly rich if not wild forms of nature. In our view, this approach provides the phenomenologically grounded experiential basis by which children can construct understandings of more healthy nature and more healthy forms of human-nature interactions and to recognize and act on increasingly rich affordances of nature.

But it is one thing to advocate for such human-nature interactions, and to ground them in constructivist and ecological psychological theory, and it is another to model what those interactions actually look like in any comprehensive way. We move in that direction in the next section.

Interaction Patterns as a Method to Model Human-Nature Interaction

In its most basic sense, a model in the scientific sense of the term is a simplified description of the information of a phenomenon in the world with the objective of making the phenomenon understandable (Frigg & Hartmann, 2012). If we take the phenomenon of interest in the world as human-nature interaction, then one challenge

in modeling human-nature interaction is that the interactions can seem endless. It is not only that you can *hop over a log*, *bask in the sun*, *swim in the ocean*, *skip a stone*, *smell a flower*, *listen to frogs croak*, *pet a cat*, and *forage for wild asparagus*, and that the list goes on and on. It is also that any single type of an interaction can seem to vary endlessly. For example, a swim in the ocean one day is not exactly the same as a swim at the same spot the next day: the weather is slightly different, the tide has changed, you are never swimming in the exact same location nor being moved by the waves in the exact same way; indeed no two waves are ever identical so that each moment of swimming can be experienced and understood as itself completely unique.

How, then, is it possible to model human-nature interaction in a way that allows the phenomenon to be understandable while keeping alive the endlessly diverse – infinite – expressions of nature and human interactions with it? Our answer builds on the idea of an *interaction pattern*. What is that? Think about a meaningful way that you have interacted with nature, and then characterize it in such a way that you could see the same thing happening with different forms of nature. That is what we call an *interaction pattern*. For example, it is often wonderful to walk along the edge of a lake or along a river. The pattern could be framed as *walking along the edges of water*. You would be able to recognize this pattern pretty easily anytime you saw it or enacted it; yet the pattern does not confine it to happening in any particular way. More formally, interaction patterns are characterizations of essential features of interaction between humans and nature, specified abstractly enough such that countless different embodied versions of the interaction – what we will refer to as *instantiations* of the interaction – can be uniquely realized given different types of nature, people, and purposes. The idea of human-nature interaction patterns builds from the pioneering work of Christopher Alexander in architecture wherein he and his colleagues developed a "pattern language" for the built environment (Alexander, 1979; Alexander et al., 1977).

To date, Kahn and his colleagues have generated around 150 human-nature interaction patterns, with photos and descriptions for many of them (Kahn et al., in press; Kahn & Weiss, 2017; Kahn, Ruckert, Severson, Reichert, & Fowler, 2010; Kahn, Ruckert, & Hasbach, 2012). For example, there is a meaningful interaction that you have likely enacted in many different ways of *recognizing and being recognized by a nonhuman other*. If you have a dog, then likely every day you have moments when you and your dog look at one another and communicate. That is a domestic instantiation of *recognizing and being recognized by a nonhuman other*. A wild instantiation occurs when you're on a forest trail and walk around a sharp bend and come face-to-face with a black bear 20 yards away. Then there may be that instant when you look into the bear's eyes, and you recognize bear consciousness, as the bear is looking into your eyes and recognizing human consciousness from the standpoint of bear consciousness. Time slows down. It is a moment that can last in your memory for a lifetime even as it is over within a second, as the bear gallops off as you simultaneously move away.

This example highlights an important characteristic of interaction patterns in that they can be instantiated in more domestic or more wild ways:

- *Watching birds eat* is an interaction pattern. You can watch seagulls fighting over a piece of white bread thrown by a child (more domestic); or you can watch a blue heron, initially still as a rock, quickly plunge its head into a lake and snatch a six-inch bass into its beak and then, over the next minute, swallow it whole (more wild).
- *Wading in water*: You can roll up your pant legs and wade into an urban fountain (more domestic) or into the Pacific Ocean (more wild).
- *Eating blueberries*: You can eat blueberries from your garden (domestic) or on the high mountain slopes in the North Cascades (more wild).
- *Resting in the shade under a tree*: You can rest under a 20-year-old planted Douglas fir (more domestic) or under the enormous canopy of a 200-year-old cedar.
- *Running the land*: You can run 8 laps around a quarter-mile track (more domestic) or a 2-mile loop through Central Park (a little more wild) or a 20-mile loop through the Canyonlands of Utah (even more wild).

We use the word *wild* to refer to that which is untamed, unmanaged, not encompassed, self-organizing, and unencumbered and unmediated by technological artifice (Foreman, 1991; Kahn & Hasbach, 2013; Rolston, 1989; Shepard, 1998). We can love the wild. We can fear it. We are strengthened and nurtured by it (Rolston, 1989; Turner, 1996). Wildness is not to be confused with wilderness. The reader may agree with Cronon's (1995) view that wilderness is a social construction and that the idea of untouched pristine landscape is a fantasy of a Western European worldview. Be that as it may, there is nature that has more wild or less wild features and affordances, which allow for forms of interaction that are more wild or less wild. It is not a culturally determined social construction, or at least not much of one, when one comes face-to-face with a grizzly bear and recognizes that one's life could be in jeopardy.

Thus it is useful to characterize the constructs of the wild and the domestic as existing along a continuum. Pyle (2002) once wrote an essay titled *Eden in a Vacant Lot*. He was trying to show that, even in cities, small open patches of land are not what some people call "wastelands" but areas for more wild nature to exist and for people, especially children, to interact with. Even weeds growing through the cracks of a sidewalk can be understood as embodying some wild characteristics, such as being unmanaged and self-organizing. But the instantiation of this wild weed should not be equated as equally wild as a vast stand of old-growth redwood trees.

Because domestic interaction patterns can be instantiated in evermore wild ways, it becomes possible to restructure human life, social organizations, and the urban-built environment to engender evermore wild instantiations of currently existing forms of interactions. For example, if you are designing an urban fountain, you can design it to allow for visual and perhaps auditory interaction: you look at it and hear it. But some fountains go further and allow for people's bodies to find its way into, amidst, or through the water. You can wade into the water, get sprayed by it, run through it, or run on stepping stones over it. Or another

example, in the metropolitan area of Seattle, Washington, there were about 20 miles of an abandoned railroad line that were repurposed as a contiguous trail. People use it for many purposes, such as for a biking commuter route and for recreational exercise. But what such a long stretch of urban trail also affords is the enactment of a very old interaction pattern with nature, one that goes back to the earliest days of *Homo sapiens*: of *walking (or running) away from human settlement and then the return*. Back then, women might walk out 3 or 5 miles from camp to forage and then return later laden with tubers and nuts. Men might go out for several days hunting and then return, successful or not. It is an important interaction pattern because it creates the conditions for many other smaller interaction patterns, such as an emphasis on being aware of weather patterns or one's location in landscape so that one can take care of oneself the further one moves from the safety of camp.

We are saying that interaction with more nature, and more wild nature, not only promotes people's physical and psychological well-being but even more importantly provides perhaps the most powerful countervailing force against the insidious problem of environmental generational amnesia. For the knowledge and understandings that emerge through such interactions run deep within the human psyche, and within the body itself, so that there is both human memory and muscle memory – a lived reality – of one's relation with nature. We are also suggesting that it is possible to restructure human life, social organizations, and the urban-built environment to engender these interaction patterns. In the next section, we show how some of this unfolds in the context of a nature preschool.

Child-Nature Interaction in Fiddleheads Forest Preschool

The school is the Fiddleheads Forest Preschool in Seattle, WA, directed by one of us (Harrington). The children (ages 3–5 years old) and teachers spend all of their time outside, in a matrix of trees, in one of the two classrooms located in the University of Washington Botanic Gardens. These botanic gardens are open to the public in this fast-growing city. We divided each of the two outdoor areas into five different filming zones, and through a randomized time-sampling methodology, we filmed the children. Our data collection was recently completed. As a step forward in characterizing child-nature interaction in a nature preschool, we offer here a handful of interaction patterns that have been emerging from our data. This effort builds on our presentation of five other interaction patterns – *falling on the ground*, *not falling on the ground*, *digging in the ground*, *leaning against the tree*, and *calling the birds* – that we have described elsewhere (Kahn & Weiss, 2017).

In addition to describing each pattern, we offer a little bit of what we call a *nature language* about the pattern. By a nature language, we mean a way of speaking about how the pattern is enacted, how it is meaningful in a child's life, how it may lead to important developmental outcomes, how it may originate from sources deep in our ancestral heritage, and how it connects to a wider social and communicative discourse throughout time and place (Kahn et al., 2010, 2012).

Leaning on and Hanging from Supple Tree Limbs

The boy in Fig. 1 is talking to a person on a road outside the boundary of the classroom. As he is talking, he begins to lean a little on the supple branches of the tree. This leaning appears to start almost incidentally, based on the affordances of the limbs right within his grasp. But then as he starts enacting these minimal interactions, the responsiveness of the limbs leads him to further engage with them. The child tests the tree's support of his body weight as he leans his body forward and backward. He holds onto a limb and leans back, and as he feels the limb support his weight, he leans back further and then a little further. He even goes so far as to lift one foot off of the ground as he leans far back, before placing the same foot on a low-hanging branch and shifting his weight forward in a lunging position.

Thus these forms of interactions with nature illustrate a canonical principle described earlier of ecological psychology, where interactions with the affordances of nature quickly create new affordances which lead to further and often more extensive interactions. Moreover, you can almost see here the child's construction of knowledge, as he is learning how to balance himself amidst supple tree limbs.

Fig. 1 Interaction Pattern: Leaning on and Hanging from Supple Tree Limbs

It includes proprioceptive knowledge, as he gains an understanding of his body in relation to a dynamic natural system.

Climbing High in Small Tree

The same boy as in Fig. 1 now engages in a solo exploration of the trees lining the edge of the classroom (Fig. 2). The tree he chooses to climb is relatively small and offers many low-hanging branches for him to easily make his way up to a suitable vantage point. Indeed, it seems plausible that his ability of *leaning on and hanging from supple tree limbs* (Fig. 1) engenders this further interaction pattern of *climbing high in small tree*. The branches embody an element of uncertainty as to their exact load-bearing capacity, which the boy needs to figure out. For example, when he

Fig. 2 Interaction Pattern: Climbing High in Small Tree

Fig. 3 Child Climbing on a Concrete and Metal Pillar

reaches for the small branch in the bottom photo, he needs to figure out how much of his body weight the branch will hold as he uses it to pull himself up with.

In the middle photograph, the child next stands on a limb and keeps his balance holding onto another limb. After that, he lets go with his right hand and balances only with his feet.

The primary interaction pattern of *climbing high in small tree* makes possible many other interactions, such as *standing in tall tree*, *climbing across small tree*, *straddling branches*, or *looking out while standing in tall tree*. Some of these interaction patterns presumably have their origins in our evolutionary history. For example, *looking out from a natural vantage point* is the more general form of the interaction pattern of *looking out while standing in tall tree*, whereby it presumably conferred advantage to be able to see what lay in a more distant landscape from the vantage of higher ground. Even in modern urban environments, you can see this interaction pattern enacted and highly valued. For example, the real estate prices of homes increase when, all things being equal, the home has a view with a vantage point, especially with a territorial or water view.

Contrast this boy's climbing high in small tree compared to the girl in Fig. 3 climbing on a concrete and metal pillar. The wood 4 × 6 beams are smooth and offer few affordances by which to climb them. One could perhaps shimmy up a little bit. But there is little to grab on to or to step up on, except for the initial cement pier; and for that it is one step and you are done. Even if it were a metal jungle gym, the affordances would be few compared to the small tree, because the metal is solid and uniform, fully load bearing and thus offering little variation and little opportunity for the child to strategize compared to the dynamic natural system of a tree.

Looking at Wild Animals

Biophilia refers to the innate propensity for humans to affiliate with nature (Kellert & Wilson, 1993; Wilson, 1984); and one of the most salient aspects of nature that humans affiliate with is animals. In our ancestral history, we hunted wild animals and

Fig. 4 Interaction Pattern: Looking at Animals

depended on them for our survival. We paid attention to where they were, what they ate, when they ate, where and when they drank, when they migrated, how they moved, their footsteps in the ground, the sounds they made, their forms of communication, and many other things. One of the primary ways of interacting with a wild animal is visually looking at the animal. And, still today, this form of interaction has a powerful pull on the human psyche. For example, each year in North America, more people visit zoos and aquariums than all professional sporting events combined (Wilson, 1984). Why? Perhaps the most plausible explanation is because zoos and aquariums satisfy the human desire to look at wild animals, even if the animals are in captivity and are but fragments of their former wild selves.

One of the strengths of a nature preschool is that it affords children the opportunity to look at wild animals or at least non-domesticated animals that are not in captivity, such as insects, lizards, squirrels, and birds. These animals have a degree of freedom and autonomy that go far beyond what animals in a zoo experience. The girl in Fig. 4 was initially jumping over the log and exploring her ability to place one foot on the log and propel herself over it. In the process, she then noticed (and vocally says in the video) that she sees a spider. She then stoops down and invites a teacher to look at the spider on the log with her. *Looking at animals* can be both an individual and social interaction. The animal is free, in its own habitat. The child is free to look at the spider or not and to marvel or not. The child is not trying to control the spider; no more than the spider is trying to control the child. It is a relationship of mutuality.

Imitating Animals

Looking at animals is one form of interacting with them. But it can go much deeper than that. According to Shepard (1996), "the human species emerged enacting, dreaming, and thinking animals and [still today] cannot be fully itself without them" (p. 4).

A nature preschool provides such opportunities with both domestic and wild animals. Specifically, one interaction pattern we have observed to date is that of *imitating animals*. In the first photo of Fig. 5, a girl crawls on her hands and knees and imitates the physical actions and vocalizations of a domestic housecat. She makes direct eye contact with the boy and is interacting with him in her pretend role

Fig. 5 Interaction Pattern: Imitating Animals

as a cat. These interactions occur in a part of the outdoor classroom that can be characterized as in between the more domestic and more wild parts of the landscape. In contrast, the girl in the second photo of Fig. 5 is standing in one of the most untouched parts of the classroom, and instead of imitating a domestic animal, she chooses to imitate the sounds of birds overhead. She is making bird calls. She is calling to them. One can think of birds as some of the wildest animals that people encounter in urban environments insofar as birds, especially those that migrate, are not hemmed in by human infrastructures and desires. Birds fly where they want to fly. If they do not care to be around you, they leave. During migrations, they can fly many thousands of miles, themselves interacting with some of the wildest landscapes of the world.

Based on our emerging data, one working hypothesis is that more relational interactions that seek harmony with nature (such as *calling the birds*) occur in the more wild and secluded parts of the nature school, while the more domination interactions with nature (such as using a stick as a pretend chainsaw to cut down trees) occur in the more domestic and built parts of the nature school. If this hypothesis bears out, it would be an important result. For as discussed elsewhere (Kahn, 2011; Kahn & Hasbach, 2013; Kenny, 2013), one of the overarching problems of the world today is that many people, and many world leaders, see themselves as dominating over other people and over nature, rather than living in relation and seeking harmony with both. Thus if this hypothesis is supported empirically, it would provide evidence that interactions with wild nature are vitally important in children's development, as such interactions provide the mechanism for

the child's construction of more relational interactions of equality and harmony with each other and with their surrounding environment.

Imagining Nature to Be Something Other Than It Is

In the field of developmental psychology, imagining and pretending has an illustrious history (Baldwin, 1973/1897; Vygotsky, 1978) and been the focus of modern-day research (Taylor, 1999; Taylor & Carlson, 2002). The young child's mind undergoes a far-reaching transformation when it comes to understand that something can be represented as something other than what it is. This transformation, in turn, opens up new forms of play and even humor. There is a story one of us heard, for example, of a very young boy who was sitting with his parents around the dining room table and then all at once he got a mischievous expression on his face. He then looked at his parents and then pointed to his glass of milk and proclaimed "beer!" Then he burst out laughing. It is actually quite funny, certainly from his perspective, because in a social communication with his parents, he was making something into something it was not. Adult irony in many Western cultures works in a similar way. You might walk outside to yet another rainy day and say to your partner: "I'm sure enjoying all the sun." You do not mean it. You are playfully having the language mean something other than what the language literally means.

Phylogenetically – tens of thousands of years ago, and perhaps much longer – this achievement of our species likely occurred through people interacting with nature and then *imagining nature to be something other than it is* (Shepard, 1998). In storytelling around a campfire, for example, hunters may well have used sticks or rocks to represent the animal they were talking about.

Many examples of this interaction pattern of *imagining nature to be something other than it is* are emerging in our data. For example, the bottom photo in Fig. 6 shows a girl who had been playing with another girl, and then she saw a long thin stick and had an idea. She got on the stick and began to ride it, calling it a "train" and then a "horse" at different times. A few other classmates wanted to join her, but she rebuffed their entreaties and in effect claimed ownership over the nature she now possessed. But after a few minutes of solitary play, this girl began asking her classmates to join her for a ride. Most who had initially wanted to take a turn were now engaged in other activities; but, as shown in the top photo, eventually the girl was able to entice a friend of hers to join her for a "trip" around the center of the classroom.

Along with illustrating this specific interaction pattern, this example shows how interacting with nature forms the basis for children's construction of social and even moral knowledge. Namely, one way to interpret what happened between the children in this event – and this may be a stretch of an interpretation on our part, but it is worth considering – is that when the girl excluded others from playing with her with her imaginary stick, she then came to recognize that there were social repercussions: that the other girls got interested in something else and no longer wanted to play with her when asked. It was a nuanced event. It did not appear to us, at least, like the other

Fig. 6 Interaction Pattern: Imagining Nature to Be Something Other Than It Is

girls rebuffed the individual girl out of spite (e.g., "you didn't let us play when we asked, so we're not going to play with you when you ask us!"). No, it was more that the other girls simply got interested in another activity. Thus the initial girl had to try hard to bring a friend back into her field of imaginary play. It did not take a teacher saying "it's good to share your stick with others now!" Rather, the girl was learning on a microgenetic level that that it is fine not to share if you do not want to, but it can often come with costs in terms of social affiliations, and so you might well want to take that into account in your future decision-making.

Making Boundaries on Earth

With the rise of agriculture, roughly 5,000–10,000 years ago, nomadic life gave way to settling, to the farmer, and for the first time in human history, it was possible to accumulate and store large quantities of food. With increased food production and storage, populations increased. Bands and tribes thus became chiefdoms and then city-states (Diamond, 1997). As populations increased, complex hierarchical systems of social organizations emerged. As part of this enormous cultural shift, the concept of land as private property emerged. This concept is now deeply rooted in Western culture and the Western mind. "This is my house." "This is my land." "Fences make good neighbors." And children coming of age within Western culture begin to learn about boundaries that separate spaces, not in the way a natural

Fig. 7 Interaction Pattern: Making Boundaries on Earth

boundary such as a ridgeline may separate two watersheds but in the way that a constructed boundary divides social uses of a landscape.

This way of interacting with nature can be named *making boundaries on earth*. We are seeing evidence of this interaction pattern in the children at Fiddleheads. For example, the boy in Fig. 7 dragged a long thick branch from another location into an open space and used it to make a boundary of sorts, which he then buttressed with wood rounds and rock that he also carried from elsewhere. The open space within the nature preschool affords him this opportunity, as well as the many "loose parts" of nature that he perceived and acted upon.

Pushing to the Edges of Boundaries

Children and adolescents often push to the edges of rules and other social understandings and sometimes go past them. A 2-year-old in a high chair might be told, "please don't throw your broccoli across the kitchen anymore." And then she may pick up a piece of broccoli and hold it in her hand and look at her parent. She may throw it. She may not. She is exploring and testing the edges of how social life is regulated, which is part of the mechanism by which she learns how to self-regulate.

In the previous interaction pattern, we illustrated *making boundaries on earth*. Children live within such social boundaries. The Fiddleheads Nature Preschool has one and asks children to respect it. The rule is that during school hours they are not allowed unattended outside the boundary of the school, as demarcated in many

places by rope or webbing attached across trees and bushes. Yet time and again, it appears that children are attracted to the boundaries and push to the edge, and occasionally slightly over. As a case in point, look again at the top photo of Fig. 1, and you can see the boy right at the boundary of the classroom, swinging his body almost over the boundary itself.

This example also illustrates that while interaction patterns can be described individually, they almost never actually occur individually. At a minimum there are "background" interaction patterns that are always occurring, such a *breathing air* or *being in space*. But more substantively, often multiple interactions are being enacted at the same time, such as *leaning on and hanging from supple tree limbs* and *pushing to the edges of boundaries*. In addition, interactions readily lead to other interactions.

Waiting Attentively in Nature

A boy and a girl had been exploring the more wild outer edges of the land. The girl then instructed the boy to wait for her. She then left the scene. More than 5 minutes passed, and, as shown in Fig. 8, the boy continues to wait for the girl, patiently, sometimes scanning the environment around him for her return. In our interpretation of his face and body motion, he is not bored. He is attentive. He is highly aware of his surroundings and taking in natural stimuli through his senses: sometimes looking for her, yes, but also likely listening. He is feeling and manipulating the leaf in his hand. He can hear birds chirp and the sound of wind in the leaves of the surrounding trees. He can see the changing light of the sun as clouds pass overhead.

Compare this interaction pattern of *waiting attentively in nature* to Samuel Beckett's 1949 existential play *Waiting for Godot*. In the play, two characters wait

Fig. 8 Interaction Pattern: Waiting Attentively in Nature

for a third person Godot (who never arrives) in a landscape barren except for one leafless tree. While the characters endlessly wonder why they should wait, and if Godot will indeed ever come, the boy in this more wild area of the landscape appears content and alert, neither bombarded by external sensory overload nor becoming distraught in a denatured environment.

Could it be said that modern-day children are being schooled in traditional classrooms and are coming of age in natural environments that are existentially as barren as in Beckett's play? But rather than face the existential conundrum, which Becket asks his audience to do, people today seek to avoid it by immersing consciousness as often as possible in digital distraction. For example, if you look at people waiting at a bus stop at a crowded urban intersection, or in line at in a crowded supermarket, and in many other situations, often they are peering intently into their smartphone and mentally tuning out their outer environment – an environment which often is so noisy and distasteful, if not toxic, that one can understand them doing so. This new form of human-technology interaction, which we could call *peering into digital device while waiting*, is becoming the conventional practice. People have sometimes told us that when they are waiting in a crowd that they will pull out their smart phone and look like they are looking at their phone, even if they do not want to, so as not to stand out from the crowd and draw attention to themselves. It may look like the boy in Fig. 8 is doing nothing; but we would like to suggest that he is engaged with some of the fullness of life.

Conclusion

Environmental generational amnesia helps explain how cities continue to lose nature and why people do not really see it happening and to the extent they do, they do not think the loss is too much of a problem. Each generation calibrates to a new degraded baseline and thinks it reasonably normal. But it is not. No more than is the prevalence of disease in the modern world. In the United States, for example, about two-thirds of the population is considered overweight, and one-third is considered obese. Eight percent have asthma, and 10 percent have diabetes. Fifty percent have one or more chronic health conditions. Numbers like these are evidence of a physically sick society. In the United States, one in ten people take antidepressants. is that not an astoundingly large number? We should look at these conditions and be appalled and seek for radical change. But mostly we stay the course: allowing for – if not participating in the destruction of nature – the destruction of the wellsprings of human life and well-being and crowding ourselves into increasingly mind-numbing urban confines, often in megacities of over 20 million people where most days the air is toxic and the sun a hazy shadow that moves across the sky and where the waters are polluted and wild animals go to die.

Paragraphs like the one you just read convey a sad state of affairs. People who write them hope that such truths will help motivate action, in the way that if you tell people that their homes are on fire, you assume they will get moving and take appropriate action. But the "renormalizing" of the baseline by each new generation

diminishes the alarming meaning of such words. Perhaps the ideas are understood cognitively, but not phenomenologically, not in a deep sense of one's being. As a case in point, elsewhere, Kahn (2011) describes a conversation he had with an architect. The architect said that he had come to understand very well the idea of environmental generational amnesia when one day he was driving with his son along the tree-lined streets of Seattle, and his son said something like "Dad, look at the beautiful forests!" The architect said with a knowing smile on his face that his son was constructing a concept that a forest was young planted trees along a tree-lined street, while he (the dad) knew that a real forest was… and here he mentioned a forested area outside of Seattle with hiking trails through it. But what the architect did not seem to understand was that the land he was referring to had been logged many times over the last hundred and more years. That land is now a former shell of what the old-growth forests were. So the architect, like all of us, even when we understand about the idea of environmental generational amnesia, is at a severe disadvantage for understanding what we have lost because we do not particularly experience it as a loss, even as the loss causes us tremendous ills and prevents the well-being and flourishing of human consciousness.

Thus our response in our work, as reflected in this chapter, is not so much to describe the ills of the world, as that does not seem all that effective. Rather we seek to show – in terms of building theory and in terms of practice – what is possible to rediscover.

In terms of building theory, we are putting forward an interaction pattern approach to modeling human-nature interaction. These interaction patterns can be thought of as a little like words in a dictionary insofar as they can be individually named, though their basic definition lies in the name itself. Thus, for example, *climbing high in small trees* and *looking at wild animals* are pretty much self-explanatory at their most basic level. But individual words often have nuanced meanings and complex histories. The unabridged version of the *Oxford English Dictionary*, for example, has extensive expositions on tens of thousands of individual words, often showing how they have been used in sentences throughout the ages. So, too, we seek to provide a *nature language* for the interaction patterns. The interactions can be enacted in an infinite number of unique ways, always alive, sometimes on fire so to speak, meaningful. *Looking and being looked at by a wild animal* are not some cerebral experience; no, your whole body comes alive, your senses open, and your immediate perceptions deepen.

In a future publication, we aim to provide a comprehensive account of the foundational interaction patterns that children enact at Fiddleheads Forest Preschool. This account should complement emerging work that has been providing lists of *activities* that children engage in at forest schools, such as running, digging, sand play, yelling, wrestling, building, birding, gardening, cooking over an open fire, and going barefoot (Hanscom, 2016; Kenny, 2013). In future work, we also aim to provide an account of interaction patterns in other locations as well, such as in city parks. One long-term goal is to be able to associate interaction patterns with the affordances of diverse landscapes, which would then help position us to use GIS mapping data to give voice to the human dimensions of specific landscapes the world

over. In turn, that knowledge could be used to articulate a more powerful conservation agenda (to conserve not just land or species but the affordances for human-nature interaction) and be used as a metric to assess the efficacy of specific landscape designs.

To rediscover nature is to care for it because we live within it and are part of it. To rediscover nature requires that we interact with it – in increasingly diverse, deep, and wild ways – and relearn how to speak about it. For anthropologists, the loss of a language is a sign of a vanishing culture. As Davis (2002) writes:

> Language isn't just a body of vocabulary or a set of grammatical rules; it's a flash of the human spirit, the vehicle through which the soul of each particular culture comes into the material world. When you and I were born there were 6,000 languages spoken on Earth. Now, fully half are not being taught to schoolchildren. Effectively, they're already dead unless something changes. What this means is that we are living through a period of time in which, within a single generation or two, by definition half of humanity's cultural legacy is being lost in a single generation. Whereas cultures can lose their language and maintain some semblance of their former selves, in general, it's the beginning of a slippery slope towards assimilation and acculturation and, in some sense, annihilation.

Thus part of our larger project is to reinfuse in our world an alive nature language that is based on our *actual* experiences with our encounters with a living nature and an infusion of our being into the wider and wilder energies and consciousness from which we come.

That is part of our theory-driven agenda, based on what we refer to as interaction patterns and a nature language. In terms of practice, through the work presented here, we are beginning to characterize child-nature interactions in one specific nature preschool. As the reader will likely have noticed from the photographs of the school's landscape, it is not a particularly wild landscape. True, there are some large trees, 5 or 6 ft in diameter at their base. And the area is removed from much of the urban noise and traffic, situated as it is within a larger natural area of the University of Washington Botanic Garden. But the land is mostly flat, with bark underfoot in many areas. Perhaps the wildest aspect of the school's nature is the weather itself. Children and adults are outside all of the time, even when it is cold and raining. Likely enough, this nature preschool could be more effective with more wild terrain, affording more wild forms of interaction. But what we want to emphasize here is that it is wild enough to engender some deep and pervasive forms of child-nature interaction, especially when contrasted to what little nature children encounter in cities throughout the world.

Nature preschools serve approximately 10,000 children each year, and 80% of the programs report a waiting list (NAAEE, 2017). It is a national movement that is gaining momentum. It is an exciting time because in principle these schools have within them the kernels to transform the world through increasing children's direct interaction with nature and a more wild nature than that exists in most urban children's lives. Imagine not just 10,000 children engaging in somewhat wild forms of interaction with nature but hundreds of thousands and even millions of children. Imagine school systems that are fundamentally structured in these ways.

It is possible, and if enacted, they will help awaken us to a natural world that is as vital, demanding, spacious, and awe-inspiring as it is nurturing.

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Part IV

Childhoodnature the Anthropocene and Crisis of Sustainability

Childhoodnature and the Anthropocene: An Epoch of "Cenes"

24

Amy Cutter-Mackenzie-Knowles, Karen Malone, and Hilary Whitehouse

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Abstract

Section Four troubles childhoodnature and the Anthropocene, a scientific and popular term used to described the present human-nature conditions on planet Earth. This section does this through eight contributions which broadly speak to four "cenes," namely: children in the Anthropocene – child-cene; woman in the Anthropocene – gyno-cene; cities as sites of the Anthropocene, city-cene; and relations with the more than human – kin-cene. The lines though between/within/through these identified cenes are porous and enmeshed as the nonliving, the

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human, and nonhuman transition between two epochs – *the Anthropocene and the Postanthropocene*.

Keywords
Anthropocene · Childhoodnature · Child-cene · Gyno-cene · City-cene · Kin-cene · Postathropocene

Introduction

This section explores the interfaces between Childhoodnature, the Anthropocene, and the crisis of unsustainability. Here we reposition the latter constructs in the context of the social, environmental, political and economic challenges of global sustainability and the Anthropocene.

The authors in this section were invited to interrogate the progress of education for sustainability (EfS), environmental education, and education for sustainable development (ESD) to date and identify ways to move forward. Potential authors were specifically asked to examine how childhoodnature was positioned within various internationally recognized educational approaches and policy developments, including the outcomes of the United Nations Decade of Education for Sustainable Development (2005–2014) (UNESCO, 2004). When expressions of interest came in, it was clear that there was a strong desire to write outside or beyond sustainability and sustainable development. In fact sustainable development hardly entered into the discourse. From these submissions alone, it could be surmised that the field has moved past sustainability with a renewed focus on the Anthropocene.

Humans have now been recognized as a geophysical force who through altering the Earth's geological systems has invited the renaming of the current epoch to the Anthropocene (Crutzen, 2006; Crutzen & Brauch, 2016). Baskin (2015) positions the Anthropocene as a radical re-conceptualization of the human-nature relationship. As Malone states "philosophically and theoretically, the Anthropocene is a concept that works both for us and on us (▶ Chap. 25, "Children in the Anthropocene: How Are They Implicated?")." The ways in which the Anthropocene is conceptualized in this section is complex, posttime and beyond the realms of a "human species" act. It is critical to caution that "an important contribution to the shortcomings of dominant Anthropocene discourses, is that much of the discourse on the Anthropocene has been dominated by Western scientific perspectives (▶ Chap 26, "Situating Indigenous and Black Childhoods in the Anthropocene" by Nxumala)." The unsettling that the naming of the Anthropocene has administered – and will continue to administer – is a massive jolt to the human collective imagination of humans. Instone and Taylor (2015, p. 139) argue: "If viewed as a potentially transformative naming event with complex affordances, rather than as a scientific validation to scramble for yet another heroic techno fix, debates over the Anthropocene can open a space for constructive circumspection and thoughtful response." In its unsettlement of the entrenched binaries of modernity (nature and culture; object and subject), and its provocative alienation of familiar anthropocentric scales and times, the Anthropocene will continue to open up a number of

possibilities for exploring concepts such as entanglements and differences in children's lives. Childhoodnature as an emerging concept has the ability to be central in identifying and illuminating these possibilities.

Throughout this section, the authors shift the discussion on "sustainability" and "sustainable development" to lives led in the Anthropocene (and within its chaotic material impacts). Perhaps this is because the story of sustainability is written as "if humans were still alone on stage, the only being who out of its own free will is in charge of apportioning space, land, money and value to the old Mother Nature" (Latour, 2015, p. 6). The Anthropocene urgently requires new reconfigurations of knowing that actively acknowledge human and nonhuman relations as intra-active, agentic, and lively, for they are. The naming of the Anthropocene has become a way of re-making such relations between humans and nonhumans, demoting the old mantra of sustainability (Davies, 2016) and considering a life-focused, ecological collective concerned with difference and diversity instead of a presumed universality of sameness. The current environmental crises being faced by children, and caused by adults, and the devastating effects felt by all earthlings, have accentuated rather than diminished real and material differences between the privileged and the not so privileged, the human and not so human. Therefore, it is important not to universalize childhoodnature encounters in the Anthropocene for all relations are located within different places, with different seasons, temperatures, changes, loves, and terrors.

There are eight chapters in this section which constitute a journey of "cenes" including a chapter from Malone on children in the Anthropocene; Nxumalo focusing on indigenous and black childhoods; Gray and Sosu on the re-naturing of science; Whitehouse, Evans, Jackson, and Thorne on children caring for Australian rainforest environments; Kopina, Sitka-Sage, Bienkinsop, and Piersol on educating children in a Post-nature world; Huang, Llu, Wamg, and Xie on urban wetlands and Chinese curriculum reform; Nelson on rats, death and relations in Canadian childhoods; and Worster and Whitten on responsive environmental education through a kaleidoscope of places in the Anthropocene. When undertaking a deep reading of the chapters in this section, a number of cenes or epochs (the beginning of a period in the history of someone or something) appear – namely, the child-cene, city-cene, gyno-cene, and kin-cene. The lines though between/within/through these cenes are porous and enmeshed.

Child-Cene

> I became a UN member, [of a Model of the United Nations for Young People] where I debated for three years, two years for environmental subjects, and one year for human rights. (▶ Chap. 27, "Renaturing Science: The Role of Childhoodnature in Science for the Anthropocene" by Grey and Sosu)

Children as activists, demonstrators, and central figures in bringing attention to the Anthropocene are receiving more and more attention in mainstream media. Hundreds (approximately 1.4 million) of thousands of young people across

Belgium, Germany, Switzerland, Sweden, the UK, and Australia (123 countries in total or 62.43% of the world) went on strike from schools in late 2018 and early 2019 to protest against the lack of political action by politicians to the climate change crisis (Rousell & Cutter-Mackenzie-Knowles, 2019). In Australia "*S*trike 4 Climate Action" has brought thousands of young people together in defiance of the Australian Prime Minister's tone deaf warning to be "less activist" (Baker, 2018).

The "Strike 4 Climate Action," has been inspired by 15-year old Swedish student Greta Thunberg. The youth climate change movement is consequently growing rapidly due to the connecting benefits of a globalized social media. In Sweden, Greta sat outside her Country's parliament insisting the leaders come into line with the Paris Climate Change agreements (see Fig. 1).

In an interview in The Guardian newspaper on 27th November 2018 Greta states:

> .If burning fossil fuels threatened our very existence, then how could we continue to burn them? Why were there no restrictions? Why wasn't it illegal to do this? Why wasn't anyone talking about the dangerous climate change we have already locked in? And what about the fact that up to 200 species are going extinct every single day? I look at the people in power and wonder how they have made things so complicated. I hear people saying that climate change is an existential threat, yet I watch as people carry on like nothing is happening. We can no longer save the world by playing by the rules because the rules have to be changed. I urge other students to join me: Sit outside your parliament or local government wherever you are and demand that they get on track to keep the world below 1.5 degrees. (Thunberg, 2018, p. np)

Fig. 1 Greta Thunberg https://www.theguardian.com/commentisfree/2018/nov/26/im-striking-from-school-for-climate-change-too-save-the-world-australians-students-should-too#img-1. (Photograph: Michael Campanella for the Guardian)

The children and young people in Whitehouse et al.'s chapter "illuminate in their own words their senses of care and connection to the Wet Tropics. Barriers and enablers to restorative practice are discussed in relation to dominant schooling practices, which continue to marginalize the work of caring, even though caring is a logical and necessary response to the Anthropocene." Notwithstanding, Whitehouse et al. (▶ Chap. 28, "Children Caring for the Australian Wet Tropics as a Response to the Anthropocene") study exposed, "many aspects of the formal, public school system in Queensland are not yet fully enabling of caring practice." This is substantiated where educators in the study said: "I'd probably be lynched by certain people for certain views..."; and "I've experienced nature but I can't care less about it [laughing]."

Gray and Sosu (▶ Chap. 27, "Renaturing Science: The Role of Childhoodnature in Science for the Anthropocene") also introduce a different view of the role of children in the critical debates of childhoodnature. They believe as still fairly natural environments speak back to children we must enable children to be able to encounter those moments, especially in the early years: "There *may* be a critical period of time when nature experience is important in establishing or nurturing this ecological identity, and there are some indications that this is in the earlier stages of childhood." (▶ Chap. 27, "Renaturing Science: The Role of Childhoodnature in Science for the Anthropocene" by Gray and Sosu). Huang et al. drawing on Chinese culture also bring the value and importance of childhood encounters into their chapter when they write: "Cultivating children's sense of loving and protecting their environment from an early age is a basic principle for implementing environmental education in China, as an old proverb says 'Habit is a second nature' (DU Guang Qiang, 2011)" (▶ Chap. 30, "How Urban Wetland-Based Environmental Education Activate School Children's Childhoodnature in Anthropocene Times: Experience from Chinese Curriculum Reform" by Huang et al.).

Insights from preservice teachers and their childhoodnature encounters (▶ Chap. 27, "Renaturing Science: The Role of Childhoodnature in Science for the Anthropocene" by Grey and Sosu) reveal the starting points for delving into the spaces for unpacking the delicate relations between children's agency in terms of child-nature relations:

> Me and my brother played a lot of computer games, so we kind of would stay inside and do that rather than going outside.
>
> My mum really doesn't like animals. I have lots of siblings, so, of course, you have to have a pet. . .at one time or another, but it's never been the same pet for more than two months. . .
>
> . . .these sheep I grew very attached to. I did generally know... out into the field when it was old enough and then off chops sometimes . . . I was very fond of a cow we had. . .I was very fond of her and granddad took her off and he came back and said, ah, well, I sold her... I sold her to a butcher who liked her so much that, eh, that he wants to keep her as a pet... even as a primary school child I didn't buy that for a second. . .I knew exactly where she had gone to...

Gyno-Cene

> Black feminist theories are invaluable in making sense of the persistence of these discourses in academia, in schooling contexts and more broadly in society and as modes of resisting absence and deficit in thinking with Black childhoods and education in the Anthropocene. Black feminisms bring much needed attention to the limits of engagements with the Anthropocene that do not also consider blackness and anti-blackness as necessary parts of the ontological and epistemological constellations that disrupt Eurowestern humanism (Frazier, 2016; King, 2017; Rusert, 2010). (▶ Chap. 26, "Situating Indigenous and Black Childhoods in the Anthropocene" by Nxumalo)

Nxumalo (▶ Chap. 26, "Situating Indigenous and Black Childhoods in the Anthropocene") accentuates feminism and black feminist theories as agentic in disrupting minority (Western) humanism. Analogous to White's (1967) seminal article "The Historical Roots of the Ecological Crisis," Worster and Whitten (▶ Chap. 32, "Responsive Environmental Education: Kaleidoscope of Places in the Anthropocene") trace the plight of the Anthcopocene to religious documents such as Genesis 1:

> Let us make man in our image, after our likeness and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth and over every creeping thing that creepeth upon the earth. (Genesis 1, 26) (Worster & Whitten, this Section)

Gray and Sosu (▶ Chap. 27, "Renaturing Science: The Role of Childhoodnature in Science for the Anthropocene") explore the idea of women as childhoodnature in the Anthropocene, where they claim that female children and their female adults, "may have a stronger biophilic predisposition brought about through childhoodnature experiences" (▶ Chap. 27, "Renaturing Science: The Role of Childhoodnature in Science for the Anthropocene" by Gray and Sosu). Whether the strength and meaning of these necessary biophilic perceptions can be recognized and drawn upon to material advantage of the many rather than the few becomes a question of culture and politics. Merchant (1981) illuminated connections between the binary categories Nature and Women as a means for understanding the persisting inequalities of dominance and submission/destruction, a diversity of different kinds of environmentalism are increasingly becoming present in the Anthropocene (Zelezny & Bailey, 2006).

City-Cene

> . . .the lure of sustainability, the city and the call of the Anthropocene, hasn't always delivered its promises. (▶ Chap. 25, "Children in the Anthropocene: How Are They Implicated?" by Malone)

More people live in cities than rural areas. In fact, by 2050 "over two thirds of the global population will call these places [cities] home" (UNICEF, 2012, p. 1). The city is readily seen as a magnet for those looking to improve their life

prospects. With cities growing globally at an estimated 1 million new inhabitants each week or around 60 million people in majority nations leaving the countryside every year, it is a challenge to comprehend the impact of this for those arriving for the first time and those already adrift in the city. Devastatingly, one third of all these city dwellers especially those newly arrived will live on the streets, in makeshift housing or slums in order to make a start to city life. The impact of this shift to urban life on children can be exceptionally grim. Children in the majority world now make up 60% of the total population with 600 million children worldwide living in poverty in streets, slums, or transitional housing in cities. Children will face significant dangers in these situations and along with the elderly will be the most vulnerable. Globally 8 million urban children died in 2010 before reaching the age of 5, largely due to pneumonia, diarrhea, and birth complications (UNICEF, 2012), most of these lives could have been saved by simple services and facilities being made available within communities. But city officials even with the best intentions find themselves burgeoning under the strain of responding to the needs for infrastructure development at the current rates of city expansion.

> Cities are not homogeneous. Within them, and particularly within the rapidly growing cities of low and middle-income countries, reside millions of children who face similar, and sometimes worse, exclusion and deprivation than children living in rural areas. (UNICEF, 2012, p. 8)

Huang (▶ Chap. 30, "How Urban Wetland-Based Environmental Education Activate School Children's Childhoodnature in Anthropocene Times: Experience from Chinese Curriculum Reform") echoes these realities (Chapter 30) with China's rapid expansion of cities. Through unrelenting development Huang (▶ Chap. 30, "How Urban Wetland-Based Environmental Education Activate School Children's Childhoodnature in Anthropocene Times: Experience from Chinese Curriculum Reform") divulge the collision of cities-nature as urban wetlands where urban dwellers find refuge from the hard lines of city streets:

> Urban wetlands with its unique characteristics meets city residents' psychological need to return back to nature, and it serves as a leisure area for local residents and tourists to learn history and conduct research. (▶ Chap. 30, "How Urban Wetland-Based Environmental Education Activate School Children's Childhoodnature in Anthropocene Times: Experience from Chinese Curriculum Reform" by Huang et al.)

Cities are difficult gritty places for humans and nonhumans, a world designed by humans for humans, others infiltrate seeking to belong and become urban adapters. For many children survival in cities can be wrought with dangers, the universal romantic urban childhood exists in the imagination of the white middle class privileged few. The Anthropocene has revealed the reality that a dream of a clean, educated healthy civilized life in cities was a capitalist speculation, a human fiction, the illusion of which has left in its capitalist wake a trail of damaged lives.

Kin-Cene

> What would it mean, in a multispecies context to really share city places? (p. 18) (▶ Chap. 31, "Rats, Death, and Anthropocene Relations in Urban Canadian Childhoods" by Nelson)

Malone (▶ Chap. 25, "Children in the Anthropocene: How Are They Implicated?") writes about her experiences in La Paz where she comes to know a different set of kin relations, a common worldling of child dog. The child-dog body becomes more than a metaphor of how a child and a dog come to be thrown together on a hilly ravine in La Paz but it opens up spaces to speak of relations across histories, cultural nuances, and kin-cene possibilities. In her chapter she writes:

> The city of La Paz has 500 thousand dogs and 1 million children. Every year in La Paz there is a day devoted to caring for dogs, offerings of food, bathes and immunisations. A bow is tied around their neck. During the project the team collected around 2000 photographs taken by children while they moved around the valley. From these images over 200 of the photographs included dogs. (see Fig. 2). (▶ Chap. 25, "Children in the Anthropocene: How Are They Implicated?" by Malone)

The world of child-dog relations follows the story of colonialization, the peopling of the world spirted through the DNA of dogs as they travelled as worldly kin with humans. The kin-cene reminds us we are not in the Anthropocene alone. A host of nonhumans (and not so humans) share our houses, beds, fridges, and families.

Fig. 2 200 dogs (▶ Chap. 25, "Children in the Anthropocene: How Are They Implicated?" by Malone)

Fig. 3 Child-monkey worlding, Iwatayama Monkey Park, Kyoto, Japan. (Photographer, Amy Cutter-Mackenzie-Knowles)

The urban spaces where humans have attempted to denature their lives find urban adapters, the creative animals, plants, bacteria and fungi, that survive with and (sometimes) despite humans attempting to eradicate them.

Kopina et al. (▶ Chap. 29, "Moving Beyond Innocence: Educating Children in a Post-nature World") "critically examines what it means to educate children *as* (part of) nature. . ." For instance, one might reasonably propose Ebola viruses are also part of nature (Kopnina, 2016). Here the trouble (from a humanist perspective) is how to appropriately respond to the expansionist human actions of one part of a planetary nature given the health, well-being, and flourishing of one's own body, species and the ecological community as a whole? Does/ought the same logic hold for all species? What about issues of animal personhood? Are we ready to weigh the life of a gorilla against that of a human toddler fallen into his cage? (Phippen, 2016) Are we ready to seriously consider why one primate should even be in a cage for the sake of another primate's entertainment? (Cutter-Mackenzie-Knowles et al., 2019).

Figure 3, the photograph of the young child in a cage, was taken at the Iwatayama Monkey Park where human animals are placed in a cage and the Japanese macaque monkeys dwell freely in the landscapes beyond. The human-monkey reaches to become acquainted in the in-between – the intra-active spaces where the possibilities for seeking a post-Anthropocene world may exist. The imaginary for something different where other worldings, human/nonhuman kin relations can be disrupted reimagined and reconfigured.

More to the point, if we begin to argue that children *are* nature and nature is *natural*: are we not moving towards dangerous appeals to nature whereby whatever children do – be it killing small animals or pouring motor oil down the sink – is

rendered *natural*? McClaren (2009) speaks to the complicated conversations and problematic logics that emerge from this kind of oversimplification applied to urban centers as natural. The logic goes something like this: "Humans construct cities. If human constructions are not natural, then what does that make humans? Stated differently, how should humans behave naturally?" (p. 303). The question asked by Nelson in her Chapter (▶ Chap. 31, "Rats, Death, and Anthropocene Relations in Urban Canadian Childhoods" by Nelson) brings us to a useful starting point to venture forward: "What would it mean, in a multispecies context to really share city places?" (Nelson).

> These questions [or cenes] follow in the shadow of thousands of years of Indigenous peoples seeing plants, animals and landscape forms as kin, wherein they are already taken seriously as co-constructing beings who impact everyday, culturally specific, place relations (Watts, 2013). (▶ Chap. 31, "Rats, Death, and Anthropocene Relations in Urban Canadian Childhoods" by Nelson)

Concluding Thoughts: Postanthropocene

The muteness for discussing the ESD agenda by the authors illustrates there are real limits to the deliberative devastation of the thin skin of the earth we call our collective home and children can no longer wait for the greening of corporate vandals. The work of reconfiguring sustainability in the face of global consequences of Anthropocentric practices means radically moving beyond a view of the political as confined to "humans." Instead geophysical forces, the nonliving, the human, and nonhuman are all actors contributing to a transition between two epochs (the Anthropocene and the Postanthropocene). In this transition, "sustainability" might begin to look like a "time-bound and contingent goal at best, not an absolute one, so environmentalists will need to construct some other normative standard of value" (Davies, 2016, p. 200). For what can be sustained in a time of accelerating and unprecedented environmental change (what adult people have done to the fabric of life on this planet)? We don't as yet know. Living in the Anthropocene means something quite different. It means love, activism, care, diversity, making space and place for all our kin, and recognizing a differentiated epoch of "cenes" as explored in this Section of the Handbook.

Who Comes in My Dreams?

You come in my dreams
While I sleep and nap
You have the perfect smile and,
Laughing eyes, beautiful hair and,
Naturally Varnished lips,
That figure is simple, yet attractive,

That figure has no well,
Still spends the thought,
That figure has no spring,
Still I can swing and have fun,
You have come in my dreams,
You spoke the lovely words,
As the new snow in the old world,
We can drench, once the snowflakes melt,
You are too lovely and smart to secure my heart
Who comes in my dreams?
Climate change does
—Kiara, 10, NSW Australia (Climate Change and Me Research Project) (Rousell & Cutter-Mackenzie, 2015)

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Children in the Anthropocene: How Are They Implicated?

25

Karen Malone

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Abstract

There has been much debate about where the boundaries lie that would mark the arrival of the new epoch of the Anthropocene. There have been a number of possibilities proposed: the start of the Industrial revolution in the eighteenth century or the beginning in the mid-twentieth century known as the great acceleration of population, carbon emissions, biodiversity loss, plastic production, and the beginning of nuclear age with the first atomic bombs spreading detectable radiation to every stratum of the planet. But for many scholars in the humanities, these arguments are not as relevant as what taking up the premise or challenge of the Anthropocene provides. As an unsettling ontology that disrupts a persistent

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"humanist" paradigm, the concept of the Anthropocene allows new conversations to happen around human-dominated global change, human exceptionalism, and the nature/culture divide. In this chapter through stories from fieldwork with children in La Paz, I will propose the means for considering the ontological openings of the naming of the Anthropocene for the field of childhoodnature.

Keywords
Anthropocene · Sustainability · Mobilities · Enmeshed · Childdogbodies · Human exceptionalism · Haraway · Nonhuman · Entanglements

Introduction

Sustainable cities have often been touted as the "solution to the ecological crisis," the problems of the age of humans fixed through human ingenuity. Yet cities proclaimed as the means for providing shelter and resources for the steadily increasing human populations have placed us in direct conflict with planetary ecologies. Under the auspices the capitalist apparatus of sustainable development and green capitalism, rural and indigenous persons have been persuaded by the dream of a better life to move to the city with their once loved earth now toiled by corporate machinery. Despite the hardships encountered, the draw is great; the anthropocentric urban revolution promised children a healthier, educated life. But the lure of sustainability, the city, and the call of the Anthropocene hasn't always delivered its promises. Robert Macfarlane, journalist for The Guardian, writes:

> The idea of the Anthropocene asks hard questions of us. Temporally, it requires that we imagine ourselves inhabitants not just of a human lifetime or generation, but also of "deep time" – the dizzyingly profound eras of Earth history that extend both behind and ahead of the present. Politically, it lays bare some of the complex cross-weaves of vulnerability and culpability that exist between us and other species, as well as between humans now and humans to come. (April 2016: par. 4)

Philosophically and theoretically, the Anthropocene is a concept that works both for *us* and on *us*. Us being the collective kin of human and nonhuman entities implicated in this obscene event. In its unsettlement of the entrenched binaries of modernity (nature and culture; object and subject), and its provocative alienation of familiar anthropocentric scales and times, it opens up a number of possibilities for exploring concepts such as entanglements and differences. The politics of the Anthropocene demands that our entangled history is revealed and our future story is waiting bare to be unraveled. It asks of us, can the Anthropocene be the means for a way forward through a species thinking that acknowledges human and nonhuman relations as intra-active, agentic, and lively. This work of reconfiguring the Anthropocene means getting beyond a view of the political as confined to "humans," instead geophysical forces, the nonliving, the human, and nonhuman are all actors contributing to a transition between two epochs. In this transition "sustainability" might begin to look like a "time-bound and contingent goal at best, not an absolute one, so

environmentalists will need to construct some other normative standard of value" (Davies, 2016, p. 200). According to Geographer Jamie Lorimer, the Anthropocene "...represents a very public challenge to the modern understanding of Nature as a pure, singular and stable domain removed from and defined in relation to urban, industrial society," and that "This understanding of Nature has been central to western and environmental thought and practice" (2012, p. 593).

Therefore, the Anthropocene rather than scientific facts, verifiable through stratigraphic or climatic analyses, can be a discursive development that problematizes a human narrative of progress that has essentially focused on the mastery of nature, domination of the biosphere, and "placing God-like faith in technocratic solutions" (Lloro-Bidart, 2015, p. 132). In a recent published interview in the journal ethnos, Donna Haraway argued the naming of the Anthropocene constructs a certain model of the globe, a view that "the contemporary world is a human species act" (Haraway, Ishikawa, Gilbert, Olwig, Tsing, and Bubandt, 2015, p. 1). She argues: "...in this moment of beginning to get a glimmer of how truly richly complex the world is and always has been, someone has the unmitigated arrogance to name it the Anthropocene" (Haraway et al. 2015, p. 11). This realization of the possibilities and implications of the events foregrounded in the era of the Anthropocene is compelling, and while the concept may still be contested, it evokes in me a desire to consider the enormous challenges this era will present to the collective global community of human and nonhuman others. Particularly, my focus is on how children are implicated in the Anthropocene.

Drawing on recent research in La Paz with children living in the slum communities, my challenge in this chapter will be to consider how to present the voices of children with and through their everyday experiences of the nonhuman in the debates of the Anthropocene. Acknowledging as Taylor and Pacini-Ketchabaw (2015) do that children's close encounters with the environment described through my research may seem insignificant, small, and ordinary events on the scale of planetary ethics and posed by the Anthropocene. But like them I propose that children, with the nonhuman others they occupy the planet with, will inherit and respond to the consequences of a world we have inherently altered through our exploitative human-induced changes. The story of children – how they are implicated and endeavoring to exist with nonhumans in the "entirely synthetic human creations" of cities – will be the focus of this chapter and is at the center of my project Children in the Anthropocene. My research seeks to reveal the complexities of children's lives entangled with the assemblage of human-nonhuman others – the posthumanist ecological communities of a city, where a paradigmatic shift in thinking is desperately needed. For those who will inherit this uncertain future, our children deserve to be recognized and acknowledged in these critical debates of the Anthropocene.

Naming the Anthropocene

What is the Anthropocene? The naming of the Anthropocene, as a new geological epoch, acknowledges the incredible force of human impact on the earth, nowhere is this impact more vivid than the crowded cities of the majority world nations. While

the term "Anthropocene" (the epoch of the hu/man) has been accepted in the geological discipline landscape, there has been much debate about where the boundaries lie that would mark the arrival of this new epoch. Was it the Industrial revolution in the eighteenth century or the "great acceleration" of the mid-twentieth century with its increasing population growth, carbon emissions, biodiversity loss, plastic production, and start of the nuclear age with atomic bombs spreading detectable radiation to every stratum of the planet (Davies, 2016).

The Anthropocene as used in my research is more than this, more than a timeline of human degradation, geological posturing, or techno-positivist hubris. The Anthropocene reveals for me that beyond the ecological damage there is no homogenous human race and that this scale of ecological impact is unequal, unethical, and unjust; the poor, the children, and the nonhuman are more in it than the wealthy. As an unsettling ontology that disrupts the persistent "humanist" paradigms of the social sciences, the concept of the Anthropocene allows new conversations to happen around human-dominated global change, human exceptionalism, and the nature/culture divide.

The term Anthropocene has not emerged uncontested. Donna Haraway (2015) and many others in the field of childhoodnature including Taylor and Pacini-Ketchabaw (2015) have argued the naming of the Anthropocene constructs a certain model of the globe, a view that "the contemporary world is a human species act" (Haraway et al. 2015, p. 1). Haraway argues: ". . .in this moment of beginning to get a glimmer of how truly richly complex the world is and always has been, someone has the unmitigated arrogance to name it the Anthropocene." Many believe the naming risks validating human exceptionalism by reifying the "reign of Man" leading to the ultimate paradox, in which heroic techno-rescue grandiose geo-engineering fixes simply rehearse the same kinds of interventions that disrupted the earth's systems in the first place. This recognition of "Man's" exceptional powers could be an excuse to redouble efforts to become "better" at managing the environment. For me although recognizing these dangers, the naming of the Anthropocene provides opportunities to galvanize emergent forms of thinking and acting, one could claim that it disrupts the global hierarchy of sciences. After all, it comes as an invitation of collaboration from the "hard sciences," from the apex of the hierarchy of sciences to the human and social sciences. By changing the entrenched habits of modern western humanist thought, which are so adept at dividing humans off from nature, requires persistence, vigilance, and a preparedness to take risks. It is hard work. It requires us to continually interrogate what it means to be human, to resituate humans firmly within nature, and to resituate nature within ethical domains. By recognizing the fragility of limiting a collapse between the categories of human/nonhuman, nature/culture, is to recognize the means through which exceptionalism as a human condition continues to act out in the everyday lives of being with other species and the ethical decisions humans make when positioning themselves as superior to all living things.

I am adopting a posthumanist ethic. A "posthuman ethics" unlike a deep ecological ethic urges us to experience the principle of "no-oness" in our view of subjectivity, by acknowledging the ties that bind us to multiple "others" in a web of complex interspecies interrelations (Braidotti, 2013). Kay Andersen (2014, p. 3) states this focus on "challenging the idea that humans occupy a separate and

privileged place among other beings has been the central goal of post-humanist agenda," with critical posthumanists taking on the task of challenging well-established humanist discourses that "separates and elevates humans from the natural world." Using a posthumanist approach and engaging with the tools of diffraction, I am disrupting the Cartesian divide between human and nonhuman by challenging the simplistic dichotomies of animal/human, nature/culture, and object/subject. These dichotomies are constructing what has come to be "*viewed as nature*," what is "*valued about nature*," and what happens when humans are "*placed in relation with nature*." These dualisms not only strip humans of all of their own "natural" dimensions – we are no longer animal and part of nature – but also install the idea that other nonhuman animals and things are not comparable to humans, humans are politicized as earthly master, superior being, humans as exempt, and exceptional.

By the enabling this multiplicity of ecologies and subjectivities, community then becomes central – the world is, becomes a community of beings. I am interested in incorporating the work of Michael Smith (2013) here, who defines an ecological posthumanist perspective as a strategy for supporting his concept of an "ecological community." A posthumanist ecological community emphasizes the myriad of ways that beings of all kinds interact to create, sustain, messy, uneasy worlding communities. Others have also explored these ideas; Jean Luc Nancy stated in 1997 we are always been "beings in common" – and Derrida (2005) who also argued any concept of "sensibility" or touching means "being in the world" – bodies being sensed ecologically is to be and know. The theory of ecological posthumanism I am applying as a means for unhitching old ways of considering childhoodnature contests singular anthropocentric approaches – by supporting a collective common world. I am supporting this through the image of the onto-epistemological entanglement. I take this term from Barad (2007) where she states when you are practicing intra-action it is impossible to separate knowing (epistemology) and being (ontology). That these shared practices, knowing and being, cannot be isolated; they are mutually implicated. And that we know this because we are off the world, not standing outside of it.

Walking in La Paz

> Cities that are the "microcosms of the planet fashioned for our [human] species and no other." (Vince, 2014, p. 338)

During the period from 2012 to 2016, I researched with over 400 children in slum communities in the highest reaches of the valley of La Paz. We engaged in walking methodologies, photography, focus groups, and interviews. The focus was on understanding the everyday materiality of children's lives as they moved through their spaces with human and nonhuman others. Understanding the materiality of mobilities and how bodies flow through places and spaces with and through materials are as Aldred (2014) notes central and important to research on bodies in the landscape:

> How one moves during fieldwork has important consequences for the interpretative process, and presented movement as a conjunction between body and landscape . . . in order to study movement there is a need to understand it not dialectically, in-between static materials and moving bodies, but rather through the flows in which these two become co-constituent in movement. (Aldred, 2014, p. 40)

These children are descendants of the Quechua and Aymara people, the two largest indigenous groups in Bolivia. Evo Morales, the current president of Bolivia, is of Aymaran descent and, as the first indigenous leader, has supported policies that enhance the opportunity for the indigenous communities to speak of and seek to live in harmony with the earth – recently the country passed the Law on the rights of Earth Mother. Pachamama beliefs view the relations of human-animal companions as dynamic, and humans who are guided in Pachamama are in relation with a "spirit animals" sent as allies during the "human" journey on the planet. Central to this belief is that humans and nonhuman companions depend exclusively on what the earth provides. Pachamama is the source of all life, human, nonhuman, soil, air, and water. Ancestral ceremonies, rituals, and offerings of lama babies to Pachamama are entwined with a profound sense of respect and gratitude for Earth Mother who provides all. The following data shares the stories of children in La Paz focusing on three aspects of their lives (Malone 2017, 2018). The first is how the unsettling of matter, unruly ravines, and slippery slopes produce a precarious landscape; the second explores entangled flows and mobilities as children and other kin move through landscapes; the final focuses on a shared life with dogs, street dogs, who come to be child companions in the precarious times of the Anthropocene.

Lines of Flight: Ravines as Unsettling Matter

> Even when shifts of terrestrial surfaces and patterns are taken into account, it is easy to see these as mainly driven by human forces or the effects of human agency, with no comparable forces seen to be operating in the other direction. (Edgeworth, 2014, p. 49)

The landscape is an assemblage with flows of materials running through it, rivers, rocks, earth, sunlight, and wind; it is a moving omnipresent not a static backdrop to human or animal activities (Edgeworth, 2014). The high slopes are the most unstable with lake sediment deposits. The higher, steeper slopes are also the wettest; they are by far the most landslide-prone slopes within the city. The houses are swept away, buckled, and broken slowly with the earth slumping, the movement edges its way down the valley slope. Houses containing children slip down the valley.

The settlements where the children live sit in a valley surrounded by spectacular mountains. The view is extraordinary, but a closer look reveals a serious reality:

> Reaching out from the urban center and making their way up the mountain slopes on all sides of the bowl are the slums and shanty towns of La Paz. Here, plumbing and electricity are scarce or non-existent, roads sit unpaved and the escarpments that afford such distant photogenic vistas conspire to create an ideal setting for floods and landslides. (Weatherby et al., 2011, p. ##)

In the self-built areas, water is often taken from underground or is filtered from poor quality river sources. Water from the main city below is piped to certain areas, but landslides continually damage and sever this supply so that water from standpipes often has to be fetched up to dwellings by truck or bucket.

Landslides and their effects impact the families living in the settlements for a number of reasons. The environment of La Paz city is landslide active because the steep slopes are covered with soft earth deposits that are easily dislodged with wind and rain and the activity of building moves and displaces the dirt. The area is also impacted by water movement coming from Lake Titicaca, a high-altitude lake that sits high above the valley floor. Rapid growth and the influx of poor people drawn to the city with a desire to build houses means construction is often based on minimal materials and resources. This demand has also resulted in informal, self-built housing being constructed on the steepest most unstable slopes of the city. Finally, without a clear city planning framework, the city had continued to expand with properties being built on the city's treacherous slopes, without care or acknowledgment to the materiality of the earth and its limitations and its constitution as a body containing a past and present history as a landslide hazard.

> When I was a child there was a landslide. My house was on the edge where all the other houses near me all fall down. Ours was the only one left. We stayed in that house on the edge of cliff for five years after that. When my house was on top of the edge my mum and me still stayed there but my bedroom did not have a door – we had a small place to walk but my porch and the other part of the house fall down. We just put some wood and have to use a ladder up the cliff to get to the house. We had to carry the water it was very difficult. That's when my mother decides to rent a different house. In that house I was very sacred. When it starts raining I am afraid scare maybe the house will landslide again. I had my packed ready to go some I have to take it with me. I remember I was scared for strange people as I have a ladder to go to the house was always there what happens it someone comes into the house. Sometimes my mother had to work two times at night and I was alone. I only have my cats. I was so alone. I feel insecure. I didn't go different places because I was too sacred to leave the house alone. My route was school house school house, that was all. I now back in the same house on the edge of the cliff. And now even though the government has given tenure to some people in communities this house cannot because it is on very dangerous land and so we cannot own it. (Elena's reflections of a childhood in the slum communities of La Paz, recorded interview 2014)

The most vulnerable group exposed to the landslide hazard comprise the inhabitants of the self-built informal housing areas who occupy the more elevated steeper slopes of the northern part of the city. But societal vulnerability to earth movement in the city is widespread and interconnected. Landslides in the city of La Paz, Bolivia, are complex in space and time. Their distribution within the city is differentiated by geographical variations in slope gradient, the nature of overlying surface deposits, and drainage density patterns. When mapped, the distribution of the most landslide-prone locations in the city coincides with the most mobile surface deposits on the higher and steeper slopes of the city. The timing of landslides is triggered when slope materials become saturated with moisture by rainfall, stream water, water seepage from high-surrounding water tables, and from domestic sources. The slums are the first and often last stop for those rural drifters and those who come to the city with

expectations of a better life and employment. Living in the steep slopes of the valley in La Paz has unique and significant dangers for children and their families. Constant landslides, fires, limited public transport, strangers, street dogs, and inadequate policing all add to the daily difficulties children experience when on their own or with friend's moving safely around the community.

Children in the communities speak of many dangers in the physical environment but also other concerns about their health due to the lack of fresh water and the dust and dirt in the air, on the street, and in their houses. The children, when taking photographs of their life experience, took many photographs of dumped rubbish in the streets and ravines, where scavenging streets dogs could be found hanging out, fighting among themselves, and frightening the children. The fear of being taken, abducted, or hurt by strangers is real, and during a guided tour, the children in one neighborhood took us to a wall in the community center where the faces of lost children hung as a reminder to them of the risks. These slum communities in La Paz with their narrow steep steps and winding laneways and children who need to make their way alone or with friends to access school, shops, playgrounds, or their homes are a familiar sight in many Latin American countries. Children speak of many dangers some in the physical environment but also other concerns about their health due to the lack of fresh water and the dust and dirt in the air, on the street, and in their houses.

> As children as we had a small house – our bedroom was small we have in the same bedroom two beds, our kitchen, our small kitchen and just that. We didn't have a bathroom with all the sanitary services. We didn't have that and we use to go to the ground. Out to the bathroom we play in the same places, where go to the bathroom we play – and that is still here. I see that in the communities now I work I see that I see my reality, I say I use to be that child. But the part where we live, the property used to be a place where there was landslides. It is not secure land. And that is the reason why my grandfather never put the services. They water we didn't have water no water no sanitary services we didn't have that. We had to carry the water from the branch? Near the river was a little river with water we carried water. (Elena's reflections of a childhood in the slum communities of La Paz, recorded interview 2014)

The unstable slopes, the dirt, and rubbish are important issues children discuss with us during the walks. Children spoke of dumped rubbish in the streets and ravines where they would go to collect water or play. Most children had a photograph in their research of rubbish or dangerous ravines close to their homes where they felt unsafe. Children in Taca Gua particularly noted more than others that there was rubbish dumped near their homes. They also have no access to water or sanitary conditions, so they have to collect water from a central location and often go to the toilet in the earth close to their house. For many like Jonathon and Ricardo, they fear that the houses they live in are precariously located on unstable hillsides, and they worry for their safety. The following is a walking story by Juan where he took photographs as he walked home from school (Figs. 1 and 2):

> I live in Cotahuma. I took this series of four photographs as I was walking up the slopes towards my house after school. The one here is the second in my series. I took this

Fig. 1 Photograph series 1: walking up the valley. (Photograph by Juan aged 15, Cotahuma)

Fig. 2 Photograph series 2: walking up the valley. (Photograph by Juan aged 15, Cotahuma)

photograph because this canal is dirty, it is at the start of the way to my house. I don't like this place to be like this because it looks bad and it makes the area look bad. It is as we are getting to my house, at the lookout. I chose this photo because it is a ravine and it is dangerous, it is so dangerous they need to close it. It is the same ravine, the one that is very dangerous because many people fallen, I think they need to close it because a lot of rubbish is dumped there and lots of people and wildlife fall in. It is just around from my

> house. I chose this next photo because it is very dirty and the owner of the house doesn't clean it. There is lots of rubbish, but the good thing is that the steps are not dangerous. I don't like to walk through here because it is very dirty but I still have to walk through here anyway. This is a photo of where I bring water down from; it is very dirty and very dangerous. The sports field is above too and if the ball falls I have to go and retrieve if from the pile of rubbish. I am worried walking through here especially when it is raining hard and the flood waters may come over the edge of the ravine and wash away my house with me and my family and my dog. See this final photograph I took this photo in El Alto and I don't like the rubbish and it makes it look bad where they go and the dogs stop here and they can bite you. I walk a long distance sometimes because the valley is so steep. There is not always roads or stairs so we make our own tracks through the dirt. (Juan's walking story from school to home)

Gabriel, like Juan, provides images of the ravines: "I don't like this place because many people have fallen from here, it is very dangerous."

In response to a similar photograph, Dayana aged 12 also from Alto Taca Gua said: "I am afraid of this place, it is dangerous, I get very scared."

Ronaldo, aged 8 from Cotahuma, also commented on the dangerous ravines: "I don't like it here because there are ravines, people fall and it is a dangerous place, this place is ugly."

Building houses on the hilltops also causes many problems that the children are very aware of. Ricardo, aged 10 from Cotahuma, took a photograph of a pile of rocks that he tells us used to be his home: "It's my house but it has fallen down, it was ill constructed." He then shows us a photograph of the house he now lives in which is also showing signs of collapse: "t's my house, the cracks are there because it was ill constructed and all the houses in my area are also falling down, the tree roots destroy the houses."

Jonathan, aged 9 from Munaypata, also includes photographs from his neighborhood showing houses precariously hanging on the edge of the hilltop. He describes this: "These houses are hanging dangerously, one of them is collapsing, the one with the nylon hanging out the front is mine." He includes photographs close to the hanging houses and his house where there are piles of dirt and lots of rubbish: "A pile of dirt and lots of dust nearby my house which is collapsing and there is a lot of rubbish' and 'lots of rubbish below my house."

What Jonathon alludes to in his photographs and description is that beyond the dangers presented by the tree roots and slopes, the ravines and the now mostly empty riverbeds have become dumping grounds for rubbish.

Alan aged 10 from Alto Taca Gua is also concerned about the rubbish in his neighborhood and that the lack of rubbish bins: "There is always rubbish here, there are no rubbish bins. I would like there to be rubbish bins because the rubbish gets into the storm water."

Sebastian, who was aged 6, lived in Munaypata, which is a community a few kilometers across the valley from Alan in Taca Gua. But Sebastian has similar concerns about the rubbish, and in his drawing of the neighborhood, we see he draws his neighborhood streets and includes an area of open space with rubbish. He

described his drawing by stating: “This is the place I like least. It is full of rubbish and they drink too much.”

Sebastian also took photographs of him in his neighborhood. It shows the view across the neighborhood near his house. When describing this photograph, he told us: “This is close to my house I took it to show you that we have poor, dirty neighbourhoods and people that drink.”

Yesonia is from Munaypata and took me on a tour of the neighborhood. She takes photographs as we walk and talk. At one place she stops in front of a large dump of rubbish: “I want to show you the rubbish that people dump and the dogs that go to the toilet; it’s a place that is close to the house. I hate it, it smells’. While many children often talked fondly of the dogs in their neighbourhood many children stated that dog feces was a real concern for them. A number of children were also worried about the dangers of street dogs who might bite them and some recalled friends or relatives that had been bitten before.”

Luz, aged 12 from Alto Taca Gua, was also concerned about the rubbish in her neighborhood and its impact on the environment. She describes a photograph she has taken this way: “The rubbish is what contaminates the environment and it is what I don’t like about the area. They dump rubbish everywhere the rubbish bins are there in vain because they don't use them because they want to contaminate the environment.”

Many children said they wanted more police in their community and more policing of bad behavior by adults. Ricardo, aged 10 from Cotahuma, dreams of place to live where there is: “more police control because a thief broke into my house and because there were no police he escaped.”

Gabriel, age 12 from Taca Gua, supports this when he stated: “My neighbourhood is not that safe, there aren’t enough police.”

Mostly children in Cotahuma said they knew where to go or someone to help them should they need help or when in danger. But for children in Munaypata and in Taca Gua, many children were worried there was no adult around to support them when they went out into the neighborhood walking. Most parents in all neighborhoods believed other adults would help their children. Children were asked if they felt safe travelling alone, and their responses were quite varied but more likely than not to say they never felt safe. What this reveals is a sense of real dangers for children in the public spaces, and being kidnapped or hurt by others is a significant worry for them. In Cotahuma children showed us where in the welfare department a whole wall was dedicated to photographs of lost, possibly kidnapped children. Most children could name one child they knew or had heard of that had been kidnapped. This is very frightening, and while some of these may be related to domestic disputes or other family issues, children are also aware that they could be taken off the streets and kept captive in child labor rings, trafficked to other places, and for girls even the possibility of prostitution. Flow and movement of bodies is not always embodied as an action of freedom. I took a photograph of the wall as we walked away (Fig. 3).

Fig. 3 Wall of kidnapped children. (Source Photograph taken by the author)

Entangled Figurations, Flows in the Anthropocene

Freedom is an act of action; it is not a property; it has no content; it can't be defined. Therefore, there is no order in how to provide freedom it only exists through 'the "autonomy" of the living being against a background of routinized or habituated activity' (Grosz, 2010, p. 148). Grosz (2010), drawing on the work of Bergson, writes about:

> . . . an understanding of freedom that is not fundamentally linked to the question of choice, to the operations of alternatives, to the selection of options outside of the subject and independently available to him or her. It is not a freedom of selection, of consumption, a freedom linked to the acquisition of objects but a freedom of action that is above all connected to an active self, an embodies being, a being who acts in a world of other beings and objects. (2010, p. 147)

This concept of freedom, one that acknowledges the entangled assemblages of children, objects, and others in a world acting together, is valuable in a world where increased uncertainty and manifestations of risk real or imagined will be central to living in the Anthropocene.

Phenomenon could be described as the intra-action between an object and its surroundings. This intra-action leaves discernible marks on those surrounds so as to constitute them as a measuring apparatus of the intra-action. Barad (2007, p. 335) argues:

> . . . apparatuses are not merely human-constructed laboratory instruments that tell us how the world is in accordance with our human-based conceptions. Rather, apparatuses are specific material configurations (dynamic reconfigurings) of the world that play a role in phenomena.

Barad uses the term "intra-action" to describe how two poles of a phenomenon, the object and the apparatus, do not exist as such apart from their intra-action. What is measured by those marks of intra-action, however, is not a property of the object in isolation but of the phenomenon as a whole. The children in the three neighborhoods of La Paz were asked to draw on a map of their movements through the landscape. These marks on the map are as Barad alludes to a "measurement of intra-action" – they record the ongoing dynamics of boundary making (marking) practices of children with the landscape. The marks provide a record of each neighborhood and how children move differently and together through these landscapes. And as they move with and through and intra-act with objects, they leave traces of their past and present.

The maps provide children's movement not as autonomous individuals but rather as collective phenomena of child-city-movements, as material dynamic entangled objects becoming through the landscape. They provide entry points when observing the entangled nature of practice as it unfolds:

> [P]athways or trajectories along which improvisatory practice unfolds are not connections, nor do they describe relations between one thing and another. They are rather lines along which things continually come into being. Thus when I speak of the entanglement of things I mean this literally and precisely: not a network of connections but a meshwork of interwoven lines of growth and movement. (Ingold, 2010, p. 3)

In this way of acknowledging the marking of child-city-bodies in the landscape, there is an accountability to the world as being material, which for Barad (1996, p. 188) "is not about representations of an independent reality, but about the real consequences, interventions, creative possibilities, and responsibilities of intra-acting within the world." Knowing the world by participating in the configuration of phenomena makes one accountable for all of their consequences (Fig. 4).

The marks on the landscape portray the messy flowing streets of Munaypata following the valley terrain and the means through which children have individually and collectively devised complex pathways through the congested urban landscape. The steep crammed valley, with houses built on top of each, providing no space or paths or roads creates. The heavy flows of movement are connected to activities within streets, open areas, parks, playgrounds, and sporting fields. The flowing in and out of the central area that is the neighborhood of Munaypata tracks the means through which children enter in and out of the space along the ravine edges to move downtown to where the schools are and where their parents are working. They return back up the ravines to the neighborhood where they find small areas of open space, some earth to play out of eyeshot of adults who may have presented risks (Fig. 5).

Fig. 4 Collation of Munaypata child-city-mobility maps. (Source: Author)

> In our free time we played just on the earth, we didn't have a play ground we just played with the air, go to the garbage play on the garbage. In my neighbourhood before was so dirty, the river was open and you can smell the water was dirty. And people other communities use to come to there to throw all the garbage near the river and some factories carry some magazines books to throw out near the river and we as a child use to run to see what they had thrown. Maybe we can get some magazines things like that. That happened when I was 10 years old. I remember always I use to have dirty clothes. (Elena's reflections on a childhood in the communities of La Paz, recorded interview 2014)

According to Leary (2015, p. 8), "Mobility is also often entangled with feelings desires and emotions, and indeed certain mobilities, such as say pilgrimages, may be undertaken in order to generate a particular feeling or emotion."

Fig. 5 Complex entangled streets of Munaypata. (Source Sebastian aged 6)

Children's movement and freedom as represented through their intra-acting with and through the dirt, dust, and water of the ravines provides insights into the materiality of being with the earth through an embodied reality of moving through place. It is not the place or destination that is central to these child-city-movements but a mobile materiality that allows the child's entangled world to be revealed. Or as Ingold (2010, p. 3) entices us to consider, "a focus on life-processes requires us to attend not to materiality as such but to the fluxes and flows of materials" (Fig. 6).

Life, according to Deleuze and Guattari (2004), is developed along thread-lines (Ingold, 2010). These thread-lines of life are referred to by them as "lines of flight" or "lines of becoming." Like the markings of the children through the landscapes of La Paz, these are not lines that connect; they are the unfolding of possibilities for how materiality is flowing through the spaces between the earth and the walking. A freedom of flow is taking up agency through child-earth becoming. "A line of becoming," Deleuze and Guattari write:

> . . . is not defined by the points it connects, or by the points that compose it; on the contrary, it passes between points, it comes up through the middle . . . A becoming is neither one nor two, nor the relation of the two; it is the in-between, the . . . line of flight . . . running perpendicular to both. (2004, p. 323)

The "thing" the gathering together of lines of flight is according to Ingold (2010) is how Deleuze and Guattari explain the concept of a "haecceity" (2004, p. 290). The haecceity or thisness of things is represented through this mapping of collective lines of flight. At the center of the Taca Gua map, we can see a number of swirling lines centered around a particular object. The object is the play and sports space – it is also

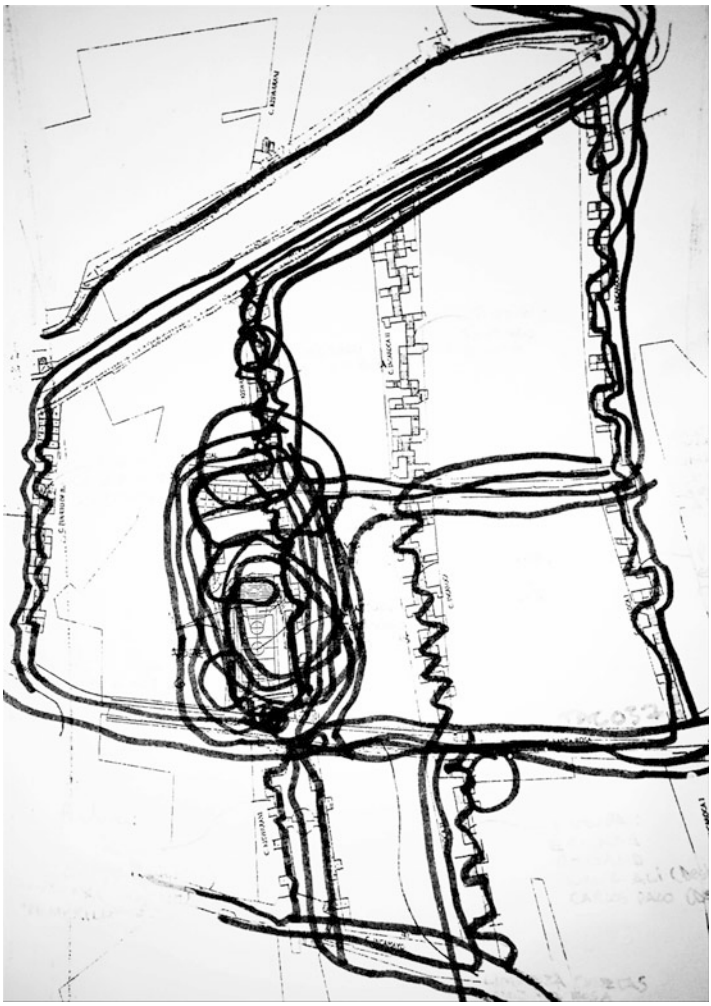

Fig. 6 Collation of Taca Gua child-city-mobility maps. (Source: Author)

the center where we held our workshops. Running vertical to these, the crooked lines illustrate the staircases where children can exit to the top of the valley and ravine into the El Alto or horizontally outward into the forested disused vacant blocks where the valley is so steep constructing houses or stairs is impossible or what was there has now been lost, washed away by a landslide. Walking, walking, carrying, carrying, puffing, puffing – up the steep staircases. The pathways are empty. Bare dirt fills the spaces in between. Hidden from view, the narrow walkways look out across the valley (Figs. 7 and 8).

Fig. 7 Staircases of Taca Gua (Photograph taken by children during walking interview)

> I walked. I always walked I never took the car or bus. Because the road I use to go was hilly and when it was the season of raining – the road was earth, the road was slippery and I use to fall down and I remember my shoes were always were dirty with all the earth. With the earth that's what it was like. We get access to the football field, was field near the river too and we use to go and play and run or play football. We didn't get access to a good real playground it was too far away. (Elena's reflections on a childhood in the slum communities of La Paz, recorded interview 2014)

Ingold (2010) explains the concepts of lines of light and flow as linked to his notions of network and meshwork. He likens it to a spider's web. The collective child-city-movement maps unlike the mapping work by Ward (1978), Moore (1986), Chawla (2002), and Driskell (2002) who use spatial maps to identify the boundaries of children's roaming range focus, these maps record spatial networks as complex intra-actions between human and nonhuman objects. Children of Cotahuma circumnavigate the valley ravines, the steep edges fall away beneath their steps. Reynaldo included a photograph of the obstacles along the pathway for children, he tells me: "I don't like it here because there are ravines, people fall and it is a dangerous and ugly place. A young person fell and that scares me; I want it to be closed off so no more people can fall" (Fig. 9).

> The lines of the spider's web, for example, unlike those of the communications network, do not connect points or join things up. They are rather spun from materials exuded from the spider's body and are laid down as it moves about. In that sense they are extensions of the spider's very being as it trails into the environment. They are the lines along which it lives, and conduct its perception and action in the world. (Ingold 2010, p. 12)

Fig. 8 Collation of Cotahuma child-city-mobility maps. (Source: Author)

The network of lines, the flow of materiality of child-city-movement, provides the possibilities for real and imagined journeys where the human and nonhuman are connected. The defining attribute of a network of flow lines is their potential for connectivity. The spider weaves their threads starting from the center, building layers by knotting carefully each thread; boundaries are created by supporting the trailing of loose ends that fall away.

I am reminded when I look at these child-city-movement maps of habitat or wildlife corridors. When I was working with schools many years ago, we often engaged in tree planting projects with the purpose of creating habitat corridors. Corridors act as points of connectivity for wildlife and are known to contribute to reestablishing populations who may have been impacted by natural disasters such as fires or disease or whose habitat has been reduced because of events such a deforestation, landslides, and road making. Habitat corridors encourage the

Fig. 9 Photograph of obstacles on children's paths in Cotahuma. (Photograph by Reynaldo aged 8)

movement of animals and plants along specific lines of flight in order to create a safe passage through a space, in order that species can flow. According to research, wildlife corridors should be built with randomness or asymmetry, rather than being symmetrical.

Multi-species Companions in Damaged Landscapes

The city of La Paz has 500,000 dogs and 1 million children. Every year in La Paz, there is a day devoted to caring for dogs, offerings of food, bathes, and immunizations. A bow is tied around their neck. During the project the team collected around 2000 photographs taken by children while they moved around the valley. From these images over 200 of the photographs included dogs (Fig. 10).

Dogs are uniquely sensitive to the natureculture attributes of human bodies with whom they live. They have the longest of evolutionary human-nonhuman relation dating back at least 15,000 years. Such is this complex history of human/nonhuman companionship; dog genetic diversity is often used as the means for tracing the history of the peopling of the new world. Tracing the history dogs in La Paz through DNA reveals 90% of dogs travelled to this land during the Spanish conquest, the gentry arrived with their hunting dogs – spaniels and poodles. My companion Poppy is also a cocker spaniel, dogs brought to Australia by the English gentry during the waves of postcolonial invasion. Although they have never encountered one another, dogs of La Paz and dogs of Australia, they are a species in common, both affected by a shared colonial history, the consequences of being worldly with humans. Deborah Rose Bird (2013), writing of her learnings with Australian Aboriginal people, who

Fig. 10 Collation of children's dog photographs. (Sources: Authors collection)

recall stories of their kinship relations with others, the Law, states, "their stories are always grounded in specific places and creatures." Rather than offerings Aboriginal people "sing up country" to acknowledge the relational human-nonhuman entanglement. "Singing up expresses powerful connectivities founded in knowledge recognition, care and love" (2013, p. 4). In my research in La Paz, children sing up earthly kin as child-dog bodies, dogs in La Paz who took us on walks, foraged for food, barked at intruders, and played games in the playgrounds. As our "spirit animals," they were our protectors, our guide dogs, sensing danger, we responded to their sensory cues. They alerted us to the precarity of the damaged landscape. Dogs in La Paz found solace in a shared life with children and children in a shared life with dogs. The following are short extracts from the stories children shared with us. The stories have been taken from a recent publication Malone (2018).

Coco-Juan

Coco coinhabits the environment with Juan. Juan starts his story of life shared with Coco by handing me a photograph of him and Coco. "Coco was my friend" he states, "On our way up the valley I photographed this large dump for rubbish; Coco is in the rubbish looking to find food. We share this life, looking for food. In my next

Fig. 11 Coco-Juan. (Source: Juan age 13 Cotahuma, La Paz)

photograph you can see the place where he plays freely with Coco at the top of the steep valley" (Fig. 11).

Kin relationships emerged in this study of La Paz as a deep sensitivity by the children when describing child-dog experiences. I use the concept of child-dog-bodies to recognize that as kin their shared relational encounters are outside of human-nature dualisms experienced by the adults of the community. Haraway (2015) argues the stretch and recomposition of kin represents the understanding that earthlings are all kin in the deepest sense – it is the purest of entities in assemblages of the human/nonhuman.

Black-Ricardo

"My dog's name is Black," says Ricardo, "He is beautiful and every time I bath him he gets dirty again. He comes with me when I play with my friends'. I worry for Black because he looks at me sometimes with a sad look and I wonder is he feeling pain or is he unhappy. Does he know how I feel? I wonder these things when I am with him. Does he like being a dog? I imagine sometimes that I am Black, that his body is mine. How great it would be to have four legs and run up the hills so fast. He is faster than me. When we go to the forest he always gets their first and he sits and watches me, slowly walking up the slope. It is steep and sometimes dangerous. I feel safer when he is there, you know I know if I got hurt he would help me. Just like I would help him."

Ricardo dreams of changes to his Cotahuma neighborhood to make it safer for him and his dog Black.

Fig. 12 Black-Ricardo. (Source: Ricardo, age 10, Cotahuma)

"The place is poor, the whole area is poor. My new house has cracks, my old house was ill constructed and fell down. I would like more police control because a thief broke into my house and because there were no police he escaped. I would like there to be more sports fields, no dust, and that things were greener so I could play safely with Black [his dog who lives on the street]'. Do you have a dog?"

As we finish this conversation, Norah walks up to show me her photographs. Norah is aged 9, from Taca Gua; she has taken the photograph from the roof of a house with her dog. "This photo is of my neighborhood" she says, "and that is where my house is, it is big and I live with my dad my mum and my sister. My house has many rooms, my dog lives on the street and takes care of me a lot." Ricardo asks her "what is your dogs name?" "I don't know," she replies, "He has never told me." Ricardo who looks down at his photograph of Black now turns to Norah again: "does he know your name then? Black knows mine" (Fig. 12).

Chino-Rosario

Rosario provides me with two photographs when we meet. The dogs are present and central to both photographs. In images she calls *dogs in the streets*, there are a group of dogs in the middle of the road. The neighborhood is empty, which can sometimes create an air of danger, but the dogs are playful, and the child is taking photographs. Rosario explains.

"As I walk to school the dogs come with me. They are the same dogs, everyday walking with me. My special one her name is Chino. She likes to just be with me the most. I like to be with them. They protect me and I protect them. You know if I get close I can smell their bodies, touch them. I can talk to them they listen. They are my friends, especially Chino." There is a pause. "They cannot come in the school though. The teachers get angry when dogs are in the school yard. I think what do they do when I am at school especially Chino? When I go home sometimes she is waiting, I think how does she know, you know that I am leaving?" (Fig. 13).

Fig. 13 Chino-Rosario. (Source Rosario, aged 12 Munaypata)

Conclusion: Attending and Attuning to the Anthropocene

To take back our personhood in relation to other species changes everything. Snaza and Weaver suggest, we need to attune to it; Tim Ingold speaks of attending to it. Both attuning and attending allow us to understand how something *not-self* is *similar to your self* and the not-self is *part of your self*. "What if we defined kin as those we share food from our fridge?" Those we sleep with? Those we play games with? Learn to drink from? "Being with the world" is how Rautio (2017a, b) describes forming a different view of ourselves as human in relation to nonhumans: "...it is about realizing that the relation is always already there, and as much influenced by behavior and existence of other co-existing species as it is by our actions." This form of egomorphism as opposed to anthropomorphism (Milton 2005) attributes the qualities of having a shared life with others – whether they be human or nonhuman. When my dog and my grandchild encounter the environment together, my dog is not being human, and Birdy my granddaughter who is pre-language is not being a dog – they are being worldly with kin, "being animal" sensing it through their bodies, an intelligence beyond "human intelligence" that is often only inscribed through cultural norms of discursive practices.

Child-animal relations co-shape shared worlds even when they are not together. Children in the Anthropocene carry the material entanglement of their lives with others throughout their journey's in cities. Taking from Marisol de la Cadena ideas on the Anthropo-unseen childdogbodies are "more than one – less than many." That is in my queering of binaries, I am creating ontological openings where child, dog, or earth is not either animal or nature. I am not offering up a flat ontology – rather

childdogearthbodies is the opening up of a new spaces in the Anthropocene, not human, not dog, not earth. Child is human but not only; dog is dog but not only; earth is earth but not only. We are implicated in our existence on the planet through our connection with earthling companions, and despite the human predilection to reiterate human exceptionalism, including within many epic and heroic narrations of the Anthropocene, the fact is that our human lives are tied together in this "but not only" spaces with our kin as worldly others.

Aldred (2014) writes: "there are several ways to inhabit movement. To move through a landscape is to dwell in movement, occurring when relates to and reflects on the material world as it is experienced and moved through" (p. 31). In this chapter I have sought to compress time and space through the study of earthly relations with and through movement patterns connected to stories and images taken by children over time in La Paz. It is a collective and individual story. I have, through children's stories of dog kin and child-city-movement maps, stories, and photographs, acknowledged that "human actions and mobilities are enmeshed with the actions and mobilities of flowing materials" (Edgeworth, 2014, p. 58). By applying Barad's (2007) tools of intra-action in order to trace the flow of materials through landscapes, as means for recording the ongoing fluidity and dynamics of objects, I have supported Ingold's (2010) notions of enmeshment and creative entanglement. Movement and freedom can be embodied, performative, and inscribed with pleasure, fear, conformity, and transgression. It is through walking, moving through the city, with children that I have come to know the complicated negotiation children perform as kin and how learning from these we can consider alternative ways of being on the planet with others.

In a posthumanist ecological community, we are always been "beings in common" bodies, materials being sensed ecologically. Sheller and Urry (2006, p. 217) argue while much of the research on movement is conducted at a distance it should also be equally concerned with "the patterning, timing and causation of face-to-face copresence." The texture of the ground, steep slopes, and loose earth; the weather, wind, rain, and darkness; vegetation forests and woodlands; and the others that we share the ground with, all influence and force certain types of movements, freedoms, constraints, and mobilities (Leary 2015). And as Ingold and Vergunst (2008) remind us, we are in relation with a world teeming with a vast array of nonhuman animal life, all of which influence how we move, with whom we move through the landscape, and the trails we leave behind (Leary). A child in the city is influenced by all these things, but beyond the immediate landscape, they may come to know through their meanderings in the leftover marginal spaces close to their homes the entangled and complex world beyond them, a world that is increasingly posing a whole host of heightened risks. Children in these precarious times will navigate the risks and dangers of natural disasters, fearful parents who restrict their freedoms, strangers, and wild beasts real or imagined lurking in the shadow ready to pounce. Mobility therefore is not simply movement, just as freedom is not just about being "free." The act of mobility is imbued with meaning, described in Leary's archaeological world of movement as "an ensemble of freedom, opportunity, adventure and progress, and yet it was also a form of restriction" (Leary, p. 11). The stories of child-dog-bodies moving freely in the landscapes of La Paz provide insights into how we (human-other as kin) come to be in places, with whom and without.

A quarter of a billion years ago, the earth went through a period called "the great dying." An extinction event where 96% of the species of plants and animals on the planet were lost, it nearly ended all life on the planet. Humans and all nonhuman species currently living on the planet are descendants from the surviving 4% of life. We are tied together by a genealogy, a history of our bodies entangled on this landscape with others. Noticing attunes us to worlds otherwise unrecognized; reconfiguring our sensing of bodies forces us into a new kind of history, the tracings of lively ghosts. In a postdevelopment/post-Anthropocene world, the Anthropocene is not just scientific facts, verifiable through stratigraphic or climatic analyses, but it becomes a "discursive development" that problematizes a humanist narrative of progress that has essentially focused on the mastery of nature, domination of the biosphere, and "placing God-like faith in technocratic solutions." It is a heuristic device for gaining a deeper understanding of how we "humans" have come to locate ourselves as master of a 4.5 billion year old planet when we have existed for the mere blink of an eyelid.

I am encouraged through the storying of the Anthropocene to track histories and trace flows and pathways that considers making multi-species livability possible. By wandering through landscapes, where assemblages of the dead gather together with the living, the Anthropocene becomes central to making meaning of the nature of childhood and childhoodnatures. Traces of the past live on through those kin who are among us; disasters and devastation formed our present; and hope lies, in considering these many pasts, as part of our future. Knowing the past is inscribed in our shared bodies and we carry them around with us (Hayles, 2003, p. 137).

Are we on the final steps to sealing the fate of a myriad of species, including our own? Will the damaged landscapes left behind hold only thin traces of the human/nonhuman histories through which ecologies have been made and unmade? (Gan, Tsing, Swanson & Bubandt, 2017). The naming of the Anthropocene acknowledges this incredible force and nowhere is this impact more dramatic than in cities, and no species has more to lose than children.

Cross-References

- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Re-turning Childhoodnature: A Diffractive Account of the Past Tracings of Childhoodnature as a Series of Theoretical Turns
- ▶ Situating Indigenous and Black Childhoods in the Anthropocene

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Situating Indigenous and Black Childhoods in the Anthropocene

26

Fikile Nxumalo

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Abstract

This chapter engages with selected Indigenous and Black feminist onto-epistemological concepts in relation to their potential for interrupting the ongoing absenting or essentializing of Indigenous and Black childhoods in dominant North American nature education discourses. In particular, I consider Indigenous feminist practices of *presencing* and *relating* alongside Black feminist traditions of *testifying-witnessing* as ways of knowing and doing that provide openings for inclusive, critical, non-anthropocentric, and speculative child-nature pedagogies, particularly for Black and Indigenous children living and learning in North American contexts. To illustrate their generative and interruptive potentials, I put these concepts into dialogue with ethnographic fragments of young children's everyday multispecies encounters, children's literature, Black speculative fiction, as well as situated Black and Indigenous place stories. I discuss how early childhood educators in the context of settler colonial North America might engage

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these ideas in their everyday practices with young children, including the ethical potentials of doing so within the ongoing and interconnected conditions of anthropogenic environmental change, settler colonialism, and anti-blackness.

Keywords
Settler colonialism · Anthropocene · Nature education · Black feminisms · Indigenous feminisms · Black childhoods · Indigenous childhoods

Introduction: Situating Knowledge in the Anthropocene

The naming of the Anthropocene as the current epoch of unprecedented human-caused environmental precarity has brought attention to the ways in which humans have transformed the Earth's ecosystems (Steffen, Crutzen, & McNeill, 2007). Intensifying waste generation, species extinctions, increased extreme weather events, and decline in clean water availability are just some of the anthropogenic challenges facing the planet (IPCC, 2014; United States EPA, 2015, 2016). However, the naming of the Anthropocene brings both potential and pitfalls in generating responses to current planetary environmental challenges. There is, for instance, potential in underlining the uncertain futurities and entangled precarities of humans and nonhumans on a planetary scale and thereby harnessing collaborative and collective responses. However, an important pitfall is the re-inscription of a universalized human that not only reinforces anthropocentrism but also fails to account for critical raced, classed, geographic, and gendered human differentials in the causalities and ongoing effects of the Anthropocene (Collard, Dempsey, & Sundberg, 2015).

Of particular concern in this chapter is the persistence of narratives that does not take into account the foundational and ongoing impacts of slavery and genocidal colonial violence in precipitating the Anthropocene (Lewis & Maslin, 2015; Whyte, 2017). These erasures persist despite interventions from work in diverse fields including Indigenous studies, the environmental humanities, feminist science studies, and critical geographies. Taken together these scholarly interventions have highlighted the ways in which current environmental challenges of the Anthropocene are intimately connected to past and present colonial and racial binaries that have prioritized certain humans' dominion over the more-than-human world in extractive and exploitative relationships. For instance, ecofeminist Val Plumwood (1993) brought attention to the fallacy of what she termed the "hyper-separation" of nature and culture in Eurowestern epistemologies and illustrated the connections between the "mastery of nature" and colonialism, whereby the assumed superiority of humans over nature was not and is not accorded to all humans. Put another way, slavery, colonialism, and their current afterlives are marked not only by devastation of the more-than-human world but also by the continual dehumanization of Black, Indigenous, and other marginalized peoples (Sharpe, 2016). As a result, the assumed superiority or mastery of Eurowestern human culture over nonhuman nature is inseparable from colonial and neocolonial extractive destruction of the planet, enslavement and slave plantation economies, and the genocidal removal of Indigenous peoples from their land (Mitchell & Todd, 2016). In summary, engagements

with the Anthropocene, while vitally important and urgent, remain overwhelmingly white and Eurocentric, largely ignoring the fact that while "we are in this environmental mess together," there is no universal "we" in relation to who counts as fully human, who currently suffers and will suffer the most, whose knowledges count the most, what ways of relating to and responding to living-with the Anthropocene are made visible, and in who gets to learn in complex and situated ways with and about the environment (Agard-Jones, 2014; Parham, 2015; Wynter, 2003).

An important contribution to the shortcomings of dominant Anthropocene discourses is that much of the discourse on the Anthropocene has been dominated by Western scientific perspectives. However, there is a growing body of work, particularly from the environmental humanities, that is highlighting the need for much more than a Western scientific understanding of the environment (Gibson, Rose, & Fincher, 2015; Kimmerer, 2002). This work has brought attention to the inadequacies of the universalisms of Anthropocene discourses, such as by arguing that, in addition to scientific understandings, more perspectives are needed to generate responses that trouble the colonial violences of Eurowestern human exceptionalism and nature/culture divisions that have precipitated current anthropogenic vulnerabilities. Important disruptions have emerged from environmental humanity perspectives that take seriously the social and ethical implications of viewing nature and culture as inseparable and point to the necessity of working to continuously avoid the recapitulation of humanist and modernist visions of (Eurowestern) man as savior of and benefactor from nature (Collard et al., 2015; Rose et al., 2012).

So what does this all have to do with early childhood education? Why do concerns about Anthropocene discourses matter for early childhood education? In North America, there continues to be a proliferation in nature-based early childhood programs, such as the ever-popular forest preschools. There has also been a plethora of books, articles, and opinion-editorial pieces on the benefits of "nature" schools or outdoor education for young children (Davis, 2015; Depenbrock, 2017; Louv, 2008; Müller & Liben, 2017). While this attention to the importance of educational attention to the more-than-human world is welcomed, the persistent romantic framing of nature is troubling (Nxumalo & Pacini-Ketchabaw, 2017; Taylor, 2017). In particular, raced and colonial erasures of dominant Anthropocene discourses are continually, even if inadvertently, reinforced (Nxumalo, 2015, 2016, 2017a). The insufficient and problematic engagements of the Anthropocene in early childhood spaces are not surprising, given the prominence of human-centered developmental understandings of the benefits of nature education for children (Taylor, 2013). This developmental framing reinforces colonial nature/culture and human/nonhuman divides and is fueled by the psychologizing and pathologizing of the perceived absence of certain children's relationships with nature (Taylor, 2013, 2017). The overwhelming economic privilege and whiteness of most nature-based preschools and kindergartens are also troubling especially since structural inequality remains invisible or is taken up in deficit ways in both academic and media representations of outdoor programs or young children (Cairns, 2017; Kopnina & Shoreman-Ouimet, 2011).

Clearly then, there is a need for more situated and complex as well as sociopolitically and ethically attuned approaches to environmental education with young

children. Important contributions toward this attunement continue to emerge in recent work by early childhood scholars such as the work of the Common Worlds Research Collective (2017). Drawing from perspectives that include the environmental humanities, posthuman theories, feminist science studies, and queer theory, this scholarship troubles persistent idealized, decontextualized, and human-centered notions of nature and childhood (Pacini-Ketchabaw & Clark, 2016; Taylor, 2017). This work has also sought to complicate environmental stewardship discourses that position certain children as future saviors of nature.

Despite these important orientations toward more ethically and politically oriented modes of engagement with the Anthropocene, there remains a gap in terms of curriculum, pedagogy, and research that specifically problematizes erasures of and deficit orientations toward blackness and indigeneity within the Anthropocene and that works to unsettle child-centered anthropocentric modes of environmental education (Nxumalo & Cedillo, 2017; Nxumalo, 2017a; Taylor, 2017). This gap includes the ongoing erasure of Indigenous land and life in settler children's encounters with places alongside persistent idealized and romanticized couplings between children and nature (Nxumalo, 2015, 2016, 2017a). Another example is found in the ways in which school gardens for young Black children in urban schools are often positioned from deficit perspectives, as a way to bring nature to certain children who lack it. Here nature becomes entangled with anti-blackness as it is positioned as a site of potential transformation for Black children deemed at risk or lacking "normal" connections with nature (Cairns, 2017; Nxumalo & Cedillo, 2017).

In this chapter, I attend to these concerns by seeking ways to disrupt Indigenous and Black erasure and deficit perspectives in environmental early childhood education while resisting anthropocentric modes of pedagogical engagement. My intent is to attend to these omissions by thinking with Indigenous and Black feminist onto-epistemological concepts and their possibilities for interrupting the ongoing absenting, essentializing, and deficit perspectives of Indigenous and Black land and lives in dominant North American nature education for young children. Building on recent work that has considered ways to center Indigenous onto-epistemologies and Black land geographies in place-based early childhood education (Nxumalo, 2015, 2016; Nxumalo & Cedillo, 2017), my specific entry point in this chapter is to bring forward three concepts from Indigenous and Black feminist onto-epistemologies and consider how they might be put to work to enact affirmative and generative childhoodnature pedagogies that center Black and Indigenous land relations and ways of knowing. I am particularly interested in possibilities for actively resisting Indigenous and Black erasure in nature education in research and practice in North American contexts. I am also interested in seeking openings for pedagogies that present Indigenous and Black children's relationships to nature – relationships that disrupt dominant salvation discourses while attending to colonial and racialized inequality.

I work with Indigenous feminist onto-epistemologies of *presencing* (Simpson, 2011) and *relating* (TallBear, 2016) and Black feminist onto-epistemologies of *testifying-witnessing* (Collins, 2000, 2016; Tarpley, 1995) as ways of knowing and becoming that have the potential to activate decolonial and anti-racist orientations

in childhoodnature research and practice in settler colonial contexts. To illustrate their generative and interruptive potentials, I put these concepts into dialogue with ethnographic fragments of young children's everyday multispecies encounters, children's literature, Black speculative fiction, and Black and Indigenous place stories. I discuss how early childhood educators might engage these concepts in their everyday practices with young children and discuss the ethical implications of doing so within ongoing conditions of settler colonialism and anti-blackness. I frame the interruptions brought by thinking with these specific Indigenous and Black onto-epistemologies as propositional approaches that researchers and educators might consider in their work with young children. My use of the word propositional is intentional; rather than putting forward enclosed prescriptions for research and practice to be followed, the intent is to provoke new ethical potentials in relational and situated encounters with knowledges, more-than-human relations, practices, places, and so on. In other words, this is a speculative approach that aims to reimagine different kinds of educational encounters but not just any kind of encounter – encounters that are particularly oriented toward disrupting erasures and deficit orientations in relation to Black and Indigenous land and life in the Anthropocene.

Presencing Indigenous Land and Life in the Anthropocene

In considering ways to respond to the absenting of Indigenous childhoods, land, and more-than-human relations in dominant forms of environmental education with young children within settler colonial contexts, I have been inspired by Nishnaabeg scholar Leeanne Simpson's (2011) conceptualization of presencing as acts that foreground ongoing Indigenous presences, resurgence, and land relationships in multiple ways. Simpson (2011) calls for presencing as decolonial acts that counter the "continual colonial mapping and erasing of Indigenous presence" (p. 96). Importantly, Simpson (2011) does not create enclosures around what presencing can be. For example, she tells a story of Nishnaabeg Rebecca Belmore's *Mapping Resistance* performance art intervention, where Belmore uses the repeated painting and removal of milk from a concrete wall in an urban setting in Canada, as a presencing act – a resistance against the persistent erasure of Indigenous land and sustenance through colonial capitalist processes (Simpson, 2011). In another example, Indigenous scholar Sandrina de Finney (2014) takes up presencing to describe Indigenous girls' complex stories of their relationships to colonized urban spaces as everyday acts that embodied resurgence and resistance in multiple ways, including "protecting, contesting, laughing, hoping, dreaming, connecting, documenting, imagining, [and] challenging" (p. 22).

Inspired by the decolonizing potentials of presencing, I use the concept *refiguring presences* to describe research and pedagogical practices in early childhood education that intentionally seek ways to trouble the literal and figurative ghosting of Indigenous peoples, knowledges, and land from place-based and environmental early childhood education (Nxumalo, 2015, 2016). I see potential for refiguring

presences as a non-innocent knowledge-making practice that interrupts everyday colonialisms in environmental early childhood education.

What then might refiguring presences entail as pedagogical practices? One practice, that I have found useful in working in early childhood settings with predominantly white settler children, has been to seek out place stories that unsettle children's outdoor place encounters as worldings on "supposedly uninscribed earth" (Spivak, 1985, p. 253) both currently and in the past. I am referring here to place stories and practices or (re)storying that affirm Indigenous land, life, and relations, while foregrounding human/more-than-human relationalities. These are place stories that recognize that "Indigenous land, life and futures are deeply entangled and co-constitutive" as Métis scholar Zoe Todd (2017) notes (para. 3). Importantly, while these are place stories for both children and educators, they are not innocent stories; the "'charmed stories' of imperialism and colonialism. . .[that]. . .blind us from understanding our own implication in ongoing racialized and colonial geographies" (Cameron, 2012, p. 15). Instead, these are stories that inhabit questions of power relations.

While such place stories are deeply pedagogical, they are not premised on children's physical, socio-emotional development or academic benefits from nature encounters. Refiguring presences through making visible otherwise place stories does not assume that all the "things," places, and people in these stories are in equitable relations. Refiguring presences through place stories has the potential to highlight complexities and inequities that might otherwise remain elusive in a normative child-centered narratives of events and encounters in early childhood settings. Importantly, refiguring presences through stories requires attention to Indigenous relationalities as an ongoing persistence. Refiguring presences then requires intentional movement away from re-inscribing the relegation of Indigenous peoples to a ghostly past. This, however, does not preclude engaging with the ways that the past continues to haunt the present. As Tuck and Ree (2013) remind me, haunting is also a necessary disruption as:

> the relentless remembering and reminding that will not be appeased by settler society's assurances of innocence and reconciliation. . ..Haunting lies precisely in its refusal to stop. Alien (to settlers) and generative for (ghosts), this refusal to stop is its own form of resolving. For ghosts, the haunting is the resolving, it is not what needs to be resolved. (p. 642)

Pedagogies inspired by presencing then, while having potential to disrupt early childhood environmental education as usual, are risky, implicated, and complex practices that necessarily include attention to intimate power relations and material-discursive colonial geographies as ongoing impacts on everyday life. These pedagogies are situated, emergent, relational, contradictory, and always messy encounters with contested places and the human and more-than-human relations therein that take "seriously the conceptual and empirical contributions of Indigenous epistemologies of land" (Tuck & Mckenzie, 2015, p. 4). Despite this complexity, I see potential in presencing as an early childhood pedagogical practice that might create openings for different connections, relations, and pedagogical responses.

The human and more-than-human stories that pedagogies of refiguring presences might bring to young children's place encounters are stories that interrupt dominant settler colonial, anthropocentric stories of place. Such stories are presented next as illustrative examples from everyday place encounters with young children that might be seen as enactments of presencing pedagogies. These stories are not shared as exemplars to be then followed. They are emergent, tentative, fraught, imperfect, always implicated, and situated practices that are not meant to be universally replicated. They are presented here to underline the importance of unsettling the erasure of Indigenous presences and relations in pedagogical encounters with settler colonial places. These small stories gesture to the possibility for environmental early childhood pedagogies to make visible and disrupt colonial inheritances – inheritances that are inseparable from children's place encounters.

Presencing Red Cedar Kin

On our almost daily walks in the forest, two red cedar trees have become places to stop and linger with the children. The first tree, disintegrating and partially burnt, called charcoal tree by the children, often invites the children to use broken pieces of charcoal to make marks on the exposed red-orange trunk of the tree – a practice one child calls and others echo "we're giving the charcoal back to the tree." The second tree is an ancient hollowed-out red cedar logged tree stump that the children have named bear house – imagined as a home for the black bears that share this forest with us.

Reflections on these encounters by the teachers in documenting children's learning include emergent literacies and children's understandings of the connection between burnt trees and the charcoal that we work with in the classroom, as well as caring relations between children and the forest. However, in thinking with a practice of refiguring presences, different questions and stories emerge. For instance, stories of the settler colonial destruction of much of the old growth Western red cedar trees by logging and fires emerge alongside place stories of the red cedar as kin to the Coast Salish peoples of this place (Nxumalo, 2015).

While there are always unexpected encounters that emerged each time we were in this particular place, this not to say that there is not intentionality in these practices. In these particular examples, our (educators and myself) practices emerged and shifted over several years of repeated encounters with this place with children, documenting the encounters, and critically reflecting on absent presences in these encounters alongside readings and rereadings of work from Indigenous studies, the environmental humanities, and new materialist theories.

More recently, children have been visiting with a Squamish artist as he works on carving a Western red cedar Squamish Welcome Figure close to the childcare center, from an ancient red cedar log gifted by the Squamish Nation. The figure honors the territories of the Squamish, Tsleil-Waututh, Musqueam, and Kwikwetlem territories (Broomfield, 2017). Indigenous and non-Indigenous children at the center have been learning with and encountering red cedar and Coast Salish red cedar kinship

relations. Importantly, here refiguring presences is not about the consumption of Indigenous knowledges and culture by settler children, though this is always a risk against which educators must remain vigilant. Rather, it is about Indigenous and non-Indigenous children living-with this particular place as Indigenous land, as a place of *living* Indigenous knowledges and kin relations. It is also about children learning with this place as a site of settler colonial destruction of the Western red cedar and displacement of Indigenous peoples. For the Indigenous children at the childcare centers, these acts of presencing can be seen as important affirmations of Indigenous land, life, and knowledges and as fractures in colonial temporalities and erasures that place Indigenous knowledge and peoples in the past. Refiguring presences is also about children learning to relate to and become affected by more-than-human others (in this example Western red cedar) in non-innocent ways that trouble human-centered and colonial notions of discovery and learning about nature. Refiguring presences can be thought of then as just one spatially attuned pedagogical orientation that might be needed in the Anthropocene to situate children within the messy anthropogenic settler colonial worlds they have inherited while simultaneously centering and affirming Indigenous land relations.

Relating to Pluriversal Worlds in the Anthropocene

> What if we thought about territory in terms of all of its multiple scales and engaged protocols to include the manifestations of radical inclusion, **radical relationality**, and the building of creative intimacies as our (re)worlding project of love? (Recollet, 2016, p. 101, emphasis added)

Alongside ongoing human-centric discourses in engagements with the Anthropocene, several environmental humanities scholars have underlined that responding to current times of proliferating anthropogenic extraction and environmental damage should include shifting to relations that decenter the human that emphasize reciprocity and obligation between humans and nonhumans and that recognize the intrinsic entanglement of nature and culture. This work has engaged critically with the focus on "grand" technological interventions into the Anthropocene underpinned by neoliberal governmentality, such as geoengineering, amidst an absence of considerations of human/more-than-human mutual obligation, relationships, and entangled precarities (see, e.g., Haraway, 2016; van Dooren, 2014). Work in the environmental humanities has primarily drawn on posthumanist or new material feminist perspectives in troubling nature/culture dualisms and in situating more-than-human others as social, agentic, and political participants in worldmaking with humans (Malone, 2017; Neimanis, Åsberg, & Hedrén, 2015). Here I join others in suggesting that while the intent is not to assimilate Indigenous worldviews into settler colonial worlds, Indigenous perspectives on relationality also have much to teach on learning to live in respectful, reparative, regenerative, and recuperative relations with the more-than-human worlds (TallBear, 2013, 2016; Todd, 2017).

Indigenous conceptions of relationality have never bifurcated humans from the more-than-human world and have always taken seriously the agency and sociality of the more-than-human world. Many diversely situated Indigenous knowledges foreground the relatedness of human and more-than-human worlds, emphasizing reciprocity, care, accountability, and interdependency (Cajete, 2017; Todd, 2017). Indigenous onto-epistemologies of relationality encompass connectedness and kinship with ancestors, future generations, spiritual beings, waterways, skyways, and animal and plant life (Martin, 2008; Tuck, McKenzie, & McCoy, 2014). Dakota scholar Kim TallBear (2016) refers to this as Indigenous people's "co-constitut[ion] in relation to [specific] lands and waters and skies (para 10)." The human/more-than-human relational entanglements recognized for millennia by Indigenous worldviews include their multiple articulations through place-specific creation stories, protocols, teachings, and Indigenous science (Whyte, 2017). In these understandings, human life involves an ongoing immersion in different expressions and experiences of reciprocal relatedness expressed in multiple, specific, pedagogical, sacred, and ecological ways (Tuck et al., 2014). In other words, "knowing your stories of relatedness. . .living your stories of relatedness" are central ways of being and becoming with specific places (Martin, 2008, n.p).

Connecting these ways of knowing and being to needed shifts away from human-centeredness suggests considerations of possibilities for foregrounding entangled relationality as a necessary part of decolonizing the Anthropocene – particularly in ways that center "inextricable relationships between land, bodies, time, and stories" (Todd, 2016a, para. 3). Importantly, a shift to non-anthropocentric relationality is not the same as romanticizing the more-than-human world. Indigenous relationships to land and its more-than-human inhabitants are not romantic: reciprocal relations include ethical, practical, systematic, adaptive ways of flourishing together and dying well together with more-than-human relatives (Whyte, 2017).

Importantly, given the intimate connections between settler colonialism and anthropogenic change, for many Indigenous peoples, living in inextricable relationship with more-than-human others has required and continues to require resurgence, renewal, and recuperation of damaged reciprocal relations (Whyte, 2017; Todd, 2016a). Whyte (2017) gives the example of Iñupiat communities in the Arctic, where people have lived for millennia in reciprocal relations with whales. These cosmological and living relations are expressed in multiple ways including sacred drumming ceremonies for whales. In some of these communities, a resurgence in drumming ceremonies, now adapted to invite whales back into reciprocal relations, has accompanied the interruption of whale cycles due to climate change.

While Indigenous onto-epistemologies of relationality have yet to see significant engagement in non-Indigenous environmental educational contexts, my suggestion here is that they powerfully orient the focus away from human-centric, predominantly scientific developmental environmental pedagogies and toward pedagogical encounters that bring attention to human entanglements with more-than-human relations. In other words, Indigenous knowledges create movements toward the "radical turn towards relationality, difference and interdependence" (Recollet,

2015, p. 132) that is needed to unsettle anthropocentrism in early childhood education.

Materializing pedagogies inspired by radical relationality to early childhood education brings difficult yet important questions. What kinds of pedagogies might be enacted that create attunement to ways of practicing, noticing, and nurturing reciprocal relations with more-than-human others (Nxumalo, 2015; Nxumalo & Cedillo, 2017)? For example, what might it look like for early childhood education to take seriously the contention that relationality with more-than-human others is foundational for young children learning to create and sustain more livable worlds? What might it mean pedagogically for early childhood teachers to take seriously that the natural world exerts agency and participates in sociocultural worlds in multiple ways, many of which are beyond human influence and knowledge? How might these ways of relating inspire early childhood educators in multiple contexts, while staying away from appropriative and consumptive engagements with Indigenous knowledges in seeking out more responsible relations with more-than-human others? While there are no simple and generalized answers to these questions, next I discuss examples of situated pedagogical encounters that might be seen as engaging a politics of radical relationality between human and more-than-human others. In particular, I focus on these pedagogical encounters as engaging radical relationality inspired by Indigenous knowledges in ways that unsettle child-centered pedagogies, resist the erasure of Indigenous land onto-epistemologies in early childhood education, and situate Indigenous childhoods within the Anthropocene in generative ways.

While there has been much written in education research about a recent "ontological turn" and its challenges to human-centeredness, as the preceding discussion suggests, this turn is not new to Indigenous teachings (King, 2017; Todd, 2016b; Tuck, 2014). Gregory Cajete (2017) illustrates how Indigenous teachings to young Indigenous children embody ethical relationality and interconnectedness with place and land as ontological:

> Maybe we will tell them that listening to stories is a way to know how things have come into being and how they are related to everything in the world – plants, animals, places, the stars, and we as human beings. Maybe we will point out a natural place and tell them how they and their people are grounded in the story of that place. Maybe we will tell them that story is sacred to Indigenous peoples and that stories, in their mythic forms, instructed the people on how to live a good life with proper relationship to all things. Maybe we will tell them how they will always be growing in relationship to their own story and the story of their people and place. (p. 114)

While underlining that the Indigenous stories of relatedness and co-constitution that Cajete (2017) refers are not for appropriation by non-Indigenous educators and children, I suggest that radical relationality inspired by Indigenous knowledges can serve as inspiration for early childhood educators in different contexts. For example, I have recently written about a long-term inquiry on bumble bees that young preschool-aged children engaged with unceded Coast Salish territories in British Columbia, Canada. This inquiry discussed shifting our curriculum from learning about bees every spring and encountering bees predominantly as objects

of scientific knowledge toward more relational, embodied, and risky immersion in the lives and deaths of bumble bees including attuning to the current extinction risk facing Indigenous Western bumble bees in British Columbia, bees with a long history of kinship relations with human and more-than-human worlds in this place (Nxumalo, 2017b). Prior to shifting pedagogies toward a relational approach, bees were a universalized and decontextualized object of learning for children. Every spring, bees were a predetermined learning theme in this early childhood classroom. Knowledge about bees as a passive object of children's learning was imparted to children in ways that included bee books, bee cutout crafts, and spring bee songs, alongside the preschool scientific learning *about* bees. A shift to interest-led, emergent curriculum in this classroom led to arguably more meaningful pedagogies. For example, bee pedagogies emerged from the curiosities of children and educators about the reasons for the absence of bee pollination of an apple tree in the preschools' garden one spring. Pedagogical encounters included children and educators self-pollinating the tree using paint brushes and researching the decline of bees in Western Canada (Nxumalo, Oh, Hughes, & Bhanji, 2015; Nxumalo, 2017b). In this example, the opening up to pedagogies that were attuned to childrens' curiosities was an important shift in the classroom. However, our pedagogies remained predominantly human-centric as we (educators) documented children's learning, followed children's interests, and gave children information on how the decline of bees would impact humans. While these shifts from teacher-directed learning themes toward following the child are not necessarily bad and are an important disruption of normative practices in early childhood education, they do not represent a significant shift in learning how to respond in more worldly ways to the challenges of living in anthropogenic worlds (Pacini-Ketchabaw, Taylor, & Blaise, 2016).

In shifting toward a curriculum of relating, our pedagogies became more attuned to alongside more affective and embodied ways of knowing and encountering bees and bee death. This included considerations of ethics, care, human, *and* more-than-human futures amidst bee decline and children's inheritances of unlivable worlds (Nxumalo, 2017b). Taking seriously the provocation to interrupt grand narratives of progress and heroism in the Anthropocene (Haraway, 2015), this inquiry did not provide any resolutions to the troubles of Western bumble bee death but suggests that it matters that children learned to be affected by bee death beyond their own human concerns, that it matters that children learned to relate to the bees' lives and deaths as entangled with their own lives, and that it matters that children came to know the Western bumble bee as an Indigenous species that had lived in relation with more-than-human life and human life for millennia. In this inquiry, children's affective (positive, ambivalent, and negative) and embodied encounters with dead and dying bees in their everyday encounters alongside their scientific learning together helped to activate different kinds of relational pedagogies. These pedagogies were not premised on children's developmentally appropriate learning about bees. Instead they remained open to and sought openings for children to learn to become affected by bee death, to immerse themselves in bee lives, and to connect bee life and bee death with a multitude of both human and more-than-human lifeways, not only their own human ones. In these small, seemingly minor everyday

relational encounters, rather than following children, educators followed bee life and death in their immediate environments, and they followed children's embodied relations with bees. Rather than avoiding or ignoring encounters with actual bees, educators paid attention to mutual affectivity and responsiveness, such as how the struggling bees responded as children "built homes" for and gave sugar-water to them. Small fleeting moments, such as one child gently touching a dead bee for the first time, became moments to consider what different kinds of relational worldings were being enacted through encounters with these typically unloved and awkward creatures (Ginn, Beisel, & Barua, 2014; Nxumalo, 2017b).

As children collected all the dead bees they found outside every day and brought them into the classroom, the growing presence of dead bees in the classroom amidst childrens' concerns about what was happening with the bees also enacted different modes of relating – relating that cannot be captured by romantic images of children-as-nature-stewards. Importantly, while I argue that these immersive relational pedagogies made possible non-anthropocentric worldings that attended to the agency of bees, bee-child entanglements, and bees as more-than-human kin, they were not intended to replicate the more-than-human social worlds and established legal orders (Todd, 2016a) of the Indigenous peoples of this particular place that have been in relationship with Indigenous Western bumble bees. Rather, here I suggest that the worlds enacted by children and bees here, while very minor and small within the scale of the colonial anthropogenic damage, can be seen as the kinds of radical recuperative ways of relating that can help to nurture sustainable worlds. Audra Mitchell (2017) describes this as a politics of collective coexistence that "honours, expresses, protects and nurtures the plurality of worlds" (para. 2) and recognizes the potential for a multiplicity of co-constitutive relations that cannot be captured by a universalizing planetary Anthropocene discourse.

Put another way, taking the plurality of worlds as a given and the attunement to these worlds as a key task in the Anthropocene, the relational attunements enacted in these bee-child pedagogical encounters can be seen as nourishing rather than taking away from the conditions for collective coexistence of Indigenous kinship worlds (Mitchell, 2017). In contrast, the child-centered pedagogies that focused on bees as an object of Western scientific knowledge and considered bees only in relation to what they do for (settler) humans could be seen as colonial worldings that shrink rather than help sustain the coexistence of Indigenous kinship worlds – worlds that encompass bees and Indigenous people in relation as well as complex webs of bee-human-more-than-human relations that can never be fully described and knowable by humans.

Some recent work, which while it may not follow the politics of citation with regard to Indigenous relationality that I have followed in the preceding bee example, is also trying out relational pedagogies that are resonant with the more-than-human relationality that I have discussed in this chapter. This includes pedagogical engagements on young children's relations with waste (Nxumalo & Rubin, 2018), oil pipelines (Nxumalo, 2017a), foxes (Rowan, 2017), raccoons (Pacini-Ketchabaw & Nxumalo, 2015), and kangaroos (Taylor & Pacini-Ketchabaw, 2016). In this work, thinking with relating is not a move back toward innocent childhoodnature

discourses, as perhaps can already be seen in working with "things" and creatures that are not typically seen as belonging in nature education with young children. Instead this work closely attends to possibilities of relating within the unequal and imperfect worlds that young children inherit and coinhabit along with other human and nonhuman beings and entities.

Taken together, the modes of relating that I am putting forward here as situated ways of responding to the Anthropocene with young children enact two important disruptions to normative environmental education. The first disruption is an intentional epistemological incursion into knowledge production about education in the Anthropocene. I have intentionally foregrounded Indigenous onto-epistemologies of relationality and more-than-human agency as an alternative to Eurowestern theorizing about the "turn" to ontology and nature/culture entanglements. As I will discuss further in the next section, such theorizing can reproduce anti-blackness in universalizing "the human" (Jackson, 2015, 2016; Nxumalo & Cedillo, 2017). A lack of attention to worlds outside of Eurowestern knowledge production also reinforces colonialism in ignoring Indigenous cosmologies that have long emplaced people in "complex relationships between themselves and all relations, and with climates and atmospheres as important points of organization" (Todd, 2016b, p. 6). The second disruption is in considering possibilities for shifting practice with young children toward ways that do not assume a singular and passive world awaiting children's and educators' meaning-making. While there are no recipes for enacting this challenging shift toward practices that always begin with relations rather than the child, I have attempted to illustrate here how they offer potential for the kinds of radical relationality that are needed to create pluriversal co-constitutive worlds (Mitchell, 2017) in the Anthropocene – worlds that help to sustain and present, rather than destroy, Indigenous kinship relations with the more-than-human world.

Testifying-Witnessing: Black Children's Lives Matter in the Anthropocene

Black childhoods and Black perspectives in both dominant North American Anthropocene discourses and in environmental education for young children are marked predominantly by absence and/or deficit salvation discourses as well as misrepresentations of Black people as not caring about or as indifferent about nature (Nxumalo & Cedillo, 2017). Black feminist theories are invaluable in making sense of the persistence of these discourses in academia, in schooling contexts, and more broadly in society and as modes of resisting absence and deficit in thinking with Black childhoods and education in the Anthropocene. Black feminisms bring much needed attention to the limits of engagements with the Anthropocene that do not also consider blackness and anti-blackness as necessary parts of the ontological and epistemological constellations that disrupt Eurowestern humanism (Frazier, 2016; King, 2017; Rusert, 2010). Zakiyyah Iman Jackson (2013) eloquently describes the antidote to these erasures of blackness and anti-blackness as the difficult yet important task of situating "'the human' as an index of a multiplicity of historical and

ongoing contestations... rather than tak[ing] 'the human's' colonial imposition as synonymous with all appearances of 'human'" (p. 681). For example, Sylvia Wynter's monumental (1984, 1994, 2003) work shows the insufficiency of Eurowestern humanism in responding to anthropogenic vulnerability. Her work brings a "both/and" orientation that interrupts human exceptionalism while also interrupting a universalized view of the human. Wynter delineates how interrogating humanism and disrupting the colonial human/nonhuman binary require attention to how Black people were and continue to be dysselected from belonging within the category of human. Wynter illuminates the problematics of centering more-than-human worlds as a response to the Anthropocene while leaving unexamined differential human vulnerabilities and responsibility in anthropogenic places. These problematics include a lack of attention to the ways in which the entanglements of colonialism, slavery, and advanced racial capitalism continue to create deeply inequitable human effects.

Taking inspiration from the teachings of Black feminists such as Sylvia Wynter to attune to the constitution of current times in complex ways that consider anti-blackness, relational Black place making, and practices of resistance, I think with articulations of the past/present histories of African-American testifying and witnessing whereby:

> talking back/testifying means to bear witness, to bring forth, to claim and proclaim oneself as an intrinsic part of the world. The act of testifying or giving testimony has deep roots in African American history, reaching back to slavery (and before), to the places our ancestors created..... where they opened themselves up to one another, showed their scars, spoke of their day-to-day life...Testifying...has also performed the function of providing a means by which the slave could make herself visible, in a society which had rendered her invisible; by which she could explore the sound of her own voice when she had been rendered silent. (Tarpley, 1995, pp. 2–3)

In resonance with Tarpley (1995), Black feminist scholar Patricia Collins (1998) points to testifying as relational practices that include affective responses and that are situated within particular Black experiences. She foregrounds testifying as an active naming of multiple and contextualized truths in creative ways. An important effect of the African-American testifying tradition is that it not only makes visible difficulties and injustices that might otherwise go unnoticed by the dominant society, it is also a relational affirmation of humanity, strength, and resilience and hope in the face of dehumanizing injustices (Ross, 2003). Therefore, Black feminist practices of what I am calling testifying-witnessing make visible the complexities of Black geographies, beyond stories of damaged place relations, surveillance, and absence (King, 2016; McKittrick, 2011). Put another way, Black life as "an intrinsic part of the world" to quote Tarpley (1995, p. 2) gestures to a refusal of "ungeographic" as a descriptor of Black life (Tuck, Smith, Guess, Benjamin, & Jones, 2013; McKittrick, 2006). As Black feminist geographer Katherine McKittrick (2006) states, "space and place give black lives meaning in a world that has, for the most part, incorrectly deemed black populations and their attendant geographies as 'ungeographic'" (xiii).

Brought to contexts of environmental- and place-based early childhood education, testifying-witnessing can be thought of as modes of revealing the inequitable differentiations of Black children's situatedness within anthropogenic inheritances, while simultaneously affirming Black children's humanity and generative nature relations. These affirmations include, but are not limited to, multiple acts of agency, subversion, and resistance that exceed knowability within the damage-centered antiblack relations that mark the ongoing wake of slavery (Sharpe, 2016).

In thinking with testifying-witnessing as modes of situating North American Black childhoods in the Anthropocene in ways that are affirmative yet also attend to anti-blackness, my underlying questions are as follows: what are the potentials of practices of testifying-witnessing for making a difference toward situated place inquiry in early childhood education that affirms Black childhoods, affirms Black relations with more-than-human worlds, and is attuned to racialized inequality in the Anthropocene? What might testifying-witnessing as a proposition for changing environmental education look like in curriculum-making or pedagogy with young children?

In beginning to engage with these questions, one proposition is to consider testifying-witnessing as an invitation for early childhood educators to seek out a multiplicity of pedagogical encounters – encounters that witness racialized place-based inequalities *and* encounters that testify to affirmative possibilities for Black children's relations to places. A recent children's picture book, *Over and Under the Pond* (Messner, 2017), provides a glimpse into the types of affirmative testifying-witnessing of Black children's relations to the more-than-human world. In this book, a young Black boy and his mother are pictured rowing over a pond. This beautifully illustrated book uses the child's curiosities and wonder about the inhabitants of the pond and adjacent land to describe the movements, sounds, and doings of a multitude of animal species including minnows, turtles, larva, blackbirds, and otters. The animals' doings described in the book pay particular attention to their interconnected worlds, including descriptions of animals hunting and eating other animals. Examples include lively scenes of a heron catching a minnow, a woodpecker digging for ants, and otters digging for mussels. However, there is an absence of Black geographical specificity within the pages of the story. In the author's note, Messner states that the book was inspired by a canoe trip at a pond in the Adirondack Mountains, but the scenes described in the book are not specifically emplaced. The reader also does not learn anything about the mother and child beyond the shared moments of this delightful day-long canoeing journey. This book could also be seen as representing "romantic, perfect nature for perfect children" (Taylor, 2013) rather than the reality of anthropogenic landscapes since all of the animals and plants are situated within a thriving pond ecosystem. Nonetheless, this book can be read as a small example of one kind of testifying-witnessing that is needed to situate Black childhoods in the Anthropocene. This is testifying-witnessing that affirms Black children as *belonging in and curious about* nature and as having affirmative relations with nature. In this example of testifying-witnessing, unsettling deficit depictions of Black childhoods also includes drawing on child-nature couplings that counter images of Black children as not belonging in or absent from "nature" environments,

including in ways that reclaim Black childhoods. Testifying-witnessing framed as situating Black childhoods in nature considers that while coupling white privileged settler children with romantic "pure" natures can reaffirm colonialisms (Taylor, 2013), for Black children, similar images can enact anti-colonial and anti-racist orientations. These contradictions point to the complexities of unsettling racialized nature/culture and human/more-than-human divides in educational contexts (Nxumalo & Cedillo, 2017).

Finding children's books that witness Black childhoods and nature in affirmative ways while highlighting relationality and belonging is not an easy task. In seeking out depictions of Black children's relationships to nature in several children's books, it has been challenging to find stories that are not linked to oppression and displacement. While the intent is not to ignore these stories, an ethos of testifying-witnessing points to the need for different kinds of stories for young children. These are stories that unsettle deficit or absented depictions, stories that in the vein of Black speculative fictions testify to and witness generative Black place relations and Black futurities. How might such stories be made visible in encounters with particular places with young children? What might emerge from seeking out Black land stories with children?

In seeking to further resist what Katherine McKittrick calls "Black narratives of un-belonging" (2002, p. 28), and amidst the lack of diverse children's literature that reflects the complexities of Black children's relations to nature, including land, I suggest that Black speculative fiction provides an ethos that might be brought to early childhood education as a creative and interruptive mode of testifying-witnessing. Black speculative fiction has a long history of theorizing about Black life in utopic and dystopic geographies – radically imagining Black futurities and reimagining past Black life (Benjamin, 2016; Imarisha & Brown, 2015). The work of Octavia Butler is seminal in this area in creatively bringing together science fiction, environmental issues, and new imaginaries for Black life (Butler, 1988, 1995, 1998). What I am proposing is that in addition to real-world encounters, educators can draw inspiration from Black speculative fiction in seeking out and co-creating with children place-based and environmentally attuned creative inventions that situate Black childhoods in places, including "nature" in ways that unsettle deficit or absented depictions of Black children and that imagine new kinds of Black childhoodnature worldings. While there is a paucity of speculative Black fiction that is specifically for young children, there is a rich body of work for adults and young adults that can provide inspiration (Nxumalo & Cedillo, 2017). One example is the comic book *Niobe: She is Life* named for its Black, half-elf warrior heroine who navigates good and evil in a fantasy world alongside fantastical creatures (Jones & Stenberg, 2015; Nxumalo & Cedillo, 2017). While the worlds inhabited in by Black speculative fiction works are often far from utopian, they provide offer powerful "transgressive visions that center black female subjectivity, challenge the (dis)connections between human and non-human entities, and initiate alternative notions of environmental/ecological ethics" (Frazier, 2016, p. 46).

As mentioned previously, alongside an ethic of resistance and affirmation of Black humanity, African-American traditions of testifying bear witness to injustices

that might otherwise go without care and response by the dominant society (Tarpley, 1995). In bringing these Black feminist onto-epistemologies to early childhood education, I am interested in possibilities for enacting testifying-witnessing in ways that pay attention to anti-blackness and its entanglements with anthropogenic damage. One illustrative example is young children's pedagogical experiences with water. Water, either in surplus or in scarcity, is at the forefront of the environmental challenges brought by climate change (United States EPA, 2016). Feminist environmental humanity scholars have pointed to the need for ethical water relations that recognize our implication in water-related inequities at local, regional, and global scales (Andrijasevic & Khalili, 2013; Chen, MacLeod, & Neimanis, 2013). Water is an ubiquitous material in North American early childhood settings as a foundational exploration, play, and learning material in both indoor and outdoor environments (Pacini-Ketchabaw & Clark, 2016; Nxumalo, 2016). Regardless of context, water is typically viewed as a resource for young children's physical/sensory, socio-emotional, and cognitive development (Gallagher, 2005; Waller et al., 2017). This learning typically takes the form of a scientific and mathematical approach, such as "what sinks or floats" learning activities, and the use of containers and tools to control and measure water. Water is rarely linked to climate change science and issues of the Anthropocene such as floods, drought, and water pollution in children's immediate environments (Dove, Everett, & Preece, 1999; Gross, 2012; Havu-Nuutinen, 2005). Water then holds the potential for the creation of different kinds of pedagogies that are attuned to environmental justice as well as to more relational and less objectifying ways of being-with water in early education contexts.

One potentiality for restorying water in ways that testify to racial and classed inequalities is found in the story of the poisoning of Flint, Michigan's water supply. Pulido (2016) has described the case of Flint's water as a story of structural environmental racism and its entanglements with racial capitalism. This story is told by lead-leached water, Legionnaire's disease-causing bacteria, myriad health problems, and fatalities faced by the predominantly Black and poor residents of Flint; lead-poisoned bodies of Black children; decaying infrastructure; necropolitical governmental practices of neglect and abandonment; the accumulation of plastic water bottles; Mari Copeny, also known as Little Miss Flint, a 10-year-old Black girl from Flint whose activism has become a symbol for the community's resistance and fight for clean water; and more (Latty et al., 2016; Pulido, 2016). Flint water pedagogies as testifying-witnessing can help to activate different kinds of water relations. Such relations unsettle the romance of water-child couplings in early childhood education by attending to specific Black childhoods impacted by anthropogenic waterways. Importantly pedagogies that are attuned to stories of watery environmental damage and racial inequality do not preclude attention to science – it is possible, for example, to consider how teachings of Flint lead-water pipe-water-illness-blackness might emerge alongside age-appropriate science, ethics, and environmental racism learning.

These are not easy pedagogies to enact – just as there is a risk of cultural appropriation in the relating and presencing propositions discussed earlier in this chapter, there is also a risk of environmental racism pedagogies' promulgating

damage-centered stories of Black communities and activating pity (Tuck, 2009). In this particular example, the story of Little Miss Flint's activism is one antidote against this risk that can be brought to children. Testifying-witnessing to the complexities of water and water-child relations could include seeking out particular anthropogenic water stories in children's local environments, paying attention to how differently raced, classed and gendered, and colonized bodies are affected in different ways by water in current times of environmental precarity.

Conclusions

In this chapter, I have put to work Black feminist and Indigenous onto-epistemologies of presencing, relating, and testifying-witnessing as modes of situating Black and Indigenous childhoods in the Anthropocene and as ways to enact citational practices that bring attention to ways of knowing that are typically marginalized in currently educational scholarship on the Anthropocene. Through illustrative examples drawn from everyday practice, real-world anthropogenic crises, and literary works, I have discussed how Black and Indigenous ways of knowing, relating, and living with more-than-human others have much to teach us about hope in current times of environmental precarity, including ways of relating to the more-than-human worlds' unsettle persistent Western humanisms and universalisms that Anthropocene discourses often (even if inadvertently) reproduce. I have also sought to think with the ways in which these concepts might bring attention to Black and Indigenous childhoods in complex ways. These complexities affirm Black and Indigenous childhoods as deserving of presence, innocence, survivance, creativity, and decolonized futurities. They also take seriously the ways in which coloniality and anti-blackness are always already imbricated in the asymmetric impacts of the Anthropocene. In taking a propositional and speculative approach to rethinking children and nature while centering blackness and indigeneity, rather than prescribing practices for early childhood educators to follow, I have provided examples of generative and interruptive orientations that can serve as inspiration for educators in their situated places and spaces of environmental education with young children.

Cross-References

- ▶ Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective
- ▶ Ara Mai He Tetekura: Māori Knowledge Systems That Enable Ecological and Sociolinguistic Survival in Aotearoa
- ▶ Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature

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Renaturing Science: The Role of Childhoodnature in Science for the Anthropocene

27

Donald Gray and Edward M. Sosu

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Abstract

This chapter proposes that there is a need to examine childhoodnature experiences and the way in which these might be influential in shaping an agenda for

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science and science education in the Anthropocene. A *renaturing* of science places a much greater emphasis on, and recognition of, the interdependency and relational nature of the natural world in which humans are inextricably embedded and suggests the need for the development of a strong ecological identity (Thomashow, Ecological identity: Becoming a reflective environmentalist. MIT Press, Cambridge, MA, 1996). This suggests that there is a need for increased availability of childhoodnature experiences and a focus on the quality of those experiences, as well as the need to explore further lifelong opportunities for developing innate biophilic (Wilson, Biophilia. Harvard University Press, Cambridge, MA, 1984) tendencies. The chapter examines the childhoodnature experiences of beginning undergraduate university students and how these influence their current relationship to the natural world. Literature suggests that the strength of a person's nature relatedness can have an impact on the way they view the natural world and can, subsequently, influence the actions they take toward that natural world. This chapter describes a mixed-methods approach used to examine beginning university students' childhoodnature experiences and how those experiences may have influenced their sense of nature connectedness. Data gathered indicates that there are statistically significant correlations between childhoodnature experiences and current sense of nature connectedness, although the qualitative data suggests that the form of those experiences may be of critical importance. Evidence from the study presented here suggests that exposure to childhoodnature, while necessary, is not sufficient in itself, and further research is required into the nature and quality of childhoodnature experiences. This concurs with previous studies, e.g., Vadala, Bixler, and James (J Environ Educ 39:3–18, 2007), which found that it was the particular qualities of the childhoodnature experience that appeared to play a significant part in shaping future interests, attitudes, and values.

Keywords
Nature connectedness · Childhood experiences · Ecological identity · Higher education · Biophilia

Introduction

This chapter starts by examining the context of the Anthropocene and why consideration of beginning university students' sense of nature connectedness is important, particularly in the sciences and those disciplines which influence decision-making with respect to the environment. This chapter draws on quantitative and qualitative data gathered over the past 5 years that is part of an ongoing study focused on sense of nature connectedness and possible childhood influential factors. Data for this chapter were obtained from a cohort of first year undergraduate students in 2013, which is to be followed up in their final year in 2017.

The Anthropocene

The natural world is in crisis, exemplified by the proposal that humanity is now living in the age of the Anthropocene (Steffen, Crutzen, & McNeill, 2007), a new geological epoch characterized by the human impact on the natural flows of energy and materials around the planet. In order to gain some understanding of the way in which childhoodnature might impact on undergraduate students, and how that might influence their actions in the Anthropocene, there is, first of all, a need to consider some of the essential features of the Anthropocene, how these arose, and the role that science and scientific practice and decision-making plays in that process.

The term Anthropocene was first advocated by biologist Eugene Stoermer in the 1980s but not popularized and put into print until he co-published an article with Nobel prize winning atmospheric chemist Paul Crutzen in a Global Change Newsletter in 2000 (Gray & Colucci-Gray, 2014). In this newsletter, they presented some of the fundamental impacts that human technology and progress have had on the planet and stated:

> Considering these and many other major and still growing impacts of human activities on earth and atmosphere, and at all, including global, scales, it seems to us more than appropriate to emphasize the central role of mankind in geology and ecology by proposing to use the term "anthropocene" for the current geological epoch. (Crutzen & Stoermer, 2000, p. 17)

While there are debates about when the Anthropocene began, with some suggesting it originated with the onset of early agriculture (Ellis et al., 2013), Crutzen and others suggest it began with the onset of modern industrialization, near the end of the eighteenth century. Steffen, Broadgate et al. (2015), however, convincingly argue that, from an Earth system science perspective, the period since the start of the 1950s, called the great acceleration, is by far the most convincing. It is during this period that the Earth system indicators, such as the concentration of CO2 in the atmosphere, began to accelerate exponentially (Steffen et al., 2004a). A report from the International Geosphere-Biosphere Programme (IGBP) indicated that the last 50 years have seen the most rapid transformation of the human relationship with the natural world in the history of humankind (Steffen et al., 2004b). Although there may be some debates about when the Anthropocene began, what needs to be asked is How did this happen? and What can be done about it?

Rockström et al. (2009) have identified nine planetary boundaries, which, they suggest, are the intrinsic biophysical processes that regulate the stability of the Earth system and act as a safe operating space for humanity. The seriousness of the global situation is highlighted by the fact that three of these nine planetary boundaries have already been overstepped: rate of biodiversity loss, climate change, and human interference with the nitrogen cycle (Rockström et al., 2009; Steffen, Richardson et al., 2015). Consistent evidence drawn from further scientific studies illustrates that humanity is, to paraphrase Steffen, Broadgate et al. (2015), involved in a great

acceleration toward an apparently unavoidable planetary catastrophe, which will be unable to sustain human life as it currently exists. What is remarkable, however, is that, according to Slaughter (2012, p. 119):

> Despite overwhelming evidence that humanity needs to change course, revise its modus operandi and steer away from the abyss, it continues on its merry way apparently oblivious to the very real danger it is in and uncaring of the costs to present and future generations. This is a civilisation in denial of its existential condition, a myopic and growth-addicted culture that constantly refuses to acknowledge the global emergency it has itself created.

There is thus a call for a fundamental shift in perspectives, worldviews, and institutions, which require a reconnection of the way human society progresses and develops within the capacity of the biosphere and essential ecosystem services to be maintained (Folke et al., 2011). So business as usual with science will no longer suffice (Lubchenco, 1998) and, as Peter Raven, the then president of the American Association for the Advancement of Science stated: "We need new ways of thinking about our place in the world and the ways in which we relate to natural systems in order to be able to develop a sustainable world for our children and grandchildren" (Raven, 2002, p. 957).

A Lost Sense of Unity

Gregory Bateson, an anthropologist, biologist, cyberneticist, and systems thinker, said "The major problems in the world are the result of the difference between how nature works and the way people think" (Bateson, 2011). Bateson argued that many of the problems encountered in the world were associated with a dominant way of thinking in scientific, political, economic, and other spheres, a way of thinking which was fundamentally counter to the way in which nature works. The premise he builds his work on is that every person is part of the living world (Bateson, 2002), and he suggests that "most of us have lost that sense of unity of biosphere and humanity. . ." (ibid, p. 16). He bemoans an education system which "teaches almost nothing about the pattern which connects" (ibid, p. 7). The pattern which connects is a response to the fundamentally reductionist practice of science, which fragments and focuses on the parts. Bateson argues, however, that it is the relationship among the parts which is of fundamental importance, and he calls for a new way of thinking, of perceiving our environment which he calls "An Ecology of Mind" (Bateson, 1972). Thus, if universities have a fundamental role in developing a deep understanding of the world, it is important that there is a close look at how universities influence, or do not influence, students' perspectives, values, and attitudes toward the natural world.

If Bateson's premise is accepted, then there are serious issues and questions arising as to the types of attitudes and values, as well as sense of connectedness to the natural world, that it is desirable for young people to have. It can be argued that this is particularly important for the near 50% of young people coming out of university institutions with science degrees and seeking employment as professional

scientists, as well as others who will be working in sectors that directly impact on the environment and develop and enact practices and legal frameworks with respect to our environment. The knowledge and understanding of their discipline, and the decisions they make, can be molded and influenced by that sense of connectedness they have to the natural world (Weinstein, Przybylski, & Ryan, 2009), which has also been shown to be directly linked to their level of pro-environmental attitudes and behaviors (Chawla, 2007). To date there have been no studies which have looked specifically at university science students' sense of nature connectedness and their perspectives, values, and attitudes toward the natural world. The study described here just begins to do that within a broader study across all university disciplines but does provide a clear foundation for further research in this area.

The view presented in this chapter is that there is a need for a shift in perspective with regard to human-nature relationship, particularly in the sciences and those disciplines which model themselves on scientific practice. As Kates et al. (2000) suggest, it is important for scientists and engineers, as well as citizens, to be aware of the social and environmental impacts of their practices and how this can inform decision-making processes. Thus, as universities are perhaps foundational in the development of these scientific practices, and their impact on decision-making processes, it is, then, important to explore these influences on the undergraduate student population. Science is built on a foundation of viewing the natural world as something "out there" to be viewed and analyzed objectively with humans removed from the scenario, but the products and resources derived from that knowledge are being used primarily for human benefit. While the developments that brought about the Anthropocene are complex and emerging from an intricate entanglement of knowledge production, commercial expansion, and consumer exploitation, it is very clear that science has had a major role to play in all of these areas. Just as there has been a great acceleration in the impact on the planet, that has coincided with significant developments and the changing nature of science in society.

Now firmly established, the idea of the "paradigm" is well elaborated in the history and philosophy of science. Kuhn (1996) describes the paradigm as being the term that relates closely to "normal science," and these suggest accepted examples of actual scientific practice, which provide models from which emerge particular coherent traditions of scientific research. As a particular worldview becomes established, drawing from the scientific laws, concepts, and theories that have come to be accepted within the scientific community, the "paradigm" becomes firmly embedded in practice and ways of looking at the world. For example, modern science since the time of Descartes (1596–1650) and Newton (1642–1727) has been built on fundamental principles of reductionism, which is the belief that the world can be understood by analyzing discrete separate parts and then assembling a picture by putting the parts together. Such views resulted in the notion that the mind was entirely separate from the body and has impacted on the way that knowledge is viewed and knowledge comes to be known (McNerney, 2011; Merleau-ponty, 2004). While the mechanistic and reductionist ideas in science have been immensely successful, and still have a very important part to play in scientific endeavors, they have also proved to be problematic when applied to complex, open systems such as

those that regulate the planetary cycles. So, for example, Solé and Goodwin (2000, p. 19), theoretical biologists, believe that reductionism is inadequate as the primary explanatory framework of science. Elsewhere Goodwin has suggested that a more holistic science is needed (Goodwin, 1994, 2000), which considers the whole rather than just the parts, but also involves consideration of the relationship between the parts and the whole. This requires a fundamental shift in the perspectives and the practices of science and scientists.

The Parts and the Whole

While for unproblematic issues science as currently practiced is probably very effective, and sufficient, for more complex problems, the model for scientific argument needs to be not a formalized deduction but an interactive dialogue among many stakeholders, what Funtowicz and Ravetz (1993) refer to as postnormal science. However, it can be argued that postnormal science still requires a new way of thinking among scientists themselves, a deeper sense of connection with the Earth on which humanity lives, and a sense of connection that is often found among indigenous communities around the world (Pierotti & Wildcat, 2000). In fact, in many respects, it could be suggested that the practice of science requires a transformation of the scientists themselves, a view espoused by Goethe (1749–1832) who, while largely recognized as a literary figure, also made significant contributions to scientific thinking. In Goethean science, the scientific ideal is to allow oneself to be transformed through an immersive observation and experience of the phenomenon itself which is under consideration, the ultimate aim of science being nothing more than the metamorphosis of the scientists themselves (Amrine, 1998). It is interesting to note that in using the term "theorizing," Goethe understood this in its etymological sense as our "way of seeing." Thus, referring back to Raven (2002) and Bateson (2002) mentioned earlier, new ways of thinking are needed, just as much as new ways of seeing. Or perhaps it can be argued that what is needed is a return to our original way of seeing and being in the world, a way of being, thinking, and seeing which has been lost over the millennia of Western human development (Kaplan, 1992) and particularly in the era of the Anthropocene.

Resonating with Bateson's views presented earlier, Bortoft (1996) suggests that the greatest difficulty in understanding comes from our long-established habit of seeing things in isolation from each other, an inheritance from the scientific practices of reductionism and personal distance from the object being viewed. However, Bortoft, who himself was a quantum physicist closely associated with David Bohm (1917–1992), provides a critique of current scientific practices and suggests that while reductionist practices can help to explain things, they do not necessarily lead to *understanding*. It is only when things are seen in their context, "so that intrinsic connections are revealed" (p. 290) that *understanding* is developed. Bortoft and Bohm were both very concerned about understanding *wholeness*, and wholeness can only be understood by considering how things *belong* together (Bohm, 1980; Bortoft, 1996, 2012). Explaining something, which much of science

attempts to do, is not the same as understanding it, even though, as Bortoft states, these are often confused.

In a similar vein, Albert Einstein, one of the foremost scientific thinkers of the twentieth century, recognized the limitations of science with respect to serious social, and it could be argued environmental, problems. He stated that science "cannot create ends and, even less, instil them in human beings.... For these reasons we should be on our guard not to overestimate science and scientific methods when it is a question of human problems; and we should not assume that experts are the only ones who have the right to express themselves on questions affecting the organization of society" (Einstein, 1949). This links with the idea of other ways of seeing the world such as those of indigenous peoples (Pierotti & Wildcat, 2000). Similarly, Jones (2013) argues that the contemporary discourses of sustainable development and tackling climate change are plagued by the same modernistic assumptions of rationality in their reliance on scientific enquiry and the separation of people from the biophysical environment. There is thus, as argued by Hofstra and Huisingh (2014), the need for a shift from anthropocentric perspectives to more ecocentric approaches.

One of the difficulties in inculcating ecocentric approaches is that young people are, arguably, having less experience in natural environments and can be said to be suffering from "nature deficit disorder," a term coined by the journalist Richard Louv (Louv, 2005). This term has been critiqued by Dickinson (2013), who calls it a "misdiagnosis," which can result in a "mistreatment" of the problem. She suggests a rethinking of human-nature disconnectedness by digging deeper into the problem's cultural roots. Nevertheless, such a view has spawned considerable research on the effects of nature, or lack of contact with nature, and on health, well-being, cognitive functioning, and environmental behaviors (e.g., Hartig, Mitchell, de Vries, & Frumkin, 2014; Taylor & Kuo, 2006, 2009; Restall & Conrad, 2015). If scientists and other professionals, as well as the responsible citizen, are expected to act in environmentally positive ways and to make decisions based on a solid understanding of the impact that those decisions will have on the environment, and ultimately the human population itself, it is necessary for them to have, from a very early age, a deep understanding of the way nature works.

The Human (Dis)Connection with Nature

While many people are now very aware of the extreme environmental problems facing humanity, this is not always reflected in their attitudes or actions toward the environment (Dunlap, Liere, Mertig, & Jones, 2000; Kaplan, 2000). A number of studies have set out to try to understand why some people engage in environmentally responsible behavior, whereas others do not. Worthy (2013), in his book *Invisible Nature: Healing the Destructive Divide Between People and the Environment,* explores the gap between humans and the natural world, providing an explanation for the profound psychological dissociation of people from nature. He suggests that fragmentation and dissociation are at the heart of the planetary, ecological crisis.

What is required to heal this rift, he suggests, is deep understanding and reengaging with nature in every aspect of our everyday lifestyles. While it can be suggested that the dissociation between humans and nature is a result of psychological and attitudinal beliefs and values, resulting in particular behaviors, what also needs to be understood is why these values, beliefs, and behaviors develop and predominate at the expense of more pro-environmental behaviors.

Given the arguments presented earlier with regard to the role of science in the complex socio-environmental and scientific entanglements, it is important that we begin to understand how attitudes and values toward, and our perceptions of, nature develop. This, it can be argued, is particularly important in those groups who have the greatest influence over how we manipulate and use natural resources, scientists being among those. Yet, to date, while there have been many studies of nature connectedness among university students, there have been none that specifically look at science students. While this study does not exclusively focus on science majors, it begins to address some issues which can be followed up in future studies.

Chawla (2007) suggests that childhood experiences in nature can influence sense of connectedness to nature which, in turn, has an influence on pro-environmental attitudes and behaviors. However, a survey by the Natural England revealed that around 12% of young people report never having visited a natural space in the previous 12 months and only 21% reported visiting a natural space once a week (Hunt, Burt, & Stewart, 2015). The key element of connectedness to nature (CNT) theory is that people's physical, mental, and overall well-being is directly affected by their relationship with the natural world and increased exposure to nature and positive experiences of the natural world (Restall & Conrad, 2015). Such claims are backed up by empirical research and consider aspects such as improvements in general health and well-being (Newton, 2007), accelerated recovery from illness (Ulrich et al., 1991), and improved community and social relationships with reduced crime and aggression (Kuo & Sullivan, 2001). Other cognitive effects are also documented such as attention restoration (Kaplan, 1995, 2001) and improved cognitive functioning (Atchley, Strayer, & Atchley, 2012; Berman, Jonides, & Kaplan, 2008). Crucial to this is the view that a greater connection with, and thus commitment to, nature can lead to a higher human interest in environmental protection. Such a view is supported by evidence suggesting that greater nature connectedness is highly correlated with pro-environmental attitudes and behaviors (Restall & Conrad, 2015). As DeLuca (2005) suggests, how individuals think about nature guides how they act toward nature.

Exactly why nature should have such significant impacts is not clear, although there are some hypotheses, most notably E.O. Wilson's (1984) biophilia hypothesis which suggests an evolutionary entanglement giving rise to feelings of "affinity" with the natural world. Nature "affiliation," in the biophilia hypothesis, is more than just a simple attraction or positive disposition but appears to be associated with fundamental human survival processes, such as physical, emotional, and intellectual well-being (Kellert & Haven, 2008; Wells, 2000; Wilson, 2001), as well as in the development of pro-environmental behaviors (Kaplan, 2000). There are other

authors who take a more skeptical view of the evolutionary hypothesis (Joye & de Block, 2011) but do, nevertheless, accept the strong evidential basis for the restorative responses to natural environments.

While biophilia may be associated with an evolutionary response, it is, nevertheless, a "weak genetic" tendency that depends on experience and socialization for its expression (Kellert & Haven, 2008). The importance of the socialization processes thus places emphasis on the significance of adults, for example, parents, other family members, and teachers, in supporting and enabling children's exposure to natural environments, fostering pro-environmental attitudes and values but also the awareness of the importance of natural environments for health and well-being and cognitive development. These adults, it is suggested, are often associated with being significant figures in children's lives with respect to developing pro-environmental attitudes (Chawla, 2007) and links with Vadala, Bixler, and James's (2007) finding that *social facilitation* is an important factor in enabling young children's play in natural environments.

It is within this context that the current study was initiated, the aim of which is to examine the kinds of environmental attitudes and behaviors, and sense of nature connectedness, exhibited by young people entering university. More specifically, this chapter examines the associations between childhoodnature experiences and nature connectedness of first year university students. The study was guided by the following questions:

1. What is the relationship, if any, between self-reported childhoodnature experiences and beginning undergraduate students' sense of nature connectedness?
2. What are the key factors in childhoodnature that appear to influence the development of a sense of nature connectedness?

Methodology: A Mixed-Methods Approach

This study set out to explore beginning university students' sense of nature connectedness, or relatedness, and how this is influenced by possible childhoodnature experiences. A sequential mixed-methods approach was adopted (Creswell, 2003). As described by Sosu, McWilliam, and Gray (2008), one of the main strategies of this procedure is using a quantitative approach to test theories, followed by a qualitative method involving a more detailed exploration with a few individuals. In the current study, both sequential and concurrent strategies were used. Data were collected sequentially, whereas analyses of the quantitative and qualitative data have been carried out concurrently. The quantitative strand used surveys to explore students' conceptions of their relationships with nature, and the qualitative strand examined more fully the students' life experiences and the role these may have had in forming their relationship with the natural world and what might be termed their ecological identity (Clayton & Opotow, 2003; Thomashow, 1996). The qualitative strand used a case study approach to provide an in-depth exploration of participants' childhood experiences and current sense of nature relatedness. The qualitative data

allows for insight into the experiences and perceptions of individuals which is not available from the quantitative data, and both data sets together enable deeper understanding of the influence and nature of childhoodnature experiences on the individual's developing ecological identity.

Participants

Data for the study were obtained from a cohort of 463 first year undergraduate students who enrolled in 2013. This group is part of an ongoing longitudinal study that was to complete a follow-up survey and interviews in their final year of study, at the time of writing. Participants were invited from first year students enrolled on courses across the three Colleges: the College of Arts and Social Sciences (CASS), the College of Life Sciences and Medicine (CLSM), and the College of Physical Sciences (COPS).

Quantitative Survey

For the quantitative study, all first year students across the three Colleges were invited via email to voluntarily participate in a survey. The email detailed the aim of the study and requested any students interested in taking part in a follow-up interview to provide their contact details. On the whole, 463 participants (21% response rate) completed the survey although once data was cleaned the number of usable data was reduced to 443. The questionnaire measured the following:

Sense of nature connectedness: This was measured using the nature relatedness (NR) scale (Nisbet, Zelenski, & Murphy, 2009). It describes an individual's level of connectedness with the natural world with a focus on one's appreciation for, and understanding of, our interconnectedness with all other living things on Earth. The scale consists of 21 items measured on a five-point Likert scale (1, disagree strongly, to 5, agree strongly). Cronbach's alpha (0.86) based on the current sample indicates that the measure is reliable.

Childhoodnature experience was measured using six different items based on literature suggesting that these may be influential in developing a sense of nature connectedness or linking with biophilia (e.g., Vining, Merrick, & Price, 2008; Fawcett & Gullone, 2001; Kaplan, 1995). Experiences were either related to being in nature (four items) or close relationship with pets (two items). Participants were asked to rate the extent to which they had these specific experiences during their childhood. Items were measured on a five-point Likert scale (1, disagree strongly, to 5, agree strongly).

Childhood domicile measured participants' place of abode during childhood. Students were asked in the questionnaire to indicate the kind of environment they grew up in ranging from large town/city to the countryside, to see if proximity to natural areas had any influence on nature relatedness. The responses were

dichotomized into rural and urban childhood domicile in order to make the findings easier to understand.

Gender was measured by asking participants whether they are male (coded 0) or female (coded 1). A total 25% of participants indicated that they were male with 66% indicating their gender as female. Nine percent did not indicate a gender preference and were coded as "gender missing" for analytic purposes.

Age: Participants were asked to indicate which of the age categories (<18 years, 18 years, 19 years, 20 years, 21–25 years, 26–30 years, >30 years) best represent their current age. Majority of the respondents (41%) were 18 years of age with over 78% of participants aged 20 years and below. This is consistent with the entry profile of first year undergraduate students in the UK.

Quantitative Analysis

Initial bivariate analyses were undertaken to explore associations between sense of nature relatedness, childhoodnature experiences, and other background variables. This was followed by multivariate regression to test the effect of childhoodnature experiences on sense of nature connectedness while taking into account factors such as childhood domicile, gender, and age. Analyses were undertaken using SPSS 24 and Mplus 8 software packages.

Quantitative Findings

Bivariate Relationships Between Childhood Experiences, Nature Relatedness, and Background Variables such as Discipline, Age, Gender, and Childhood Domicile

Bivariate analysis (Table 1) showed that students in the College of Life Sciences and Medicine exhibited, on average, the highest nature relatedness (NR) score closely followed by the students in the College of Arts and Social Sciences, with the Physical Science students scoring the lowest. However, these differences were not statistically significant $F(2, 440) = 1.66$, $p = 0.12$. Students in all three Colleges, overall, also reported similar levels of childhoodnature experiences $F(2, 431) = 0.8$, $p = 0.93$. Since no statistical differences exist between students in the different disciplines, all subsequent analyses were based on a combined sample across the disciplines.

Bivariate analysis (Table 2) exploring associations between discrete childhood experiences and sense of nature relatedness indicates that students who reported greater childhoodnature experiences were equally more likely to report a greater sense of nature relatedness.

With respect to the different types of childhoodnature experiences, those who reported greater engagement in one nature-related activity were significantly more likely to also report greater engagement in other types of activities. However, having a family pet was weakly associated with other nature experiences during childhood.

Table 1 Comparative descriptive statistics (mean and standard deviation) of students' sense of NR and childhood nature experiences across disciplines

College	Nature relatedness mean score (SD)	Childhoodnature experience mean score (SD)
Arts and Social Sciences	3.62 (0.57)	3.57 (83)
Life Sciences and Medicine	3.63 (0.61)	3.56 (0.96)
Physical Sciences	3.50 (0.47)	3.53 (0.91)

Table 2 Correlation between childhoodnature experiences and nature relatedness reported by undergraduate students

	1	2	3	4	5	6	7	8
1. Nature relatedness	–							
2. Time in nature alone	0.43***	–						
3. Time with friends in nature	0.28***	0.43***	–					
4. Walks with parents in countryside	0.23***	0.37***	0.38***	–				
5. Outdoor activities	0.30***	0.39***	0.35***	0.42***	–			
6. Own pet	0.24***	0.23***	0.18***	0.13**	0.12*	–		
7. Family pet	0.13**	0.18***	0.11*	0.12*	0.05^{ns}	0.63***	–	
8. Age	0.26***	0.02^{ns}	0.11*	0.01^{ns}	0.01^{ns}	0.07^{ns}	0.04^{ns}	–

When exploring associations with age, it was found that, while a sense of nature relatedness increases with age, older participants did not have significantly greater childhoodnature experiences than younger students.

Analysis exploring gender differences suggests that female students reported higher childhoodnature experiences than their male counterparts (Table 3). Differences were statistically significant for spending time with friends in nature, taking walks with parents in the countryside, and owning a pet. Differences were not significant for spending time in nature alone, doing outdoor activities, and having a family pet.

With regard to current sense of nature relatedness, female students ($M = 3.62$, $SD = 0.59$) reported higher sense of nature relatedness than male students ($M = 3.47$, $SD = 0.50$), and these differences were statistically significant $t\,(401) = -2.35$, $p < 0.05$.

Students were asked in the questionnaire to indicate the kind of environment they grew up in ranging from large town/city to the countryside. Consistent with expectations, those who lived in a rural setting compared to urban dwellers reported significant nature-related experiences with respect to spending time in nature alone

Table 3 Gender differences in childhoodnature experiences

Childhoodnature experiences	Male	Female	*p*
Spent time in nature alone	3.24	3.41	0.255
Spent time with friends in nature	3.34	3.88	0.001
Walks with parents in countryside	3.18	3.77	0.001
Did outdoor activities	3.47	3.51	0.823
Had own pet	3.05	3.45	0.03
Had a family pet	3.54	3.78	0.218

(M = 3.6 vs. M = 3.1, $p < 0.001$), spending time with friends in nature (M = 3.9 vs. M = 3.6, $p < 0.01$), taking walks with parents in the countryside (M = 3.9 vs. M = 3.3, $p < 0.001$), and having a family pet (M = 3.9 vs. M = 3.5, $p < 0.05$). Although those who lived in rural areas reported more outdoor activities in childhood (M = 3.7 vs. M = 3.6, $p = 0.81$) and owning a pet (M = 3.5 vs. M = 3.2, $p = 0.06$), these differences were not statistically significant. There were however no statistical significant differences in sense of NR between students who lived in rural and urban areas during childhood (M = 3.6 vs. M = 3.6, $p = 0.27$).

Predicting Sense of Nature Relatedness

Childhoodnature experiences, childhood domicile, gender, and age were specified as predictors of sense of nature relatedness. Regression analysis was used in order to ascertain what factors uniquely predict the students' current sense of nature relatedness. Analysis was carried out in Mplus 8 software using maximum likelihood estimation to effectively deal with issues of missingness in the data. The overall model explained a significant amount of the variance (29%) in students' sense of nature relatedness. Results of the analysis (Table 4) showed that of the childhood experiences examined, spending time alone in nature, having pets, and engaging in outdoor activities significantly predict current sense of nature relatedness. More specifically, these experiences were associated with greater sense of nature relatedness.

Childhood domicile was not a significant predictor of sense of nature relatedness. However since domicile was associated with significant nature experiences in childhood in favor of rurality (bivariate analysis above), it can be speculated that domicile may have an indirect effect rather than a direct effect on sense of NR through greater opportunity for nature experiences in childhood. Significant background variables were age and gender, with older students and female students having a greater sense of nature relatedness after controlling for childhoodnature experiences. From the bivariate analysis above, there is little indication that age differences in NR are due to greater nature experiences in childhood.

The quantitative data and analysis provide some indicators of key differences among particular groups within the sample cohort, but it does not provide enough information to gain a better understanding of the way in which childhoodnature

Table 4 Predictors of sense of nature relatedness

Predictor	B(SE)	β
Childhood experiences		
Time in nature alone	0.15(0.02)	0.33***
Time with friends in nature	0.01(0.03)	0.03^{ns}
Walks with parents in countryside	−0.001(0.02)	-0.002^{ns}
Outdoor activities	0.05(0.02)	0.14**
Own pet	0.06(0.02)	0.17**
Family pet	−0.02(0.02)	-0.06^{ns}
Childhood domicile (rural vs. urban)	−0.05(0.05)	-0.5^{ns}
Age	0.09(0.02)	0.24***
Gender	0.12(0.06)	0.09*

experiences act on or might influence the perceptions, attitudes, and values of the individuals concerned. In order to try and gain a deeper insight into the students' childhoodnature experiences, and their perceptions of those experiences, a number of interviews were conducted. These are described in the following section.

Qualitative Case Studies

While the quantitative data offers an indication of *what* has happened, in order to try and understand *why* this happens, it is important to conduct a more in-depth qualitative study drawing on case studies (Miles & Huberman, 1994). The 2013 cohort who completed the survey were asked if they would be willing to be interviewed. Over 100 students provided their names for potential follow-up. Since our methodology was a sequential mixed-methods approach, preliminary analysis of the survey data informed the selection of interesting cases for interview. Participants who were of interest were those who had different combinations of NR and childhoodnature experience scores, as well as a mix of subject disciplines and childhood domiciles. From those who had provided contact information and expressed a willingness to be interviewed, 28 invitations were sent. Of these, 14 responded initially but only 12 of these confirmed and turned up for interview. However, one of these turned out to be a third year international exchange student whose email had been included in the first year email list and had completed the survey. She was, therefore, excluded. This left 11 case study students who were interviewed. Details of the case study interviews are provided in Table 5.

What is of particular interest in the cases is that, while in many instances the scores reflect what might have been expected from the statistical analysis, i.e., nature relatedness (NR) score tends to be correlated closely with the childhoodnature (CN) experiences, there are interesting exceptions to these. Some students with low self-reported childhood experiences had a rather high score on the NR scale, e.g., Mary (NR = 4.05 out of a maximum of 5, average CN = 1.00 out of a maximum of 5), while others with a higher than average childhoodnature experience

Table 5 Characteristics of case study participants

Name[a]	Age	Gender	Childhood domicile	Mean NR	Mean childhood experiences
Filipa	>40	F	In a small town or village <50,000	4.81	4.83
Nichola	27	F	In a small town or village <50,000	4.57	4.67
Nadia	19	F	In a small town or village <50,000	4.14	4.17
Mary	20	F	In a small town or village <50,000	4.05	1.00
Hedda	19	F	In a small town or village <50,000	3.33	2.50
Gordon	18	M	In the countryside away from centers of population	3.29	3.83
Aristea	18	F	Edge of large town/city	3.05	3.33
Conrad	19	M	In the countryside away from centers of population	3.00	4.33
Clara	18	F	Medium-sized town/city 50,00–500,000	2.90	1.83
Toby	19	M	Large town/city 500,000	2.86	2.67
Sandy	21	M	In the countryside away from centers of population	2.48	2.33

[a]Note: Names have been changed to preserve anonymity

display a less than average NR score, e.g., Conrad (NR = 3.00, CN = 4.33). The interviews were therefore focused on gaining insight into their backgrounds, experiences, and perspectives in order to advance a greater understanding of the kinds of factors and experiences that act on and influence young people's sense of nature connectedness and their attitudes and behaviors toward the natural environment. The length of the interviews ranged from 15 min for the shortest to 45 min for the longest with an average length of 26 min.

All interviews were transcribed verbatim and analyzed using NVivo software. Specifically, findings from cross-case emerging themes and issues arising from the data are presented.

Qualitative Findings

This section looks closely across the cases to see if there is anything that can be discerned from their backgrounds and experiences that might be helpful and informative in understanding the relationship between childhoodnature experiences and sense of nature connectedness.

We can say from the quantitative analysis that childhood experiences are strongly linked with current sense of nature relatedness, and within those experiences, spending time alone in nature, having pets, and engaging in outdoor activities appear

to be significant predictors of current sense of nature relatedness. As the qualitative cross-case analysis was undertaken, aspects of these emerged from the students' descriptions of their childhood with two distinctive areas or themes emerging. The first of these related to the proximity of nature, and the second was with respect to the types of experiences described by the students in those areas.

Table 5 shows that there are essentially three groups of students distinguished by their score on the NR scale. The first of these are the higher scorers, each of them scoring above 4 on the NR scale. This, according to Nisbet et al., (2009), is predictive of ecological perspective, as well as strong views about the seriousness of ecological problems and human treatment of the environment. Nisbet et al. also hypothesized that highly nature-related individuals would be drawn to animals. Nisbet (2014) found that community samples had mean scores on the NR scale ranging from approximately 3.0 to 3.7, while environmental activists and educators had an average score of 4.4–4.5. So with the student sample, it could be said that Filipa, Nichola, Nadia, and Mary are more similar to the environmental activists and educators, while Hedda, Gordon, Aristea, and Conrad are more representative of the average citizen. Clara, Toby, and Sandy on the other hand relate less to nature than average. It might, therefore, be possible to discern from case analysis of students' accounts some characteristics of their childhood experiences that are particularly formative. Interestingly, in these cases, three of our four high-scoring students are older than the other students, two of them being at least several years older. This reflects the findings in the quantitative analysis that age is a significant predictor of nature relatedness.

Proximity to Nature

The first theme that can be discerned from the interviews is that of proximity to nature. Many of the students actually lived within close proximity to nature, although with slightly differing forms of nature ranging from open countryside, farmland, and woodland to urban parks and city greenspace.

The students with higher NR scores described their childhood homes with respect to the nearness of the nature:

> Born in, in a little village in. . . so a lot of nature, freedom and so on. . .. (Mary)

> It was a tiny little village in [place], erm, I grew up right in the middle of. . .it was countryside farmland. (Filipa)

Nadia did not elaborate on the natural environment where she stayed, in a small town of around 30,000 inhabitants but said:

> . . .it's near the tourist area,. . . so it's where party destinations are and stuff like that. (Nadia)

In contrast to the other three high scorers who had more rural childhood experiences, Nichola grew up:

> . . . in a suburban area. . . I wouldn't say easy access to the countryside because it's a suburb within a big city. So, you would have to drive. . .to go to the countryside. (Nichola)

Nevertheless, within this suburban area, there was quite a bit of greenspace:

> . . .in my suburb specifically we have lots of trees,. . ., that we used to climb. . . (Nichola)

Comparing the type of childhood domicile across the cases, there does not appear to be much to separate the high scorers from the more average scorers.

Hedda, while living on the outskirts of a small town, lived in quite close proximity to the countryside:

> Where I lived was just on the outskirts, so it was like, at the top of my road there was like farms and stuff. . .. But I was still part of the town. And erm, it was like relatively urban and er, but it wasn't particularly like skyscrapers at all. (Hedda)

Interestingly, Gordon had had considerable experience of nature, perhaps more than his childhoodnature score would indicate, having grown up on a farm:

> I grew up with a lot of nature and I suppose I was just. . .I say nature we. . ., I grew up with a lot of other things. . .eh, nasty chemicals that, . . . were inevitably nipping my eyes. (Gordon)

Aristea's very early childhood was in a semi-rural area close to a small town; her later childhood was overseas but still close to countryside:

> From my house we can see the forest research institute in [country]. . .and it's a very large, kind of, a seed bank. . .huge big forest, and that. . .. (Aristea)

Conrad described his childhood domicile as:

> I was brought up in a town for the first nine years of my life, and then we moved out, . . . from the town,. . .to land owned by my grandfather. He had a farm. . .so they gave us a field and we built a house, . . . so we lived in a field . . .the closest. . . population was maybe two miles down the road, . . . a small little hamlet of houses. (Conrad)

While most of the students lived in fairly consistent environments during their earlier and later childhood, even if they moved, two of the students had quite different, contrasting changes. Mary's early childhood had been, as described above, in close proximity to a natural environment but later her family moved:

> . . .to a small studio and every time I walked out of the studio, we had a sidewalk . . .. (Mary)

So, from the time she was 6, for the next 14 years, Mary, until she came to the university, lived in a small European town and clearly had a much more restricted sense of freedom to roam within that town:

> The studio, it was just. . .. Every time you walked out the door you had to be careful, because there weren't cars all the time, it was, basically, a city. It was completely different. (Mary)

This was in contrast to the way she describes her very early childhood prior to moving to the town:

> . . .you had nature everywhere. We had a big garden and then, um, you just had to go up a little street and you were surrounded by fields and so on, which. . .some of them belonged to my,. . .to my grandfather. (Mary)

Such a shift in environment may help to explain why Mary reported a low score on the childhoodnature experiences in the questionnaire, which actually related to her later childhood, whereas her early childhood was rich in nature experience. In contrast to Mary, Conrad reported a relatively high score on the childhoodnature experiences (4.33) and yet a rather neutral sense of nature relatedness (3.00). Interestingly Conrad's story is almost a reverse of Mary's where the earlier part of Conrad's childhood was spent in a small town but the later part in a very rural, countryside setting:

> I was brought up in, sort of, a town for the first nine years of my life, and then we moved out, . . . about twenty miles from the town,. . .to land owned by my father's father, so my grandfather. He had a farm. . .so they gave us a field and we built a house, and so we lived in a field away from everyone else. . .we lived. . . like, in a little. . .the closest, sort of, population was maybe two miles down the road, and it's, like, a small little hamlet of houses. (Conrad)

Conrad's earlier home:

> . . .it was quite suburban and we lived on the edge of, like, football pitches and some. . .like, sort of, wasteland-y, field-y stuff. (Conrad)

The students with the lower NR scores tended to be associated with more urban environments yet still reported having some access to more natural areas.

Toby, for example, grew up in a suburb of London, but while in a fairly metropolitan area, he described the environment as quite green:

> It's fairly, fairly green actually. . .there are lots of green spaces. there's a very, there's a pretty famous park where, erm, some of the famous Tudor people used to live. (Toby)

Clara similarly, while she lived in a medium-sized town, reported using city greenspace with friends and significant adults as a child:

> I was very much an active child, like, liked to be outside quite a lot.. . .there was quite a lot of kids around my street where I grew up, and we all had quite big back gardens. . .um, so we tended to go in there. If I was out with my grandparents and things like that, they'd take us to all the different parks around [hometown]. I think I've been to all of them. (Clara)

Sandy, in contrast to the other two lower-scoring students, grew up in the countryside, his family living in:

> An old school house that's been converted into a residence. It's me, mother and my uncle live there. There's a few houses nearby within maybe a few hundred metres but the nearest village is five miles and the nearest town is fifty miles so it's fairly isolated. (Sandy)

So, while there is some evidence from the quantitative study indirectly linking rurality with more childhoodnature experiences, all of our cases had some form of access to either countryside areas or greenspaces in the form of parks or other urban greenspace. This is where examination of the types of experiences described by the students may have more significance.

Types of Nature Experiences

When the types of nature experiences reported by each of these three groups are examined, it is possible to get a sense of the differing experiences they each had. Those who had what might be described as richer, or more affective experiences, or who had more extended periods of time in nature, tended to have higher NR scores.

Filipa describes a childhood with a lot of freedom to roam:

> . . .me and my best friend, . . ., we just used to disappear at the crack of dawn and come back at the end of the day. Take a sandwich or something with us or go and run around the orchards and steal the . . . blackcurrants and apples and strawberries and stuff.
>
> . . .it was really, a really kind of free country childhood, if you like.

Also, in line with the findings from the quantitative data, she spent quite a bit of time in nature alone:

> . . .we were pretty much left to our own devices. And if my friends weren't around I used to wander off by myself and. . .I would investigate rabbit holes and fox holes and things like that.

Mary similarly had a relatively free range type of childhood:

> . . . we would just. . .me and my sister, we. . . And now with cousins, we would just wander. . .freely, so, um, um, it was a. . . Yeah, we had a lot of freedom. . ..

Nichola, on the other hand, had regular routines in greenspace, but this was done nearly always with her mother.

> And my mum's a single parent and she doesn't drive so we walked everywhere.
>
> . . .my mum would make a point on the weekends to, eh, find some sort of green space.eh, within the city centre,. . .every Saturday was our picnic day so we used to go to the park and

> run around and play ball et cetera. . . . have a picnic and walk around the entire day before going home. So, that was. . .it was like my weekly routine.

Although the quantitative analysis links experiences alone in nature with higher NR scores, this did not appear to be the case with Nichola, as most of her time was spent with her mother. However, it appears that the experiences with her mother were rich as she was an advocate of the outdoors:

> Be in nature alone? I said no because even though my mum was like a, eh, a very big advocate of camping et cetera because she was a single parent. . .I didn't have the opportunities to go out camping. . . and I don't think she would have let me go out by myself.

Nadia indicated that much of her childhood had been spent quite actively in the outdoors:

> . . .like, my spare time was full of that and my activities would involve camping.

Later, however, Nadia was unable to be quite so active as a knee injury prevented this. Nevertheless, she was very involved in reading about environmental issues and was involved in organized debates around these issues:

> I became a UN member, [of a Model of the United Nations for Young People] where I debated for three years, two years for environmental subjects, and one year for human rights.

Examination of the second group of students, with more average NR scores, indicates that, while they did appear to have been close to nature in a physical sense, they did not have what might be described as deep or sustained experiences of exploring nature. In contrast to the above average NR students, the descriptions by the more average NR scoring students did not give any sense of prolonged enjoyment with nature or had a very utilitarian view and in some cases also led to mixed, perhaps negative, emotions or experiences.

With Hedda, a further description of the town she grew up in revealed that there were plenty of opportunities for nature experiences:

> . . .and there quite a lot of like nature reserves and places around sort of where I lived. Like they had a reservoir, and there was like a big park in the middle of the town centre and stuff.

However, Hedda made it clear that she did not engage much with greenspace or nature:

> I was a big fan of staying indoors. . .Watching TV and stuff, rather than actually going outside. . ..I went outside quite a bit in like summertime, when I'd have like summer holidays and stuff. . .But erm, it would mostly be kind of going outside but not to nature parts, like places where I could ride my bike and stuff.

For Hedda, a significant part of her childhood was spent indoors, watching TV and playing computer games with her brother:

> Me and my brother played a lot of computer games, so we kind of would stay inside and do that rather than going outside.

Similarly, Conrad's childhoodnature score on the questionnaire came out as quite high, but when asked about this, Conrad then said that he didn't spend a lot of time in nature, rather spending his time playing computer games:

> . . . I played a lot of computer games and stuff like that . . .when I was a lot younger. . . I can't tiptoe around the fact that I probably. . .wasted a lot of time just playing video games and stuff.

However, when asked to say a little about what kinds of activities he would do when he did go outside, he explained that:

> We wandered around. . .there's a couple of, sort of, half used building sites, but they weren't really building sites, they were more just, like. . . abandoned, and we just, sort of. . .like we made forts and stuff like that, and all that kind of stuff. Um, go for walks. There's, sort of. . . a forest. . .a pine-y forest-y area. . .that we'd go to and climb trees and stuff like that. . . we walked on. . .we walked on the beach sometimes.

In explaining his reticence toward outdoor and nature experiences and his retreat into computer games, he said:

> . . .but, you know. . .in. . .in Ireland it's cold and wet and. . ..

This suggests a less than enjoyable experience of nature.

In contrast, Aristea spent quite a lot of time by herself in nature:

> . . .back when I lived, um, in [country], we had, kind of, walkways, but into the jungle, a bit out. . .er, I'd go for a walk there. . . . . .round three or four times a week as well, where. . .and I did that alone. I would be me. . .spending time in nature alone. . ..

Nevertheless, Aristea did not appear to fit the profile of someone who had positive experiences with pets:

> I had a bit of trouble with the pet issue, because my family has had pets, but my mum really doesn't like animals. I have lots of siblings, so, of course, you have to have a pet. . .at one time or another, but it's never been the same pet for more than two months. . ..

Gordon's experiences in nature were quite extensive as he lived on a farm and had a lot of freedom to roam around the countryside. However, what is perhaps characteristic of Gordon is that his description of nature could be very instrumental:

> . . .and the spring from that river was actually the water that fed our house. . .
>
> We get water from a well that's got a gravity fed pump but over this was this great big oak tree. . ..
>
> . . . the cattle used to come down there and drink and. . ..

Gordon also said that he didn't have any pets but he did develop attachments for some of the animals on the farm. Nevertheless, he was well aware as a child what the animals were for:

> . . .these sheep I grew very attached to. I did generally know. . . out into the field when it was old enough and then off chops sometimes . . . I was very fond of a cow we had,. . .I was very fond of her and granddad took her off and he came back and said, ah, well, I sold her. . .I sold her to a butcher who liked her so much that, eh, that he wants to keep her as a pet. . .even as a primary school child I didn't buy that for a second. . .I knew exactly where she had gone to. . ..

Gordon's quite immersive experience with nearby nature, farm animals, and wildlife was of a quite pragmatic, utilitarian position, and he himself suggested:

> I'd probably be lynched by certain people for certain views. . .

> I've experienced nature but I can't care less about it [laughing].

With respect to the three lower NR scoring students, it was evident that their experiences were perhaps even less engaging than the middle group of students.

Toby said that he rarely used the greenspaces and parks:

> No I tend to go to the cinema and things generally. I take different sort of social activities. . .compared to going for walks in the park.

Whereas, while Sandy had relative ease of access to the countryside, he said:

> I kind of got bored of it really. It sort of stops being idyllic once you. . .it is lovely there but I mean I walk the dog and everything but in terms of going out and sitting on my own. . . not much of that at all, no.

Clara also had a rather ambivalent attitude toward the natural areas. Even although she might have been a frequent visitor to the parks, visiting with her grandparents about once per week, what she tended to do in the parks was go straight to the children's play area:

> I was always more obsessed with the swings and. . .[children's play area]. (Clara)

What comes through from the interviews is that all the students appear to have had some form of access to natural areas or greenspace, but the way in which they interacted with that space varied. Even those students who had fairly immersive experiences in the countryside, through having relatives who had farms, or who themselves lived in rather more isolated spots within the countryside, had different accounts of how they related to that countryside.

Discussion

The result of the preliminary investigation into a single cohort study of undergraduate students is revealing but also raises many questions and opens avenues for further exploration.

The first aspect, which is probably the least surprising, is that there is a highly significant correlation between childhoodnature experiences and one's sense of connectedness to nature. This reaffirms what has been reported in the literature (e.g., Wells & Lekies, 2006). However, what becomes apparent through the interviews is that there *may* be a critical period of time when nature experience is important in establishing or nurturing this ecological identity, and there are some indications that this is in the earlier stages of childhood. The idea of an age period that is important for developing this sense of connectedness, leading to a stronger ecological identity, concurs with Orr's (1993) suggestion that there may be a critical period of development where it is very important to have positive experiences in nature in order to develop biophilic beliefs, feelings, and tendencies (Capaldi, Dopko, & Zelenski, 2014). However, what appears to emerge from our data is that the quality of experience is perhaps as important, if not more important, than the actual age, with some indications that this can continue to develop throughout life. The importance of quality of experience has also been put forward by Vadala et al. (2007), with their analysis suggesting a clear distinction between child-child and child-nature play in natural environments. Such differing experiences, they suggest, can develop quite different views and attitudes toward nature. Given that a number of respondents mention child-nature experiences, such as seeking out rabbit burrows, or hunting for fruits, future studies might look at the link between such activities, nature connectedness, and scientific inquiry, to see whether such experiences develop particular mindsets. In addition, it is important that people throughout their life are exposed to significant experiences and appropriate culture for biophilia to be more openly visible and expressed (Kellert, 1997). While early childhood experiences in nature are, perhaps, highly influential, this does not necessarily mean that nature connectedness cannot be nurtured or expressed later in life.

One of the interesting aspects of the data gathered here is that female students and older students displayed higher nature connectedness scores than the male and younger students. This supports findings from other studies which showed that being older (Grønhøj & Thøgersen, 2009) and being female (Scannell & Gifford, 2013; RSPB, 2013) tended to be associated with higher environmental concern, attitudes, and behaviors (Capaldi et al., 2014). It is difficult, however, to find any explanations provided for these differences. Do female students actually have a greater childhoodnature experience, or is it that they have an inherently higher awareness of nature, a greater biophilic predisposition, which results in a stronger childhoodnature experience memory?

With respect to the age phenomenon, it might be thought that this was as a result of older individuals having had greater childhoodnature experiences than the

younger individuals, as is plausibly indicated by the literature suggesting a decline in childhoodnature experiences between generations. However, statistical analysis of the data gathered in this study gives no indication that these age differences in nature connectedness are due to greater nature experiences in childhood. In other words, older students did not have any significantly greater childhoodnature experiences which would explain the higher nature connectedness scores. What then might be an explanation is that further life experiences, which may be linked to greater exposure to, or awareness of, nature and nature-related issues, have added to the older students' sense of nature connectedness. Thus, as well as early childhood experiences contributing to a strong foundation for ecological identity formation, later life nature experiences, increased knowledge, cultural influences, and exposure to different points of view might also play a significant part in developing and strengthening an ecological identity. Thus, it is possible for this to be a continuing process which can be enhanced by appropriate activities and exposure to nature experiences in further and higher education as well as in the workplace. This aspect is worthy of further research in that if biophilia is, as suggested by Kellert (1993), a weak "genetic tendency" that can be stimulated by contact with nature, then there is a need to explore how this can be done and whether experiences require to be facilitated in different ways for different age and gender groups. In this case, it may be particularly pertinent to consider what role the university plays in nurturing this biophilia, this sense of nature connectedness. This links to Jones' (2013) idea of the Biophilic University which is a "university which restores an emotional affinity with the natural environment" (p. 148).

Conclusion

There are perhaps four key ideas emerging from this particular study, each of which will require further consideration and research:

First the idea of childhoodnature experiences appears to contribute to developing a sense of nature connectedness, or ecological identity, which, it is suggested, is crucial if we are to nurture a responsible citizenry which adopts and enacts pro-environmental behaviors. However, childhoodnature experiences per se, while necessary, are not in themselves sufficient. What may be more important is that there is a need to look very carefully at the quality of those experiences and how they enable the development of sense of nature connectedness. This is likely to require an in-depth examination of nature experiences over a period of time and how those experiences impact on the individual's ecological identity.

Second, while adults may be important mediators for childhoodnature experiences, it appears that other independent experiences in nature, outdoor activities in nature, and biophilic practices such as keeping pets are important in nurturing a strong ecological identity.

Third, females may have a stronger biophilic predisposition which is brought out through childhoodnature experiences, but further research is required into these

perceived gender differences. Further research is also required to determine whether different or deeper forms of childhoodnature experiences are required for males, particularly earlier in childhood.

Fourth, there is a need for further examination of the impact of nature experiences beyond childhood. There are indications that these may also play an important part in developing ecological identity, and therefore, there is importance in such experiences being incorporated into lifelong education programs and to support the idea of biophilic cities and workplaces.

This chapter, and the research referred to, has dealt with the relationship between childhoodnature experiences and sense of nature connectedness, which is linked to ecological identity and values, attitudes, and behavior toward the natural environment. The development of such dispositions, it can be argued, alters the way individuals think about the natural environment and how they will act toward that environment. Such dispositions also influence how decisions are taken and can influence the work of scientists and others involved in environmental policy and practice decisions. There is an urgency to this, and it is important that more research is undertaken to understand why human populations persist in enacting damaging environmental behaviors and what can be done to change those behaviors.

Cross-References

► Closing the Gap Through Rewilding, Interacting, and Overcoming
► Exploring the Significant Life Experiences of Childhoodnature

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Children Caring for the Australian Wet Tropics as a Response to the Anthropocene

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Hilary Whitehouse, Neus (Snowy) Evans, Clifford Jackson, and Marcia Thorne

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Abstract

The Wet Tropics World Heritage Area in far north eastern Australia is a unique place where tropical rainforests are internationally recognized for both biodiversity and cultural values. The chapter explores how children, advised and supported by their teachers and parents, in regional and rural schools intimately connected to these rainforests and associated aquatic ecosystems, are doing works of conservation and restoration, both as a response to the novel landscapes created by the rapidly changing environmental conditions of the Anthropocene, and as a personal contribution to caring for the Wet Tropics. Caring for country is an old discourse in Australia with its origins in Aboriginal and Torres Strait Islander cultures. Contemporary environmental education practice in Wet Tropics schools draws on these older concepts and those of ecological and social science to create

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a hybrid of understandings to promote practical means for caring for rainforest country. Interview data from children are presented in the chapter to illuminate in their own words their senses of care and connection to the Wet Tropics. Barriers and enablers to restorative practice are discussed in relation to dominant schooling practices, which continue to marginalize the work of caring, even though caring is a logical and necessary response to the Anthropocene. Children wish to actively care and are supported by adults to do so; however, many aspects of the formal, public school system in Queensland are not yet fully enabling of caring practice.

Keywords
Children · Caring for country · Wet tropics · Anthropocene · Agentic learning · Relationality · Barriers · Enablers

Introduction

> We are helping to do our bit to stop global warming. I don't think it can be stopped, but we can keep it at bay for a little while. It's inevitable, but I'm a bit freaked out with global warming, because we've driven ourselves to a dead end. If we leave the planet in this state, then evolution won't be able to start again, because we finally have the power to destroy ourselves. (Ten year old enrichment program participant interviewed by Clifford Jackson.)

The survival of the Wet Tropics World Heritage Area in tropical Australia is now partly dependent on its (human) children not only relearning to properly care for their rainforests and waterways but learning how to sustainably care for the novel landscapes of the Anthropocene (Collier & Devitt, 2016). The Wet Tropics stretches approximately 450 kilometers along the northern coastline of the state of Queensland and was listed on the World Heritage register in 1988 in recognition of its "outstanding universal value" and "the permanent protection of this heritage is of the highest importance to the international community as a whole" (Wet Tropics Management Authority [WTMA], 2017). Both cultural and natural values form the basis for World Heritage recognition as these rainforests are settled by one of the oldest, extant, human societies on earth.

Australian World Heritage rainforests are often positioned in tourism brochures and in Australian nature writing as "pristine" wilderness. Historically, they are nothing of the sort. These rainforests are very, long lived in country. Before European colonization, the Wet Tropics rainforests were one of the most populated areas of Australia and the only area where people lived permanently in rainforest (WTMA, 2017). A map of the distribution of people's language groups is available from the Wet Tropics website (http://www.wettropics.gov.au/our-cultural-landscape). Within the Djabugay language, spoken by traditional people of the rainforest situated on the western slopes of Cairns, balmba means habitable country – or wet woodlands in European terms – and bama balmba translates to English as a person or people quite at home within these wet woodlands (Bottoms, 1999). For Djabuganydji people, "the forests have been a source of sustenance for thousands and thousands of years" (Djabukai Aboriginal Corporations [DAC], 2017).

Australia's tropical forests can be viewed from a sociological perspective as a nature-culture (Whitehouse, 2011) as there have been tens of thousands of years of continuous human settlement. As culturally informed, tertiary educators, we favor drawing on the old and revitalized Australian concept of country for inquiring into concepts of education and care, for people can walk on country, learn on country, learn from country, and care for country. Caring for country is historically associated with the cultural practices of Aboriginal and Torres Strait Islander peoples and has been generally understood as a suite of highly sophisticated water and land management practices (Gammage, 2011) from which emerge many well-being, health, social, and economic benefits (Weir, Stacey, & Youngetob, 2011).

To understand care in an educational context, we draw on the work of Nel Noddings, who defines education as "a constellation of encounters, both planned and unplanned, that promote growth through the acquisition of knowledge, skills, understanding and appreciation" (Noddings, 2002, p. 283). Noddings' (2005) own definition of care is relational and transactional: She writes that "in a caring relation or encounter, the cared-for recognizes the caring and responds in some detectable manner" and argues, "what we learn in the daily reciprocity of caring goes far deeper than test results." Caring is a form of deep attention, what Noddings (1984) calls "engrossment." Caring is receptive and reciprocal; the carer (child) receives what the cared-for (forest, river, reef, animal, plant) is feeling and trying to express. This opens the carer to motivational displacement. Noddings (2005) writes, "when I care, my motive energy begins to flow toward the needs and wants of the cared-for [and] n a caring relation or encounter, the cared-for recognizes the caring and responds in some detectable manner." Philosophically, Noddings sees caring as a *moral* attitude that can be taught. This morality is "informed by the complex skills of interpersonal reasoning, that it is neither without its own forms of rigor nor somehow less professional than the calculated skills of formal logic" (Flinders, 2001, p. 214). Caring for country is being adopted much more widely across Australian society because it is such a generative, productive, and democratic concept. Within the complex idea of country is a very deep sense of relationality. People and country are close; people need country; country needs people. When we look at the forests and biomes of the Wet Tropics, we can say that the Wet Tropics needs people to care for it, and people certainly need the Wet Tropics.

We are four tertiary educators who work together with a deep, collective interest in social, scientific, and environmental sustainability education. In this chapter, we take up the sociological position of Malone (2011) who argues children are "subjected to the same social forces as adulthood, and children as social agents...can contribute to the reproduction of childhood and society through a variety of opportunities that are created in conjunction with adults, peer cultures and other children" (p. 476). We present views of caring in the words of children and illustrate the adult and peer leadership necessary to promote their agentic learning. Clifford Jackson collected the focus group interview data with 10- and 11-year-old children participating in the Cairns District Schools Science and Sustainability Enrichment Program, led by Sandra Charlton that involves students and teachers from the Queensland Government Department of Education and Training (QGDET) primary

schools and colleges in Cairns and the Atherton Tablelands. Marcia Thorne collected focus group interview data with teachers and 15-year-olds in QGDET secondary schools and colleges in Cairns and the Atherton Tablelands. Neus Evans collected the document data of caring project materials available in the public domain and viewed artifacts created by children. Together we analyzed these data looking directly at caring practices in (and for) the Wet Tropics, and Hilary Whitehouse took carriage of writing this chapter.

Malone (2011, p. 466) advises that to "focus on children's agency without considering structure is to overlook the fact that a person's capacity to engage in an action and take it forward can only be realised if the established structure in which they are operating will support and accommodate those actions." Current education policy in Australia is strongly influenced by globalization and neoliberalism (Smith & Stevenson, 2017) and follows an education agenda that generally serves the neoliberal marketplace over and above the needs of individuals and the needs of human and forest communities. Caring for country and education for environmental stewardship is not conceived as core to school curriculum in the Wet Tropics (Thorne, 2017). Educators can experience a persistent philosophical conflict between the effects of the neoliberalist paradigm of efficiency and productivity that dominates Australian curriculum and educational policy (Cuervo, 2016) and the other meaningful imperatives of education, such as preparing children adequately for life in the Anthropocene. Children, too, have to negotiate the same structural tensions. The Anthropocene, as a way for framing socio-ecological conditions, is an educational problem (Laird, 2017), and we can use dimensions of the concept to acknowledge "educated human agency's power to change Earth environments for worse and for better, including its consequences for a place's habitability" (p. 269), and this requires "educating children to develop nature-loving practices" (p. 275).

Schooling, the Anthropocene, and the Need for Care Work in the Wet Tropics

According to the influential Australian philosopher and ethicist, Clive Hamilton, the idea of Anthropocene was first conceived by earth system scientists to capture "the very recent rupture in Earth history arising from the impact of human activity" (Hamilton, 2016, p. 94). The Anthropocene is "not a continuation of the past but a steep change in the bio-geological history of the Earth" and what we now have to cope with is "not continuous change but rupture" (p. 100). Philosophically, the notion of rupture "invites a new understanding of the human relationship to the Earth" (p. 104). Some pockets of Wet Tropics forest, particularly those in the Daintree, have been extant for 120 million years, and such oldness is a source of wonder and awe. The youngest forests are 9000 years old. Yet, these resilient, persistent, biodiverse, and vegetable communities, from mountain forests to coastal mangroves, are at now extreme risk. Much of the landscape, particularly the aquatic ecosystems that meander from the Wet Tropics World Heritage Area through

a myriad of agriculturally purposed and built environments to the Great Barrier Reef World Heritage Area, has been deliberately changed to meet the needs of growing human populations. George Skeene, a "descendent of the Yirrganydji, Wakaman and Birri Gia Tribes" (Skeene, 2009 p. 7), recalls the experiences in his youth in the Cairns region in the 1950s and laments the changes to *his* country (p. 51):

> There was a small creek that came off the hills under Reservoir Road and through the farm. This creek was fed by a small spring in the mountains. Taro grew around this small spring. We would catch red bream, mud cod, jewfish, perch and freshwater turtle. Today this creek has been obliterated by development, which is called "progress".

Biodiversity conservation is a priority for action in the twenty-first century (Perring, Audet, & Lamb, 2014) given the Anthropocene is marked by unprecedented human population growth and mass deterioration of habitats and loss of species. Individual children, teachers, local groups, schools, and their communities cannot readily or easily address international problems; however, practical forms of action at local and regional scales can have significant effects.

The case for action is that the Wet Tropics region is characterized by high endemism meaning the risks of extinction are predictably dire (Williams, Bolitho, & Fox, 2003). Broad-scale species loss is detrimental to remaining biological communities (Reside et al., 2017), including the human populations dependent on healthy ecosystems for the provision of life supporting services. Governments and policy-makers have long been aware of the effects of biodiversity loss on human health and well-being (see Department of the Environment, Water, Heritage and the Arts, 2009). But how adequately these identified concerns have been addressed through formal education is an open question. Our understanding of the Anthropocene is that the term gives shape and meaning to current conditions and imparts a sense of urgency to the task of transforming the purposes of education. Davies (2016, p. 2) writes that the idea of the Anthropocene (and the consequent terminal death of the Holocene) "provides both a motive and a means for taking a very, very long view of the environmental crisis. It gives the ecological upheavals of the present day their proper place in the history of the planet." The national *Australian Curriculum* neglects to mention the Anthropocene and does not provide any overarching ideas or directions about the teaching for the Anthropocene. There are creative spaces within the *Australian Curriculum's* learning areas (disciplines) and the cross-curriculum priority of sustainability (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2017). However, the sustainability cross-curriculum priority is precarious space as there is no mandated requirement in the national curriculum that any learning area be taught through this cross-curriculum priority (Salter & Maxwell, 2016). Our critique of the *Australian Curriculum* is that the whole document is predicated on the assumption that the global climate will remain stable, as it did in the Holocene, and that the purpose of formal education is to focus almost wholly on matters advancing human society.

In Queensland schools, the current obsession is with Australian Government education policy focused on improving standardized literacy and numeracy scores

aligning with a larger global agenda. A regulatory testing regime called the National Assessment Program – Literacy and Numeracy (NAPLAN), which began in 2008, is administered annually in May to children in years 3, 5, 7, and 9. Schools and teachers spend an inordinate amount of time conforming to this testing regime. Meaning, sustainability education in general and the wonderful projects children discuss in this chapter are marginal to normative school practice and can be considered quite unusual. When the truly dis/ruptive nature of the Anthropocene becomes undeniable and education leaders recognize that young people are going to need more than numeracy and literacy to overcome severe conditions, this is likely to change. Until then, a key performance indicator for Queensland schools remains the improvement of NAPLAN scores. The emphasis on standardized testing comes at the expense of teaching and learning for caring for country and for taking action on sustainability, environmental citizenship, and other worthy endeavors of formal education.

Marcia Thorne's (2017) document analysis of five Year 10 subjects, English, Math, Science, Geography, and History, revealed less than 6 h of lessons in core curriculum subjects directly focused on sustainability and environmental stewardship out of the (approximately) 390 h of teaching time allocated to these five subjects across the Year 10 school year. Thorne (2017) conducted online surveys and research conversations with Year 10 teachers ($n = 5$) and Year 10 students ($n = 126$) in state secondary schools located in the Wet Tropics. She found that the participating teachers expressed concern for the natural world and saw the need for formal education to actively value learning to care for local environments (e.g., caring for country). Teachers interviewed saw the curriculum as "rigid" and teaching time as "pressed." Similarly, students expressed concern for the sustainability of the Wet Tropics and worried that their generation will be left with a world full of environmental problems. Half were "deeply" worried by this thought, and 65% said that sustainability education should occur at school through targeted care actions and projects that encourage learning by doing. Students reported they did not know nor fully understood the extent of Anthropocene challenges, what mitigation is occurring, what adaption needs to occur, nor what role they could viably play. One teacher told Marcia, "the curriculum is very rigid. It's hard enough to get through the specified lessons in order to get the assessment. I think [the school] would have to rejig in order to incorporate sustainability values more." Another reported that there isn't a "great deal happening. There might be the occasional mention of recycling or not using air conditioning when you don't have to but [caring/stewardship] is not really something that has been emphasized in the school." Poignantly, a third teacher summed up student interest in caring work as "It depends on how much they know about [the Anthropocene] and that would be limited by the fact that we don't teach it."

Learning /Caring Initiatives in the Wet Tropics

We shall now focus on what is being done to enable children's care projects. Groups of educators in coastal and highlands regions in far north Queensland, who themselves have a strong sense of care, are initiating and supporting student projects that truly focus on caring for country. In 2013, the Cairns District Schools Science and Sustainability Enrichment Program (CDSSSEP) was started by Sandra Charlton,

Louise Carver, Helen Underwood, and Annette Ryan, and 2014 was the first year of the program. Led by Sandra Charlton, the program involves students and teachers from Queensland Department of Education and Training primary schools and colleges. The initial program was centered on environmental networks established by staff at the Holloway's Beach Environmental Education Centre (HBEEC), and subsequently the program is also offered by the Tinaroo Environmental Education Centre (TEEC). Both programs facilitate extracurricular science and sustainability enrichments for able and selected, preadolescent children in Cairns, Gordonvale, and towns across the Atherton Tablelands. Since 2013, 9- and 10-year-olds in Year 4 have been recruited to take part during their Year 5 studies as 10- and 11-year-olds. The children are nominated by their school principal and while in Year 4 complete an International Competitions and Assessments for Schools (ICAS) (UNSW Global Pty Ltd, 2017) science test Paper C (Year 5 equivalent) to gain entry. The top 15 students are offered places and once accepted into the enrichment program are challenged to develop small-scale sustainability initiatives and encouraged to seek advice from education and environmental professionals in the region – such as from the Cairns Regional Council, local Queensland Government Departments, Barron Catchment Care, Terrain NRM, Great Barrier Reef Marine Park Authority, Wet Tropics Management Authority, James Cook University, and local community organizations and businesses.

Cairns District Schools Science and Sustainability Enrichment Program (CDSSSEP) range of 1-year projects is truly inspirational (see Table 1 for a small sample from 2015). In most cases, the young children excel at recognizing the problem and identifying actions for solution. Despite their age and inherent lack of access to integrated resources, these children are no less interested in leveraging their ideas via the community into fully realized caring projects. The program is extracurricular and not usually undertaken as part of a school day. Children spend their own time on their projects. In some schools, the children meet with the teacher liaison of the school for 1 h a week and then work on the project in their own time. The children's efforts are not graded nor assessed, and children's two public presentations of their project's results are viewed as an opportunity for the child to gain additional feedback about their project from people outside the program and project team. The children's initiation starts with induction days into how to set up a sustainability project. The children attend excursions to both a nearby tropical island (Green Island) and a Wet Tropics aquatic ecosystem, the Barron River. Children indicated that their project ideas were inspired by their adult-facilitated experiences on county as these excerpts from focus group interviews show (gender, school, and year are de-identified for confidentiality). Given that children are the agents of their own learning (Malone, 2011), these data enable the enrichment program children to speak about their experiences and their decisions in their own words.

The children in the enrichment program designed their own projects. A trip down the Barron River gave some of the children project ideas:

> When I saw the Barron River, I thought, how would you feel if you were pouring a cup of water and then there was white dots full of washed out fertiliser in your water and that was what you had to drink, and I wouldn't drink that. (Eleven year old)

Table 1 Sample of student projects from the Cairns District Schools Science and Sustainability Enrichment Program (CDSSSEP) 2015 (Cairns Regional Council, 2015)

Project	Title	Collaborators	Brief description
1	When he saw the stream	Children's authors Mother	Student has researched in impact of litter on the rainforest, and she has written a children's book to address this issue
2	Batman	Cairns regional council Tolga bat Hospital	Student has researched the importance of the spectacled flying fox to our environment. He has investigated attitudes and knowledge of the general public and his fellow year 5's. The student attended meetings as a member of the cairns regional Council's flying fox advisory committee
3	Conservation 4 kids	Family	Student flagged the notion that the topic of conservation was considered by young primary school-aged students in a negative light. She scripted and filmed four short videos to address this perceived shortcoming. She conducted surveys with 5 year one classes before and after the screening of these videos and analyzed the students' responses
4	Running in the right direction	Barron catchment care Canegrowers Association Mulgrave Landcare, and catchment group	Student researched and identified best management practices (BMP) sugar cane farmers are using to reduce sediment runoff. She surveyed cane farmers about their use of BMPs and interviewed a farmer about the barriers farmers encounter in reducing runoff
5	Protecting our marine life	CSIRO Cairns turtle rehabilitation Centre Cairns regional council	Student conducted litter surveys and water quality testing at four locations on Barron River catchment. He has created a reef Guardian household survey and proposed that ratepayers that meet or exceed specific litter targets be rewarded via a rates reduction or voucher. He was invited to join the Cairns City Council's water advisory Board for the January 2016 meeting

> When we were going down the Barron River there was a bank completely bare of mangroves. A very, very, very, clear example of shelf erosion, so I thought, hmm, maybe that has something to do with there being no mangroves. (Ten year old)
>
> I got the idea because one day we went . . . on a boat ride down the Barron River. Then I saw Singapore Daisies [a declared noxious weed in Queensland] covering all the trees and it just looked horrible so I thought it was an idea to help stop the Singapore Daisies. (Eleven year old)

And the trip to Green Island combined also promoted an idea for a project:

> I decided to go to . . . Goomboora Park. . . In the river, I saw a car admission ticket . . . and it was expired and it was just floating down the river and it was two days old. Then I thought going to Green Island I could make a ticketing system that doesn't even require a ticket, it

> just requires your phone, you scan and you're magically allowed on the boat. (Eleven year old)

And a keen observation of school grounds led to a project idea:

> Well, I got the idea for my litter project because of all the litter around our school. For example, on the oval you can't walk one metre without seeing at least one piece of litter on the ground. (Eleven year old)

Children's location proximate to the Wet Tropics is an important consideration as is the location of the Great Barrier Reef, the other World Heritage area offshore from Cairns:

> I wanted to do a project that I was inspired by, and I am honestly inspired by nature. So, it would either be the rainforest or the Great Barrier Reef. Living near the rainforest myself I chose to do [my] project on the forest and the area around it. (Ten year old)
>
> We're surrounded by ocean and rainforest [and] our litter impacts the environment very badly. I think the only way to stop litter is to educate people that it's not right to do it because you might clean it up but there's always going to be somebody who will keep littering and littering. So, during my project, I found and researched different ways to educate the community about litter. (Ten year old)

While litter reduction projects are tangible and meaningful, some children said they were motivated by the notion of a novel project, the idea that they could change the behavior of others, and the perception that they could make a positive difference:

> I had several original ideas. I said to my mum, Ghost Nets. Not too sure about that one. Marine life? Yeah. Someone already thought of that. What about mangroves? Then mum started getting really excited, because it was something that would amount to a good project. Because I wanted to do something that no one had ever done before. That was very important to me. (Ten year old)
>
> I'm interested in all varieties of environmental issues but mainly water problems, pollution in water. So, for my project I've built a few sediment traps around the school. I've measured the sediment that has been trapped and stopped from going into the Great Barrier Reef. (Ten year old)

Children view their endeavors as worthwhile, and some stated an intention to continue their projects beyond the program's deadlines:

> I am going to continue my project after this year. I'm going to continue it for as long as I can, because you – because once you've started something like this, you can't just give up. (Ten year old)

The children were optimistic about making difference, though several were also realistic about the size and longevity of that difference. What emerges through all these data is that the children interviewed very clearly demonstrate an understanding of relationality between their social worlds and the world of rainforests and reefs. They exhibit compassion for animals and plants:

I created a little challenge for all the classes in the school. I would go around [to the classes] and the teachers would email [the teacher liaison the results and the class] with the highest percentage of students in their class with no litter or rubbish items in their lunchbox get a prize at the end of the next week. I think that really motivated my school to stop bringing rubbish to school and stop littering. When we announce the winners we also told them how all the litter kills hundreds of animals every single day. (Eleven year old)

I increased the awareness in Stratford [suburb in Cairns] about plastic bags and it definitely made a difference. My project was trying to reduce the amount of plastic bags used in the Stratford shopping area by talking to the owners of the shops just not to give a plastic bag on automatic. Ask if [customers] need it or if they have their own bag. (Eleven year old)

The most important thing for me was spreading the word around, because this is an awareness campaign. (Ten year old)

Enablers and Barriers for Children Doing Care Work in the Wet Tropics

Designing deep and meaningful learning experiences that reach beyond prescriptive numeracy and literacy classroom-based lessons is not easy on a number of levels. As Bowers (2011) notes, the crisis of the Anthropocene is not currently being addressed in formal education because so much of what is promoted in public (government) schools tends to reflect the thinking and actions that have promoted the very crisis we face. What is required is thinking and actions that respond to increasingly complex systems. Educators, at both the administrative and classroom level, who wish to respond to complex Anthropocenic systems are required to surrender false presumptions of control and instead exert trust, creativity, time, and energy. Our research with teachers and children who engage in caring for the Wet Tropics finds similar barriers to those provided by scholars elsewhere, including insufficient time and money. Understandably, school principals are preoccupied by consequences of neoliberal education policies that emphasize (and in some cases, punish and reward) performative excellence in education as decided on narrow, literacy and numeracy standardized test results. Educational activities that divert attention away from primary schools' core business of literacy and numeracy can be seen as disruptive to progress. In this vein, far north Queensland schools have responded by defaulting to rigid, explicit instruction pedagogical models.

There is research that argues for the effectiveness of explicit instruction over other pedagogical models (Clark, Kirschner, & Sweller, 2012; Hollingsworth & Ybarra, 2009; Rosenshine, 2012), particularly for teaching numeracy and literacy skills. However, literacy and numeracy learning can also take place alongside or through works of conservation and restoration, with added positive wide-ranging results for school reputation, learning, learners, and their communities (see Archie, 2003). North American schools that use the local environment for learning report dramatic improvements in the quality of education, including improved academic performance overall and in standardized test results, student motivation, behavior and

attendance, parent and community involvement, and assimilation of concepts and skills beyond numeracy and literacy. Learning for caring can cover a broad range of core curriculum requirements in English, Mathematics, Science, and Technologies alongside improving children's capabilities considered necessary for the twenty-first century, including problem solving, communication, and critical and creative thinking.

For example, consider the work of Molly, who, as an individual (and not part of the CDSSSEP) at age 9, took action after learning about the consequences of plastic for marine ecosystems and animals. After considering a suite of possible actions, Molly decided to start a campaign to eliminate use of single-use plastic straws from all far north Queensland school canteens. Molly calls her campaign "Straw No More" and uses social media features across Facebook (https://www.facebook.com/StrawNoMoreProject/), Twitter, local radio, and a website (https://www.strawnomore.org/). Molly began at her own school first gaining support from the school principal and then the canteen manager and teachers. In less than a year, 16 other schools joined the campaign. Molly worked with local not-for-profit organizations, speaking on local and national radio and presenting at the local TedXCairns event. Clearly, Molly's learning over the year extended far beyond school-based literacy and numeracy to develop her personal and social capabilities; critical, creative, and problem-solving skills; and personal growth alongside improving the ecological fabric of waterways that enter the ocean. Molly is planning to expand her campaign to local cafes and restaurants.

School leaders can choose to be enablers or disablers. School-based activities are bounded by the rules, regulations, and norms of the broader education system and community context. Principals who choose to enable conservation and restoration work can do so by actively supporting emergent initiatives and establishing democratic and trusting structures which, in turn, generate space for flexibility, creativity, and increased social capital. Although principals tend to report feeling constrained by systemic barriers imposed by educational governing bodies, they have discretionary power to use "leverage points" (Hjorth & Bagheri, 2006) within their spheres of influence. In one Wet Tropics school, the principal used her leverage to support teacher and student conservation and restoration work of local wetlands by creatively rearranging the school's budget lines to enable the key teacher to have 1 day per week free of teaching to administer and organize this caring work. Another very important enabling practice is trust. Reciprocal trusting relationships between principals, teachers, students, and the local community are very important for advancing conservation and restoration work. Principals, teachers, and parents have to trust that ecological caring work leads to student lifelong learning rather than being tempted to focus on systemically valued and immediately measurable short-term goals and gains.

The barriers to children caring range from existential to practical. Children in the CDSSSE Program learned that their care actions were unusual, and their high expectations of community involvement were not met, discovering that others "do not care" or do not appear to care enough "to turn up":

> Well, it's really amazing how much mangroves actually do for the environment, but no one seems to care. No one really seems to care about what they do for the environment. [Clifford Jackson: Why do think no-one cares?] Because they're too caught up with their day-to-day lives and they don't have any time to care about the environment. But some people, even though they are so, so, so busy actually find time to spare a thought for Mother Nature and help her out. (Ten year old)
>
> Well one of my expectations was that when I held the big clean out of Singapore daisies at the front of Holloway's Beach, I put a lot of effort into making the big flyers you put on parade and I saw my teacher and he put it on parade [too]. Then many people said they were going to turn up. But then when it came to the day, nobody turned up. It was only me, my friend, my parents and the Holloway's Beach [Environmental Education Centre] crew. (Eleven year old)

CDSSSEP children realized that while their project idea was worthwhile, the practicality of completing the project was beyond their ability and also that the others on whom they had to rely were not always reliable or fully cooperative for differing reasons:

> Yeah, I definitely would have liked to finish it, but I have no contact. I don't know how I'm able to find the [High School] student that I worked with [on the coding]. He said he's got some sort of office but he never told me about it, he never told me where it was and so I'm not able to finish the project at all. (Eleven year old)
>
> [My project] wasn't as successful as most of the others [projects]. Partially, since I had to work with younger children and their teachers, they were very busy, especially since had to get most of this done near the end of the year and that's a very hectic time for most teachers. So, trying to get the surveys I handed out returned twice getting time to show the clips [child directed and filmed video clips on water conservation] to the kids was very difficult and half the surveys didn't come back in time, so I didn't actually end up finishing my project completely. (Ten year old)

The three main enablers identified by the children when interviewed about their care work were the direct assistance of parents, school educators, and environmental professionals. What we enjoyed finding in these data was the influence of the children's mothers and fathers and their teachers and community supporters:

> I was interested in the environment because of my Mum, she studies environmental education and stuff like that. I thought it would be a good idea [to do the project] because I could have support from her. She would know some stuff and I thought that would be good. (Ten year old)
>
> Mum took me to the mangrove boardwalk to do a little bit of research [and] have a look - so many crabs. So, I've been at mangroves and I've done a lot of research. (Ten year old)
>
> My dad just thought of it and I just went with him because I couldn't think of anything else. (Eleven year old)
>
> Mum has a Pozible account [https://pozible.com/], so she set up crowd funding platform on that. Mum again helped me spread the word about my survey that I made on Survey Monkey . . . via Facebook and her friends and the community choir. (Ten year old)
>
> So one of my challenges at the start of the year was thinking of what project I should do. Luckily, I had some of my teachers help me out. One of my teachers said, "Remember the excursion to the Barron Gorge." The water was basically red and she explained that it was sediment. So she said, "Why don't you do your project on sediment?" and I went along with that idea and I found it really enjoyable. (Ten year old)

> Biggest helper probably was [the teacher]. She kept me going when the going got tough. (Ten year old)
>
> The person [who] got me started and going along the right track was Danora from the Cairns Regional Council. Second person was [JCU lecturer]. Being a teacher, lecturer person herself, she knows how to get through [to] people and know[s] how to get working. So, she was basically my little helper. (Ten year old)

Another significant feature to emerge from interviews was the concept of working at scale. Scale is a vital consideration for educators and their students involving themselves in positive actions (rather than ignoring or despairing about Anthropocene because the identified problems are global). Local scale, practical actions are realistic for young people who are well below voting and driving age:

> Litter I think would be much easier to change other people's perspectives and teach them about. Because climate change is such a large issue and even if one person stopped [contributing] it might not change much with the issue. But with litter, if one person stops, their suburb that they live in could get cleaner. (Ten year old)
>
> Global warming, I know it can't really be stopped, but we can halt the progress by doing little things. All those little things help. You know the saying a little drop of water in a big sea still makes a difference. That's what we can do. Tiny, midget actions can still be used against global warming. (Ten year old.)

What emerges from these data is just how wise these young children can be, particularly in understanding the power of multiples when it comes to individual and local caring actions. We are very moved by these data and particularly the phrase that "tiny, midget actions" count.

Conclusion

The novel landscapes of the Anthropocene are the new normal. No child's project can return developed country to any sense of wholeness associated with the conditions of past centuries. What the children are doing are enacting their own relational ideas of care, enabled and practically supported by innovative educators and involved parents. All projects concern raising awareness and reducing one or more human impacts on a Wet Tropics catchment or biome. Not one project involved taking peers outside to more directly "connect with nature" (Charles, Louv, Bodner, Guns, & Stahl, 2009), and this is very practical decision-making. For children in the Wet Tropics, the forests and rivers of Far North Queensland are safely accessed in the company of supervising adults like parents and outdoor and environmental educators. Coastal rivers hide very large crocodiles. Forests are alive with poisonous snakes, disease-bearing ticks and mites, biting insects, and stinging trees. And for half of the year, it's incredibly hot. None of this lessens the meaning and impact of the children's actions, for what underlies all these initiatives is both a strong sense of purpose and a strong sense of connection.

Children desire to take large and "midget" action to address environmental and sustainability issues in the Wet Tropics, while Queensland public education remains

largely preoccupied with maintaining the education status quo and limiting student learning to "safe" experiences that can be measured and controlled. The children afforded participation in the extracurricular CDSSSEP are challenged to work with others and make a difference to their local community; however the program is limited to children with demonstrated high academic ability and with access to higher levels of social capital. Molly, who was not involved in the CDSSSEP, was supported by her own school and family. The key condition is that children receive full and meaningful, trusting adult support to keep them buoyant and optimistic.

> I know that one thing is for sure, I know that I can never give up as you can [always] try some new ways to make a change. (Ten year old)
>
> I think I can make a difference if I can get out the information from my survey to the relevant industries, companies or environmental groups . . . and basically tell the public, you guys are letting these poor animals die. Why don't you know anything about them? Maybe they can start helping. (Ten year old)

Laird (2017, p. 268) writes that the Anthropocene will demand from all of us a "much deeper and broader rethinking of educational ends and means that take the myriad complex challenges of Earth habitation and habitability seriously, both locally and globally, with diverse children's needs and situations explicitly in mind." Children's participation in the formal enrichment program on the Atherton Tablelands and in Cairns was enabled by a regional network of adults in possession of "a heightened sense of human agency's consequences for the habitability of both the planet and children's local environments, the places where they live, play, and learn" (Laird, 2017, p. 268). There is a concept of a "good" Anthropocene (or possible, plural, Anthropocenes), lit by a myriad of actions, large and small, all making positive and productive contributions toward creating a future that is just and sustainable (see https://goodanthropocenes.net). Whether our Anthropocene turns out to be "good" or dangerous for human societies, ancient rainforests (and their neighboring reefs), is going to be decided in the next few years. What we can rely on is human creativity ingenuity and care. And as with the CDSSSEP, within hybrids of formal and informal learning, caring educators and children will find the opportunity for change (Stevenson, Nicholls, & Whitehouse, 2017). What we show in this chapter is that when enabled by caring adults, children are agentic, they do care deeply, they possess relational systems thinking, and they value their Wet Tropics.

Cross-References

- ▶ Children in the Anthropocene: How Are They Implicated?
- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Posthuman Child and the Diffractive Teacher: Decolonizing the Nature/Culture Binary
- ▶ The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment

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Moving Beyond Innocence: Educating Children in a Post-nature World

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Abstract

This chapter examines some of the challenges of unlearning anthropocentrism – i.e., the deep-seated cultural, psychological, and enacted prejudices of human specialness – in nature-based early childhood education programs. We begin with a critical exploration of recent trends in environmental philosophy and the conservation sciences that seek to move beyond the so-called archaic notions of "wilderness" and "nature" toward more managerial models of human dominion over planetary "ecosystem services." We suggest the trouble with these discursive moves is that they shirk from the courageous conversations required from environmental education in a time of ecological emergency. We conclude by drawing on research at nature-based schools in the Netherlands and Canada to illustrate

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the tenacity of anthropocentric "common sense" and suggest the beginnings of pedagogy of childhoodnatures guided by notions of rewilding and ecological humility.

Keywords
Rewilding pedagogy · Ecocentrism · Post-nature · Wilderness studies · Moves to innocence · Anthropocentrism · Nature-based elementary schools

Introduction: The Trouble with Being Nature

In this chapter we critically examine what it means to educate children *as* (part of) nature. As stated in the Introduction to this handbook: "the new concept 'childhoodnature' reflects that as children *are* nature this should be redefined in this integrating concept." We wholeheartedly support redefining and disrupting "existing ways of considering children and nature," in order to critique and reject "the view that humans are superior." For us, however, the real trouble is not whether we consider humans biophysically "part of nature" – this is convincingly self-evident – but rather how anthropocentric "common sense" repurposes such discursive practices into feel-good axioms like "everything is connected" while maintaining business as usual (Kopnina, 2016b). The problem then is not strictly ontological (i.e., children *are* nature). Rather, we argue that the ontological move *must* also consider the politics of interpretation and recognize the deep-seated cultural, psychological, and enacted prejudices of human specialness. The challenge of unlearning anthropocentrism, we submit, thus lies at the crux of any project to (re)define and integrate notions of childhoodnature.

It is true: we *are* nature – all the way down (see Kearney & Treanor, 2015). The trouble with this formulation arises not so much in its truth claim but the way such logics are strategically appropriated and redeployed as *moves to innocence* or evasive *bad faith* in the face of grave ecological realities and the eco-ethical implications of *being nature* (Derby, Piersol, & Blenkinsop, 2017; Foster, 2015). (Janet Mawhinney (1998) develops the notion of "moves to innocence" – i.e., the "seductiveness of the innocent position" (p. 94) – in her critique of the operations of white privilege in anti-racist pedagogy and organizational change. The phrase is drawn from the work of Mary Louise Fellows and Sherene Razack (1998), who originally describe a "race to innocence" but deployed by Mawhinney in a slightly different way. Eve Tuck and K. Wayne Yang (2012) further develop the notion in the context of settler colonialism to describe a "set of evasions" that "problematically attempt to reconcile settler guilt and complicity, and rescue settler futurity" (p. 1).) In this chapter we deploy these notions as a means of describing an anthropocentric set of evasions and/or appropriations to reconcile ecological guilt and complicity, in order to legitimize a techno-optimist future of human dominion as common sense.

As practicing environmental educators and researchers, any recognition of our coevolutionary entanglement with/in a multispecies world (see Haraway, 2016) is only meaningful insofar as it contributes to cultivating eco-ethical praxes. In other

words, the trouble for environmental educators is twofold: (a) fostering the pedagogic strategies to integrate notions of childhoodnature in the first place (i.e., instilling that we *are* nature) and (b) maintaining hyper vigilance to the ways in which such lines of thinking are reappropriated by anthropocentric biases, desires, and discourses.

Admittedly, a host of "complicated conversations" follow from post-anthropocentric lines of thinking. For instance, one might reasonably propose Ebola viruses are also part of nature (Kopnina, 2016b). Here the trouble (from a human perspective) is how to appropriately respond to the expansionist behavior (from a human perspective) of one part of nature given the health, well-being, and flourishing of one's own body, species, and the ecological community as a whole? Does/ought the same logic hold for all species? What about issues of animal personhood? Are we ready to weigh the life of a gorilla against that of a human toddler fallen into his cage (Bron Taylor, 2016)? Are we ready to seriously consider why one primate should even be in a cage for the sake of another primate's entertainment? More to the point, if we begin to argue that children *are* nature and nature is *natural*: are we not moving toward dangerous appeals to nature whereby whatever children do – be it killing small animals or pouring motor oil down the sink – is rendered *natural*? (For an example of the complicated conversations and problematic logics that emerge from this kind of oversimplification applied to urban centers as *natural*, see McClaren (2009). The logic goes something like this: "Humans construct cities. If human constructions are not natural, then what does that make humans? Stated differently, how should humans behave naturally?" (p. 303).) Obviously, we could never address all these complicated conversations in one chapter, but we will attempt to trouble conceptions of childhoodnature by proposing that (a) ecocentric (i.e., post-anthropocentric) lines of thinking are critical to the project and (b) suggesting *rewilding pedagogy* as one means to counter the tendency to move to innocence by way of human exceptionalism. In order to illustrate these issues in an educational context, we will draw on research concerning the pedagogical complexities of (un)learning anthropocentrism at nature-based education in the Netherlands and Canada.

As educators interested in integrating notions of childhoodnature, we recognize it is incumbent to explore the complex relationships between material compositions and the contested meanings attached to foundational categories such as *nature*, *wilderness*, *urban*, *human,* and *children*. This task is all the more pressing in the so-called Anthropocene, where some have suggested it is "the end of nature" (McKibben, 1999) and the time has come to rethink "pristine" notions of wilderness (Cronon, 1996). In light of these proclamations, Robert Fletcher (2015), for example, has suggested pedagogy focused on "saving nature" is no longer relevant as the idea of pristine wilderness embodies a culturally specific, elitist perspective in which immersion in nature is understood as a therapeutic escape from the reputed ills of industrial civilization. Nature thus negates sociocultural necessities, from social equality to cultural determination, with wilderness preservation seen as a limitation on human progress. According to this line of thinking, wilderness is an archaic notion, and the future of both conservation and environmental education lies in embracing a "post-wild" or "post-nature" world. Typically, this view construes nature as a product of idealized "Western middle-class sensibilities" (Malone,

2016, p. 399). Relating this to early childhood education, Taylor (2017, p. 61) has criticized "entrenched and romantic notions of nature as a separate and pure domain," to which "innocent children might be returned and through which they can be saved," claiming that these notions "are no longer tenable or constructive."

As educators committed to the health and flourishing of relatively wild places, which are places where there is a flourishing biodiversity and, for the most part, nature-on-its-own-terms, we tend to view such positions with a measure of suspicion. This is due, in part, to the way these positions are readily appropriated by neoliberal and "neo-green" interests (Kingsnorth, 2014). We call for post-nature thinking which recognizes the significance and intrinsic value of the myriad beings, elements, and relations that co-constitute existence (Kidner, 2000; Crist, 2004). Moreover, we hold that the *real* trouble with wilderness is that vast tracts of land and sea continue to be colonized for short-term capital gain and it would seem many post-nature discourses either intentionally or naïvely pave the way for increased exploitation. Our issue with *certain* post-nature discourses (i.e., those failing to recognize anthropocentric moves to innocence) is not so much the spirit of their ontological reflexivity – we *are* nature and pristine notions of wilderness *ought* to be troubled – but their ideological naiveté with respect to how these discursive practices are deployed. Disrupting a foundational category like *nature* or *human* is, relatively speaking, the easy part. The real work begins in staying with the complicated conversation and following the implications where they lead no matter what sacred cows or sacred primates need to be sacrificed.

Our vision for pedagogy informed by childhoodnatures is simply this: that it stays with the troubling conversations called for by these historical moments in lieu of deferring to technocratic cheerleaders for the Anthropocene peddling what Donna Haraway has called "a comic faith in technofixes" (2016, p. 3). This is not to say that technical innovation has no role in addressing ecological degradation, but rather it is a critique of the faith-like "rational superstition" (Wilson, 2017) that undergirds the anthropocentric logic of many post-nature discourses. This penchant for "looking away" (Klein, 2014) from displeasing realities to comforting fantasies functions to shut down complicated conversations at the very time they are most required. For instance, witness the way Erle Ellis at the Laboratory for Anthropogenic Landscape Ecology deploys such thinking to both plug the "amazing opportunity" presented by the Anthropocene and shut down any objections: "Nature is gone. . . You are living on a used planet. If this bothers you, get over it" (as cited in Wuerthner, Crist, & Butler, 2014).

Regrettably, much post-nature thinking currently seems more concerned with appropriating the discourses of science and environmental philosophy to legitimize a managerial approach to "ecosystem services" than engaging in complicated conversations about the eco-ethical implications of the "sixth extinction" (Kolbert, 2014). It would seem this brand of post-nature politics does not view anthropogenic mass extinction or climate catastrophe as a call to conscientization but rather evidence of the apotheosis of human and capital to god-like geologic forces (see Moore, 2016). Some may claim we are conflating "nature" with "wilderness" that the concept of wilderness has been debunked for at least

20 years and we have moved on to more modern and pressing issues such as climate change or ecology without nature (Morton, 2007). We are not conflating as much as drawing a parallel. The discursive strategies that supposedly debunked the notion of wilderness 20 years ago appear to have turned now on "nature" writ large. (It bears noting the notion that Cronon debunked wilderness 20 years ago is simply not accurate. The wilderness debate "rages on" (Nelson & Callicott, 2008) and has evolved in response to recent environmental scholarship, trends in the conservation sciences, and changes in the semiotic-material conditions of the biosphere (see Wuerthner et al., 2014; Kahn et al., 2013; and the September/October 2014 edition of *Orion* for recent debates). It also bears noting that Cronon's original thesis is widely misread and frequently appropriated for ulterior motives (as per the thesis of this chapter). See, for example, the foreword to the paperback edition of *Uncommon Ground* (1996) where Cronon attempts to clarify his position, noting the danger of conflating conceptual critiques with material realities: "Asserting that 'nature' is an idea is far from saying that it is only an idea, that there is no concrete referent out there in the world for the many human meanings we attach to the word 'nature.' There are very real material constraints on our ideas and actions, and if we fail to take these into account, we are doomed to frustration if not outright failure. The material nature we inhabit and the ideal nature we carry in our heads exist always in complex relationship with each other, and we will misunderstand both ourselves and the world if we fail to explore that relationship in all its rich and contradictory complexity" (pp. 21–22).) We would be foolish to overlook that one of the reasons Cronon's thesis was so widely received was its compatibility with the ethos of our age, that is, the ease with which it is appropriated and repurposed to align with the dominant interests of Anthropos and Capital. And now that "wilderness" has been permanently fused to archaic notions of "pristine" – a defunct idea brandished by maudlin, sentimental (and potentially racist) simpletons – the next move is to deconstruct nature itself (and conveniently all the lands and "resources" under its aegis). As Christopher Ketcham recently commented, "Wilderness advocates have stopped talking about wildness, because wildness is not commercially viable" (2014, p. 43). We must always bear in mind that we are four decades deep into a calculated restructuring of human-nature relations (Henderson et al., 2017) and our intention is to encourage environmental educators to resist the move to "get over it" due to economic common sense. In this chapter, we shall try to stay with the complicated conversations and argue that while one of the troubles with wilderness is that it has been deployed as an ahistorical anachronism pandered by sentimental elitists; the *other* trouble is the fact that the *material referent*, or what remains of it, continues to be colonized all the while. (We note that "colonized" in this case does not *only* signify the imperial practices of accumulation by dispossession within global capitalism as places are reconfigured to compete based on resource endowments (e.g., Fletcher, 2015; Mendoza, 2017). Instead, like Serres (2011), we speak of colonization as *appropriation* of both urban and natural spaces with the "disadvantaged" or "dispossessed" including both vulnerable members of the human species as well as other-than-human beings. This does not mean we wish to

reinforce a categorical separation between human and nature. We share with Taylor (2017, p. 61) that "it is the deluded hyper-separation of ourselves from nature that distinguishes modern western thinking and has resulted in unsustainable modes of living in the world and produced the anthropogenic ecological crises we now face.")

For educators interested in integrating notions of childhoodnature, we submit the trouble lies in what post-nature thinking will mean in practice. Will it simply be a novel means of reinscribing human exceptionalism and the managerial responsibilities that come with planetary stewardship (i.e., a move to innocence) or will it involve what Gary Snyder called the "real work" of coming to recognize our place in the world with humility (see Jardine, 2012, p. 220)? We acknowledge that calls to unlearn foundational dualisms and anthropocentric biases in education are not new (Kopnina, 2012a, 2015a; Bonnett, 2015; Lupinacci & Happel-Parkins, 2016; Quinn, Castéra, & Clément, 2016); however, we hope to illustrate some of the challenges inherent in the endeavor based on our research with nature-based early childhood education. As we shall discuss below, educational experiences of "direct contact" with "nature" all too often backslide into anthropocentric moves to innocence. Ultimately we suggest any educational initiative aiming to integrate notions of childhoodnature must remain hyper-aware and realistic about such tendencies and appropriations.

Rewilding Pedagogy

We cautiously describe our educational project as *rewilding*, that is, co-crafting experiences that trouble the taken-for-granted logic of human dominion and seek to recognize our entanglement with/in a more-than-human world. Rewilding pedagogy entails cultivating the historical consciousness and humility to recognize a planetary loss of flourishing "wilderness" (i.e., healthy and biodiverse ecosystems with relatively minimal human involvement). While rewilding in conservation discourses tends to mean reintroducing species, or reasonable facsimiles thereof, to places where that species has gone extinct (Kolbert, 2012), it also refers to committing to the flourishing of places in ways that recognize the reciprocity between humans and other-than-humans (Bekoff, 2013). Rewilding, in this sense, seeks to shift environmental relations from being primarily economic or resourcist toward a more holistic recognition of the necessity of "nature protection" (Washington, 2013; Kidner, 2014). Ultimately rewilding pedagogy entails evoking encounters and experiences that challenge anthropocentric discourses and recognize the interpenetration of culture/nature, organism/environment, urban/wilderness, etc. There is, however, a way in which even these reorientations might slide into anthropocentrism (e.g., we need to save *our* forests for their educative or health potential for human children). There is nothing inherently wrong with human land use per se, the issue lies in an anthropocentric ethos writ at a planetary scale and amplified by the "paradigm of unlimited economic growth." As Miller, Soulé, and Terborgh (2014, p. 4) underline:

> the assumption that managing nature for human benefit will preserve ecological integrity is ungrounded and does not address the root causes of biological destruction, such as the paradigm of unlimited economic growth, unabated consumption and ever-increasing human numbers. . . We contend that the *ideology* rests more on delusion and faith than on evidence. The ethic of the *ideology* is utilitarian and sometimes parallels neoliberal economic philosophy. . . the center of traditional conservation is the preservation of biodiversity for ecosystem function and evolutionary potential.

The more ambitious side of rewilding represented by the "nature needs half" movement, for example, challenges the ideology of anthropocentrism by recognizing the intrinsic value of other-than-human beings while maintaining the dignity and uniqueness of human beings (Cafaro & Primack, 2014; Doak, Bakker, Goldstein, & Hale, 2015). Rewilding in this sense is related to the concept of *bio-proportionality,* seeking not merely viable but flourishing populations of myriad species and strengthening the case for increasing the extent of protected areas (Mathews, 2016, p. 140). Within this framework, setting aside vast tracts of land and sea for "nature" without direct human control or management is necessary to guarantee *abundance* not just sufficiency (Mathews, 2016). One of the crucial differences between rewilding pedagogy and many of the conventional ESD approaches is this recognition of the intrinsic value of places/beings and a commitment to supporting bio-proportionality in "the natural world" as well as "urban environments." The trouble, for us, lies less in taking up specific positions on conservation issues and more in the tendency to make faith-like appeals to the metaphysics of mastery in lieu of staying with complicated conversations. With respect to education, we are concerned with the way in which these logics play out, for example, the recent move in some nature education programs to make no distinction between "domesticated" and "wild" species as a pedagogical strategy for the Anthropocene.

Case Studies

The Netherlands Case Studies

The Netherlands is a country populated with over 17 million people at the rate of roughly 500 people per km^2 and rising. Since most land is used for agriculture or industrial development, rewilding initiatives in the Netherlands tend to be couched in the language of "land management" (Kolbert, 2012). Dutch rewilding thus mostly involves reintroduction and preservation of smaller species with larger species, such as deer and wild cows, needing annual "maintenance and management" or, in other words, culling (Kolbert, 2012, 2014; Shoreman-Ouimet & Kopnina, 2015, 2016). As discussed in the gardening case study below, children are taught to "take care of nature" primarily to ensure human food security. Dutch environmental education includes multiple stakeholders (e.g., schools, communities, garden centers, local businesses, NGOs), and the curriculum typically involves a number of nationwide nature activities: including *schooltuinen,* or "school gardens" to learn basic horticulture, and *bosweek*, or "forest week" (Kopnina, 2011a, 2011b). Other ad hoc

initiatives include visiting "wild areas" (small parks, populated perhaps by birds and a few small mammals such as rabbits) in order to participate in botany, biology, and geology-related coursework.

Schooltuinen/School Gardens

Between June 2016 and July 2017, the author (Helen Kopnina) conducted a number of in-depth interviews with the children and school supervisors involved in a school gardening project. Amsterdam schoolchildren between the ages of 9 and 11 routinely follow a "nature education" course involving gardening. In this case, over 60 children in the summers of 2016 and 2017 were involved in a *schooltuinen* program in an urban park called Westerpark (detailed in Kopnina, 2013, 2015b). Students helped with activities such as trimming, cleaning, and gathering wood and are sometimes rewarded with honey from local bees. The garden itself is an area of the park used exclusively for educational activities where students learn rudimentary facts about Dutch agriculture.

In conversing with students, it quickly appeared that they equate "weeds" with something that needs to be destroyed, not, for example, as wild plants contributing to biodiversity beyond human utility. However, we need to note that in biological terms, the category of "weeds" needs to be treated on the case-to-case basis. If the plants are introduced invasive species they might not be contributing to biodiversity and thus may impede the task of agricultural rewilding, which is about growing diverse foods. The practical question is whether "weeds" may create a monoculture that threatens all other plants or whether any nonedible plants are routinely destroyed just because they are seen as "useless." It was also noted that the fact that the "cultivated land" requires industrial fertilizer after the end of the season was not mentioned during the educational program. This kind of rosy colored and oversimplified understanding of ecological entanglement is also evident on a larger scale when visitors to the Netherlands (not to mention the Dutch themselves) view expansive agricultural fields to the horizon only to wax lyrically on how "green" a country it is. Students also learn that due to generous subsidies to domestic farmers, the Dutch are able to export some of their excess produce to African nations to feed disadvantaged peoples. The manufactured landscape is thus rendered morally beneficent. Students learn to clear weeds and are allowed to harvest their produce and cut flowers to take home. As one of the teachers explained: "This way they [the children] learn how important land is. . . They learn how to take care of the land." As a reward for taking care of the land, the children, according to the same teacher, learn that "nature feeds them." At the end of October, when harvesting is complete and all crops and weeds are cleared, the land is left bare to be fertilized for next year's gardening activities.

Bosweek/Forest Week

Bosweek takes place in Utrecht province, in the area called Lage Vuursche, where recently planted forest covers about 1150 ha. The activities include "camping and survival type activities" (e.g., learning how to cut wood and make fires, climb trees, make "wild" river crossings, and discover basic outdoor rules and ethics). On the

forest farm, the children are involved in competitive games, talent competitions, music performances, and stories about the past when "dangerous wolves and bears" roamed the forests. Some children were allowed to help with chopping wood for the fire and were told, as with students in the Canadian case below, that the wood needed to be cut to allow young trees to grow. Significantly, we note that the "thinning" of wood and its use for "green" energy generation is a common practice in all Dutch wooded areas (Kopnina, 2015b). In conversation with the children, it emerged that they mostly enjoyed role-playing and musical competitions inside the house as well as chopping wood. A few children said that the things they missed the most, besides parents, were their smartphones and video games; however, most children the author spoke to referred to their experience as "fun."

Reflections

As these case studies illustrate, Dutch children are rarely exposed to natural areas that are not heavily managed "working landscapes," and yet, educators often frame these experiences as wild encounters. Dominant approaches to agriculture that tolerate little biodiversity or utility beyond human needs are recreated in miniature *schooltuinen* programs in order that students learn how "nature feeds them" and those who are "less fortunate" (quotes here are used to designate terms taken from field notes recording conversations with children or supervisors). Thus the primary lesson drawn from school gardening is that by "taking care of nature," one can sustain not only local needs but "feed the world." While this chapter does not delve into the details of European agricultural subsidies or the manufactured dependence of the developing world upon agricultural imports, we note that even on a small scale, this type of environmental education serves to normalize and celebrate the "metaphysics of mastery" (Bonnett, 2015). This mastery manifests not only as the divine right to determine what species are "weeds" and "pests" but also instills in children the idea that nature itself is better served if humans take our place as planetary stewards and ecosystem managers.

This is not to say that school gardens or forest weeks are inherently anthropocentric, but to reemphasize that in addition to learning to how to grow vegetables, the role of environmental educators in a post-nature world ought to entail provoking students to think about notions such as interdependence, ecological humility, and perhaps even a "more-than-human world" as basics for life in the Anthropocene (Affifi, 2016). Concretely, a good starting point might be letting an area grow without or with minimal management (by simply observing what happens to the land without human "care" or "maintenance"). From this one might highlight, for instance, how bees conduct their ritual dance to indicate the location of "flowering weeds" and make honey used for the bees themselves (not only *for* human children). To avoid giving children the idea that humans are "bad" and outside nature, as well as provide healthy activities for the children, a number of nonintrusive in-nature activities are easy to organize. They can include imitating the bee dance and asking other children to locate the hidden flower following the dance, or playing hide and seek, or observing and naming different types of plants and insects. It seems to us that a pedagogy committed to rewilding or integrating childhoodnatures

ought to always be troubling strict adherence to dualisms such as human/nature, culture/nature, human/animal, modern/primitive, and human/wilderness. There is nothing inherently wrong with school gardens or forest weeks, just as there is nothing inherently wrong with being a human; the objective here is to push environmental education beyond anthropocentric moves to innocence when addressing the emerging realities of a post-nature world. Even in places where there is relatively more "nature-on-its-own-terms," as we shall see in the next section, integrating notions of childhoodnature can still lapse into ecologically problematic interpretations due to the tenacity of anthropocentric commitments.

Notably, much of the discourse around education for sustainable development (ESD) is informed by the metaphysics of mastery and tends to frame "nature" in resourcist terms. As such, a growing number of critical environmental education scholars have noted "sustainable development," as it is currently conceived, is patently anthropocentric (Kopnina, 2012a, 2015a; Kopnina & Cherniak, 2016; Jickling & Sterling, 2017). As a post-anthropocentric alternative, consider the ecopedagogy movement (Kahn, 2010), which is concerned with the radical reorientation of education toward ecocentric concerns in a more-than-human world. In order to incorporate children as positive actors in such a childhoodnature program, a child who is in an animal rights education could come home with a different ethos and that recognizes the subjectivity of nonhumans (Kopnina & Gjerris, 2015; Kopnina & Cherniak, 2016). Perhaps we would do well to recall that initially, environmental education was concerned with helping students acquire an awareness of the natural world and its current plight, sensitivity to the need for protecting nature, and the acquisition of skills to help address environmental challenges (UNEP & UNESCO, 1976). While more recent social approaches (e.g., that knowledge/awareness, skills developed through social learning, trust, connections, and the importance of collective action) are certainly valuable, the plural perceptions of sustainability tend to take focus away from the ecological crisis (Kopnina, 2012a). We suggest that rewilding pedagogy is, in part, a revitalization of the original aims of environmental education.

Canadian Case Study

In comparison to the Netherlands, Canada is a large country with a density of under four people per square kilometer. There are tracts of land comprised of *relatively* healthy ecosystems, which exist, for the most part, beyond the purview of constant human management. The cultural definition of "wilderness" thus varies greatly between continents, as illustrated by a recent contributor to *Orion* who suggested: "Where the American definition of wilderness traffics in philosophical absolutes about what wilderness *should be*, the European definition presents a more general set of ecological guidelines about what a wilderness *could be*" (Miller, 2017, p. 36). As we have illustrated, many environmental philosophers including Cronon have convincingly challenged the American definition of "pristine" and "primeval" landscapes in recent decades. We too are suspicious of wilderness in terms of

"philosophical absolutes," and yet in response to one of the central tenets of environmental education, that is, getting children outside into the natural world, three of the authors (Blenkinsop, Piersol, and Sitka-Sage) were compelled to co-create a school where students could be immersed in relatively "wild places" for as much of the school day as possible.

The Maple Ridge Environmental School Project (MRESP), located on the west coast near Vancouver, was initiated with two core assumptions: the first, that "Canadian culture" (i.e., the dominant settler colonial culture) is predicated upon and aggressively maintains an anthropocentric and colonial relationship with the natural world (Blenkinsop, Affifi, Piersol, & Sitka-Sage, 2016). Secondly, the role of public education, generally speaking, is to induct the next generation into these cultural norms. The central research inquiry was thus what role education might play as an agent of cultural transformation in the move toward more ecologically sensitive ways of being? Supported by a grant from the Social Sciences and Humanities Research Council, the school district, and myriad community partners, the MRESP "opened its doors" in 2011 (see http://es.sd42.ca). Presently, there are some 88 students (aged 4–12), 4 full-time teachers, 2 support teachers, 3 educational assistants, and a principal. The school has no permanent buildings (there are some yurts and shelters and students occasionally visit libraries and swimming pools "in town," etc.), and the vast majority of learning occurs outdoors in various forested parks, research forests, rivers, and lakesides. Additionally, the project is shaped by a set of ecological principles that attempt to bring all aspects of conventional schooling into question and guide the pedagogy toward place-based and ecological kinds of understandings. Although legally required to teach the provincial curriculum, the MRESP has significant latitude to experiment and think differently to explore new conceptions of learning, teaching, and assessment while pursuing a curriculum deeply rooted in place.

The Free Time Politics of Nature-Based Play

One late October day, Sitka-Sage happened to follow students into the small forested area called the "village" for their daily "fort time." Long a staple of environmental education and a component of children's development writ large (Sobel, 2001; also see Donald, 2009 for a critical appraisal of the "fort curriculum"), the village is an incredible opportunity for researchers to listen and observe what happens as this mini-society moves from the initial building stages to imaginative social play. For Sobel, this process of building dens, homes in the woods, caves, etc., often out of sight of adults, is part of becoming adult. Here the students can experiment with who they might want to be and what is socially appropriate to express. This situation also presents a chance to experiment with what students want their ideal communities to look like. The following comes from research notes from the same "free time" period, and all conversations in quotations are verbatim (Note: "I" refers to Sitka-Sage):

> On that particular day, I noticed several of the older boys carrying ominous-looking sticks around that they began loading with invisible bullets, cocking back and taking aim at the sky,

firing at will upon enemy fighters, and occasionally, a very real robin. They converge upon one of the larger forts and began to modify its structure into a prison. Other students start businesses and beginning hording sticks and twine to "sell" the surplus. I frantically search my rain jacket pockets for my voice recorder and situate myself as a visiting reporter interested in the emerging politics of The Village.

"What kind of buildings are there here in the Village?" I ask a Grade 6 girl.

"Well, I know that there is a McDonalds, and an armoury, a twine shop, a tattoo shop, a supplies shop and maybe a doctor. We also have two police stations and a jail."

"That is a lot of police."

"Yeah," she says matter-of-factly, "there are some pretty crazy people round here."

One of the oldest and largest boys, Travis, emerges quickly as the favoured "Prime Minister." He capitalizes on the tangible unrest in the Village over stick stealing and focuses his campaign on a kind of "get tough on crime" enforcement of the law. His party includes most of the older students, who are all promised positions in his caucus should he win the election: social care positions for the girls and military positions for the boys. A group of boys forms a perimeter around their Prime Minister elect and travel with him throughout the Village armed with stick-bazookas as he asks the younger students whether he can "count on their vote." I manage to inch my way towards them and thrust the recorder in Travis's face.

"Travis, can you tell me what life is like here in the Village?"

He takes on a confident, almost paternal tone, "Until now it has been very unorganized, there has not been a lot of organization."

"Yes, but I have noticed an increase in police stations, weapons. . . is this part of your campaign?"

"Yes I have made lots of changes, lots of police, there is a police station just over there."

"Is having more police the best way to. . . organize this village?"

"Well, I find that if we are out and about and we are out there. . ."

"What do you think is the root of the criminal activity?"

"Stolen sticks, there are lots of sticks being stolen. . . and the forest is getting destroyed."

"Could it be that some people have more sticks than others?" I ask.

"Well, yes, but, if. . . it's all about. . . look, we have lots of sticks, it's plentiful, people just do not want to get out there and look, which is why it's not the best thing. . . Look, I am being sponsored by lots of businesses, I am making sure that they get lots of business."

Reflections

As readers no doubt recognize, this is a complex instance that might be explored in multiple ways; we will focus on a few key observation relevant to the thesis at hand. The first, which we found quite striking, was how easily the imaginative play mimicked the dominant norms of mastery, militarism, and economism. So even though students were consistently immersed in the natural world, surrounded by teachers focused on and interested in transformational change and place-based education, the village rapidly slides from a tranquil forested grove to a patriarchal state with power maintained through a militaristic and competitive hierarchy. All of which undermines the work of the teachers and the place itself, legitimizing an anthropocentric utilitarian ethic. Our sense is that this example, one of many in years of research at the MRESP, troubles a few core assumptions in environmental education. The first, which we will overstate for sake of argument, roughly follows the sentiment that being outdoors engaged in self-directed play is a "good thing" and that young children in these settings are more likely to become compassionate and environmentally engaged adults (e.g., Chawla, 2002). The second, related to first, assumes an imaginative range among young children that allows them go beyond the

cultural norms, habits, and beliefs of their respective communities that is inspired somehow by being in "direct contact" with nature. The suggestion here being that they are apt, if situated in the right conditions, they will have more compassionate orientations toward each other and the natural world and ultimately be more relational beings. Yet, as this example shows, this is far from a foregone conclusion.

For us, one of the key insights in this discussion is that the work of the human educator is truly complex and involves a great deal of self-awareness, a willingness to be reflexive, and a vigilant awareness of how students are engaging with each other and the place and making sense of these encounters. It is incredibly easy for educators to undermine their own good work and that of their nonhuman co-teachers by way of moving to innocence and naturalizing dominant, utilitarian, and human-centric cultural norms. For example, toward the end of the first year at the MRESP, a group of the older students, grade three to seven, walked to the clear-cut, a section of the research forest that had been logged with conventional clear-cutting techniques, in order to read *The Lorax* by Dr. Seuss. To our minds, this was an ideal synthesis between place-based experience and language-arts curricular content. Imagine how much more meaningful and affectively powerful the message of *The Lorax* (discussed in Kopnina, 2012b, 2015c) might be while sitting in an actual clear-cut compared to a classroom. After the story, however, students and teachers alike seemed unwilling to acknowledge the destructive nature of clear-cut logging even as they sat within it. Instead the discussion rapidly slid into the more conventional language around forestry that permeates British Columbia including naming the potential benefits of clear-cutting, how it "opened up the forest" and "allowed for smaller plants to grow." This educational experience, in spite of what the teachers are proposing they are doing, hardly teaches children that forests have stood there before human species emerged (which is different from the humans *are* nature discourse in important ways) and that natural selection has allowed the old and new trees to regulate themselves.

This kind of double messaging was illustrated again when an excavator came in to dig up some land to "efficiently" make room for the new yurt that students use during the cold winter months. The teachers were asked about how this clearing of the land was approached with the students. One staff member responded, "they're excited about doing it because it was a jumbled mess beforehand. I don't think they're concerned about destroying habitat because there isn't really anything there to begin with." Another staff member interjected, "a support teacher and a student rescued a ton of salamanders around this log beforehand," apparently unaware this comment contradicted their colleague. The first teacher laughed "Oh ya, we found one this morning. I'm not feeling too bad about it if that's what you're wondering." Firstly, transferring life out of one section of land to another is an instrumental approach to the problem; it treats the ecosystem as a collection of objects rather than a dynamic set of relations and intrinsically valuable beings. Secondly, the laugh potentially indicates that the teacher thinks worrying about the impact in this case is ridiculous and moves to the innocence provided by the dominant culture; that is, that salamanders do not matter and should not be mourned "in public." If one deploys the discursive strategy that "there isn't really anything here to begin with," only a

"jumbled mess," it removes us from care and responsibility. This move justifies ethical distance in bad faith. One might claim we are simply being "too harsh" on a teacher "trying his best," which is partially true; however, we offer this instance as a concrete means to think through the challenges of unlearning anthropocentrism. As a single instance, it may not seem like a "big deal," but it represents a discursive pattern that we have witnessed time and again in our research, at environmental education conferences and, indeed, in our own behaviors and practices. Our intention here is to underline the need for a reflexive practice to address such moves to innocence as a key component of a childhoodnatures approach to teaching.

A nature-based school of this kind begs some important questions: does rewilding pedagogy have to include total immersion in the natural world, child-centered techniques, extended play, and teachers committed to cultural change as illustrated in this example? We have two responses aimed at teachers drawing from our research. The first suggests environmental educators actively cultivate a reflexive practice characterized by what Foucault called "hyperactive pessimism." Foucault employed this term to describe his practice of being an ongoing and suspicious cultural questioner but also to underlie his sense that cultural change is not so easily achieved as it may appear or as we may desire it to be. Our research observations consistently demonstrated how easy it was to slip into a kind of commonsense anthropocentrism. This was apparent in the ways teachers responded to students, to the natural world, to parents, to their pedagogic reflexivity, etc. It should be noted it was also a constant tendency within the research team that the place and its myriad denizens were easily ignored. For us, hyperactive pessimism is a necessary orientation to be constantly alert to these moves to innocence and to assume that any enacted habit or uncritically offered belief was likely rooted in the very culture we were aiming to transform (for more on this see Foucault, 1984; Blenkinsop, 2012; Derby, 2015). Secondly, we encourage educators interested in childhoodnature approaches to continue to develop discursive communities oriented humbly toward recognizing the significance of a more-than-human world. It has become patently clear in our research that this work is exceedingly difficult in isolation, and it is essential that educators working toward redefining foundational categories and enacting pedagogies informed by childhoodnatures find each other and provide both support and "critical friendship" when needed. Engaging with pre-exiting discursive communities and works that, generally speaking, promote ecocentric perspectives may be useful in this respect (this is not to say there will not be disagreements), for example, deep ecology (e.g., LaChapelle, 1991), posthumanist education (e.g., Bonnett, 2015), animal rights (e.g., Ortiz, 2015; Kopnina & Cherniak, 2016), and animal welfare education (e.g., Gorski, 2009). Or educational programs that focus on environmental ethics and post-anthropocentric lines of thinking (Kopnina, 2011a, b, 2012a, b, 2014a, b, 2016a, b & c; Kopnina & Meijers, 2014; Kopnina & Gjerris, 2015). Anthropocentrism is perhaps the deepest foundational category informing modernity; presumably it will take a broad-based approach to challenge its authority, and we find inspiration in the recent wave of pedagogical approaches seeking to critique and reject a faith-like adherence to human dominion.

Conclusion

Given the deep-seated foundation that anthropocentrism provides in the dominant culture, it is not surprising to witness it inculcated and reinforced in modernist educational programs. The fact that it remains so tenacious, even in schools committed to school gardens, forest weeks, and full-time immersion in the natural world, speaks to its power and psychological appeal. If we are to integrate notions of childhoodnature in any meaningful way, the struggle will thus be against commonsense habits of mind, the workaday desires of "consumers," and the seemingly sacrosanct myths of "unlimited economic growth, unabated consumption and ever-increasing human numbers" (Miller et al., 2014). Due to these entrenched challenges, it is crucial that childhoodnature educators evoke complicated conversations inasmuch as they are able to consistently trouble anthropocentric moves to innocence.

It must be noted that conservationists and rewilding proponents are often required to make difficult choices between which species "to keep" and which to eradicate (as in the case of invasive species) or whether or not "historical baseline" ecosystem configurations ought to be maintained vis-à-vis human intervention. The authors of this chapter reject the notion of a hard and fast either/or schism between these "two camps" with respect to conservation: strict noninterventionists or intensive ecosystem managers increasingly maintaining "conservation reliant species." On the one hand, noninterventionists are suspicious about "the language of this new body of ideas about conservation, which frequently uses words like 'engineer' and 'manage,' [and] lacks what environmentalism has always called for: human humility" (Marris, 2015, p. 25). On the other hand, "post-wild" thinkers, like Marris, hold that:

> Perhaps, through trying, through intervening. . . we'll learn more and become more effective at "managing" Earth. And that increased ability to consciously control, rather than just blunderingly influence, may well be distasteful to many. They would rather be mere passengers on Earth, taking our place among the other animals, living as part of an ecosystem but not as its master. Well, me too. That sounds less stressful, more pleasant. But that would mean abdicating our responsibility to the many species and ecosystems we've harmed with our lack of mastery. We owe it to them to improve our scientific understanding, our gardening prowess, so that we can ensure their continued persistence into the future. (p. 26)

It is interesting to note the charge of "human exceptionalism" is employed by both sides and leveled at each other with righteous indignation. We remain wary about against drawing too close a parallel between rewilding in conservation and rewilding in pedagogy; however, the instance does present an interesting means of exploring a third way. The trouble, for us, is that the traditional noninterventionists and the "post-wild" engineers both tend to demonstrate a shocking lack of cultural-historical consciousness, political acumen, and, at the risk of sounding self-serving, an understanding of the significance of education in a post-nature world. For us, there is little to fret over about, for example, replanting whitebark pines in Oregon's Crater Lake National Park (Marris, 2015). Indeed, students at the MRESP routinely hike out to

various "clear-cuts" in Malcolm Knapp Research Forest to participate in replanting efforts. The issue at hand is what discursive practices are deployed in order to frame, make sense, and debrief the experience of replanting. There is a world of difference, we suggest, between framing the activity as an example of our gardening prowess and increasing efficiency at managing Earth with mastery and framing the activity as a gesture of healing in order that we might recognize our interdependence with other-than-human beings that we share this land with. This kind of rewilding pedagogy also provides a reality check for those who seem to think that "aggressive interventions" (Marris, 2015) like moving species outside of their historical ranges to colder areas ahead of climate change are (a) even possible, (b) that such interventions represent anything more than applying a Band-Aid to a severed limb. In other words, the ecological crisis is not going to be solved by simply improving our scientific understanding as mastery over nature. This position shirks the role that mastery-focused scientific understanding played in precipitating and intensifying the ecological crisis in the first place, but it also neglects the sociocultural and psychological roots of the problem (as well as the pedagogical aspects of any potential "solutions").

Pedagogy informed by childhoodnature, it would seem, needs to be both realistic and strategic about confronting the deep-seated myth of human supremacy and face some rather difficult realities. Shall we continue to teach our children that nature should be protected because it gives us vegetables, lumber, and honey and provides a fun background for games? Or more to the point, how do we move away from such discourses and practices to instead teach about restraint and carefulness in relation to "nature" so as to respect the varied more-than-human beings that require relative wilderness to exist? How do we sit with the topic of loss without "moving on" to avoid any strong (and perhaps appropriate) reactions to the history of nature and the current state of many ecosystems?

We refuse to simply "get over it" – both the staggering loss of wild places and the wildness within and the push to celebrate the advent of all planet Earth as "rambunctious human-tended garden" (Marris, 2011). For us, integrating notions of childhoodnature or any brand of post-nature thinking in education requires us to go beyond rhetorical moves such as "children *are* nature" or "everything is connected," beyond any set of evasive strategies or moves to innocence, to stay with the complicated conversations and do the complex work required of us. One way we might do this, to return to one of the objectives of this handbook, is by critically examining how children are "positioned as active participants, critical explorers, and/or co-researchers?" How, for example, are we to support children to have the imaginative range – the capacity to conceptualize and enact different ways of being in the world – to transcend the problematic ecological norms of the cultures in which they are nurtured (i.e., what would an idealized multispecies "village" look like, for example)? To what extent ought the educator intentionally de-center human interests and perspectives? It seems to us that one of the principal lessons of the so-called Anthropocene is learning how to be human and be nature and still leave space for others to flourish, without pruning, cutting, managing, burning, and domesticating landscapes because of some vague and archaic notions that there is not really anything there to begin with.

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How Urban Wetland-Based Environmental Education Activate School Children's Childhoodnature in Anthropocene Times: Experience from Chinese Curriculum Reform

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Abstract

With China implementing a new round of basic education curriculum reform, environmental education has come under focus for primary and secondary schools. As part of this curriculum reform, a number of primary and secondary schools have applied their attention to urban wetlands as important sites for environmental education, school-based curriculum development, and meaningful learning experiences. However, little is known about how formal learning in urban wetlands activates children's environmental awareness and sense of

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place, or cultivates children's environmental literacy in the Anthropocene. To address this knowledge gap, we set the context for Chinese curriculum reform and describe urban wetland-based environmental education in China. We argue that environmental education is an indispensable part of China's curriculum reform and provides a source and power for reform. We draw on two case-studies to show the process and features of urban wetland-based environmental education within school-based curriculum development. School-based urban wetland environmental education can be an effective way to improve Chinese school children's childhoodnature in Anthropocene times. This chapter not only aids in better understanding the place and meaning of urban wetlands-based environmental education in Chinese schools but also the role of environmental education in curriculum reform in primary and secondary education in China.

Keywords
Anthropocene · Childhoodnature · Urban wetland-based environmental education · Curriculum Reform in China · School-based curriculum

Introduction

The rapid development of China has been a prominent feature of the twenty-first century. As a part of counter-strategies for problems arising from great and rapid development, China has paid more attention to the benefits of environmental education. From the eighth curriculum reform for basic education in 1999, environmental education has been specially highlighted within formal Chinese curriculum. A symbolic policy document, *Implementation Guidelines for Environmental Education in Primary and Middle Schools*, was produced by the Ministry of Education in 2003. It was the first national-level curriculum guidance document for environmental education in formal education. According to the *Guidelines*, the schools are strongly encouraged to promote environmental education by taking advantage of surrounding environments and local natural sites and developing school-based curriculum for local environmental learning. Urban wetlands serve as an important site for environmental education. In the context of curriculum reform, schools in Bejing, Harbin, Hengshui, Shenzhen, and other cities have developed school-based curriculum for their local wetlands to promote environmental education.

In this chapter, we focus on case studies from two schools in Bejing, a primary school and a secondary school, to explore the intersection of urban wetland-based environmental education, school-based curriculum development, and Chinese school children's experience of nature in times of very rapid environmental change. We begin by setting out the context for environmental education and curriculum development in China as a response to the Anthropocene, and review what is known about environmental education in China in relation to children's nature learning. This chapter will not only help us better understand the role of urban wetlands-based environmental education in Chinese schools but also the role of environmental education in curriculum reform in primary and secondary education in China.

China's Environmental Problems in the Anthropocene

One of the most prominent features of the Anthropocene has been the rapid development trajectories that have emerged in the world's largest developing countries, most prominently China (Steffen, Grinevald, Crutzen, & McNeill, 2011). China has recently entered another period of economic take-off – a great "revolution" without a parallel in the history of the human world. But this "revolution" throws a dense shadow on China's capacities for sustainable development. Losses from pollution and ecological damage range from 7% to 20% of China's GDP every year in the past two decades, and continuously emerging new problems become great threats for the nation and its people. Such problems affect not only China but the world. Political leaders promised that the Chinese government would lead China to build a sustainable country in this Anthropocene time. Obviously, this commitment, if it is a real commitment, means a overwhelming duty and foreseeable huge amount of effort.

The scope of China's environmental problems is complex, involving poverty, culture, and political situations, as well as technical, social, and economic development conditions. With a current population over 1.410 billion (20% of the world's human population) and relatively low economic, scientific, and technical capabilities, China's socioeconomic development before 1978 was difficult and inefficient. Industries did not adhere to a standard of environmental performance, and environmental agencies lacked sufficient funds and authority to enforce environmental regulations. Since 1978, especially since 1986, China has showed vigorous economic growth unmatched elsewhere in the world. China's swift economic growth over the past three decades has been delivering to its people a relative prosperity that is largely defined in immediate material terms. But China's economic prosperity is taking place at great cost to China's environmental quality and natural resources. China's rivers, reservoirs, and other water resources are largely contaminated. Cities are the engines of economic growth. Unfortunately, cities in China are facing expanding pollution problems, with urban air laden with harmful particulates, gases, and toxins; solid and hazardous wastes often dumped untreated; and pollution extending from urban areas to rural areas. Environmental pollution is affecting overall social and economic development.

Environmental problems are exacerbated by mismanagement, carelessness, indifference, ignorance, as well as a lack of measurement and monitoring methods to provide baseline data critical to serve as a technical basis for planning and design to prevent and control pollution, and as verification of adverse effects on health and the environment. A lack of information sharing has led local governments to misinterpret laws and regulations. Moreover, institutional obstacles within the government and legal systems have contributed to unequal distribution of information on laws, regulations, and enforcement mechanisms. Without proper knowledge and information, local governments and the people cannot implement environmental regulations effectively.

As one consequence of rapid development, urban areas have expanded rapidly and millions of people have migrated into cities. Sixty percent of the human population now lives in cities, meaning more than 250 million children under the

age of 14 live in urbanized areas. As Noschis (1994) suggested, densely populated cities have become the "natural environments" for children, as well as rich learning environments, whether or not formal places for children are intended, planned, or otherwise. Chawla (1995, p. 11) writes that "Western culture has historically separated notions of nature and the city, and since the eighteenth century, it has associated children with nature" and in China, too, separation between a designated nature (natural space) and city children deemed a cause for a so-called nature deficiency.

Environmental Education in Twenty-First Century in China

Steffen et al. (2011) argued that humanity is now entering stage 3 of the Anthropocene based on the growing awareness of human impact on the environment at the global scale and the first attempts to build global governance systems to manage humanity's relationship with the Earth System. The Chinese Government has set "invigorating China by means of science and technology" and "sustainable development" as the fundamental state policies since the late 1990s. In January 1999, the *Education Promotion Plan of Action for the 21st Century* (Ministry of Education, 1998) was approved by the State Council to the Ministry of Education, marking the beginning of education curriculum reform. The 10-year Plan was to implement a "cross-century quality education project" to improve the quality of state education, comprehensively improve national innovation capability, reform the curriculum and evaluation system, and formulate a standard of contemporary education curriculum in 2000. The Plan reformed educational content and teaching methods. In June 2001, the Ministry of Education released the *Master Plan of Basic Education Curriculum Reform [Trial]* (Ministry of Education, 2001), which officially meant the new round of Chinese basic education curriculum reform (hereinafter referred to as the new curriculum reform) was in full swing. Part of this Plan is to improve students' sense of social responsibility and environmental awareness as a part of civic moral literacy. New curriculum reform was adopted by all primary and junior high schools (middle schools) in more than 30 Provinces covering the 9 years of compulsory education. As, such, this curriculum reform has become a normal state for Chinese education today.

In 1999, the Ministry of Education proposed that environmental education should be formally incorporated into primary and secondary schools as an interdisciplinary theme. In March 2003, the Ministry of Education introduced the *Primary and Secondary Students' Environmental Education Syllabu*s (Ministry of Education, 2003a), requiring all schools to teach environmental education. In October, the same year, *The Guidelines for Implementing Environmental Education in Primary and Secondary Schools [*Trial] was published by the Ministry of Education, which marks the legalization and standardization of environmental education in Chinese schools (Ministry of Education, 2003b). *The Guidelines* guarantee that environmental education will be operationalized to cultivate the sustainable development awareness and educate for a rational concept of population, environment, and development. Students are encouraged to learn about environmental issues from

an early age and work together to create a sustainable future. These two Ministry of Education documents mean that environmental education is officially manifest in basic education in China and the legitimacy of environmental education has been established for 15 years in formal state schooling. Educators were encouraged to combine environmental education with pedagogy reform and recognize participatory and exploratory teaching methods as the contribution brought by environmental education into general curriculum reform.

The Guidelines is China's first environmental education document at national level, a true milestone benefitting hundreds of millions of primary and secondary students, who receive quality environmental education, not only for the protection of nature but also to enhance their confidence and capacity to build a sustainable future as world citizens with a sense of responsibility towards their environment and society. *The Guidelines* put forward a "learning from practice" model, as stated in the Part IV of the *Master Plan of Basic Education Curriculum Reform [Trial],* the purpose of which is "to create educational environment where students can participate actively, stimulating their learning enthusiasm and developing their ability to use knowledge in the real situation, so that each student can be fully developed." The later *National Environmental Education Action Plan (2016–2020),* issued by Chinese Ministry of Environmental Protection in 2016, explains that "primary and secondary schools should include knowledge of environmental protection and ecological civilization into curriculum, through strengthening teacher training and developing teaching materials" and putting effort into environmental education extracurricular events.

China's 230,000 (from Chinese Statistics Bulletin of National Education, 2016) primary and secondary schools are mandated to provide environmental education – the development of environmental education in China has always been a top-down model. In China, the "activity-based teaching and learning" process has had an evolution from "extracurricular activities" to "courses related to activities," then "activity curriculum" to "integrated practical activities" and finally "activity-based teaching and learning." Within the Chinese context, "activity-based teaching and learning" can be regarded as a specific form of teaching, a form of curriculum construction, a form of curriculum implementation, and a manifest for "activities curriculum" and "integrated practical activities."

"Activity-based teaching and learning" (ABTL) has its roots in a historical, naturalist educational tradition of Plato and Rousseau, Dewey's empiricist educational theory, and Piagetian cognitive psychology (Kin-Lee, Yu, & Ma, 2010). ABTL now can be considered a contemporary type of experience learning developed in China corresponding to international teaching methods, and having similarity with inquiry learning and project-based learning, promoting student-centered activities, and experiential learning as a unique dimension of environmental education.

The original, centralized curriculum has been greatly adjusted by recent curriculum reform, by way of putting forward a three-tier system: the national curriculum, local curriculum, and school-based curriculum, enables the expansion and development of local scale curriculum resources. Research indicates using local natural environments as a curriculum resource and as a site for learning can effectively solve

a nature deficiency syndrome (Huang & Xie, 2017), stimulate learning interest, enhancing student knowledge of nature, promote scientific experience, cultivate a kind heart and the spirit of exploration, enhance teamwork, purify the mind, promote moral sense, and develop the ability of artistic creation. Current cases show that "adapting to the local conditions" has become an important feature of curriculum reform, especially the school-based curriculum, which can integrate teaching and learning for local environmental situations into school curriculum, and present a real opportunity for environmental education to perform innovatively (Liu & Huang, 2013).

Urban Wetlands as Environmental Education Sites

Urban wetland can be seen as one of the symbols of the Anthropocene – the human imprint on the natural environment, a mix of city and nature. Urban wetlands are ecosystems located within a city and are half land and half water (Zhang, Li, Liu, & Zhu, 2016). Urban wetlands have prominent leisure and educational functions, and while profoundly influenced by human activities, they keep an intimate relationship with human beings. The types of urban wetlands in urban China include lakes, rivers, swamps, ponds, reservoirs, ditches, canals, and urban coastal wetlands (Liu, Lin, Wang, Yin, & Guo, 2013).

Empirical studies have shown the importance of using natural experience as an educational method (Huang, 2017). *The Guidelines* encourage schools to use sites such as wetlands to carry out environmental education. There are different types of urban wetlands in the cities of China; some have been developed into city wetland parks. On the one hand, urban wetlands are rich in water, animals, and plants and are resource sites for environmental education. On the other hand, compared with natural wetlands and wetland nature reserves, urban wetlands are able to be equipped with more educational facilities, and they are accessible by transportation and are considered to excellent sites for primary and secondary schools to carry out environmental education.

Cultivating children's sense of loving and protecting their environment from an early age is a basic principle for implementing environmental education in China, as an old proverb says "Habit is a second nature" (Du, 2011). Nature can be seen as the second classroom because it will help students directly develop their environmental knowledge much better. The unique ecological environment of the wetland provides opportunity to take a close look at wetland scenery including its plants and animals in relaxation, so as to further have willing to protect it (Li, Cui, Dong, Zang, & Wei, 2014). Educating children according to their nature is also an ancient wisdom of China, the so-called Dao models itself after nature. The early stage of youth is also the time when children are full of curiosity toward the nature, so it is the perfect time to help them build the bridge with nature by engaging in activities related to nature, which will improve their perception towards it and local sense of belonging (Table 1).

Table 1 Different age groups of wetland environmental education comparison, cited from Shen (2016)

Age	Characteristics	Ability to participant	Education emphasis
0–5	The perception of nature is still in a state of chaos	No ability to act independently. Need parents to accompany	Get in touch with nature closely with rich and interesting facility
5–12	Lively and dynamic, has a strong curiosity to nature	Little ability to act independently but can act within group with teachers' guidance	Close contact and observation of nature with attractive education activities
12–24	Views toward nature have not been formed. Possess basic natural science knowledge	Be able to act independently or within group, and even can be a leader in it	Wetland ecosystem knowledge; animal and plant knowledge; interesting and professional education activities
24–50	Views toward nature have been formed and can be guided	Be able to act independently and within group	Get in touch with nature and enjoy beautiful landscapes; simple wetland knowledge
50~	Views toward nature have been formed and can be guided	Have the ability to act within group but acting independently is not recommended	Get in touch with nature and enjoy beautiful landscapes, especially for the purpose of health caring

Learning Urban Wetlands

A number of noteworthy cases on wetlands as education sites include the study of the history and culture of the moat in Dongzhimen Middle School in Beijing (Zhu, 2007); the study of algae and birds in Taoranting waters by No.15 secondary school (Lu & Wang, 2004); student research in Jiaozhou Bay wetland in Shandong Province by College Road Primary School. In the following two cases, we analyze school-based environmental education using urban wetlands as learning site.

Ya'er Hutong Primary School is located in the Xicheng District of Beijing Shi Cha Hai north shore, only a few steps away from the Shi Cha Hai wetland at the center district of Beijing city. The school is located in the old city known as Hutong landscape and surrounded by former residence of celebrities, historic relics, courtyards, and many other attractions filled with typical Beijing characteristics. Using Shichahai wetland as a learning site, the school has carried out a distinctive school-based environmental education since 2001. The school first organized all the teachers to participate in seminars and training to arrive at a unified understanding of the principles of curriculum reform and means to develop school-based curriculum. Subsequently, the school set up a school-based curriculum leading group headed by the Principal to help teachers design programs around improving environmental awareness and cultivating environmental literacy through enriched engagement programs that included classroom teaching, regular school rallies,

extracurricular activities, the Young Pioneers events, community services, and cooperating with family members.

The curriculum design team decided to use current teaching material and local sources to design courses at three levels: low, medium, and high, according to students' grades. Students in low grade mainly need to understand simple environmental knowledge; at medium level, the education aim is to form students' sense of protection and initiative to act; at the highest level, curriculum design is to enable students to take action within their ability. This means that the key to effective and meaningful curriculum is teachers. Through seminar system every 2 weeks, teachers exchange opinions with their colleague and reach a consensus. Data collection and evidence-based practice is emphasized as school-based curriculum is developed. Activities are designed for student exploration, respectively, the school-loving education based on school history, the patriotism education based on surrounding former residence of celebrities and garrison, the social education based on community research and service, the history education based on surrounding monuments, and environmental education conducted in the famous, local wetland.

The Shi Cha Hai wetland includes the calm lake and has become a well-known place for leisure and student investigations have raised various questions about the impact of such changes of land use on the water quality and daily life of residents in this area, reporting their findings to the local Chamber of Commerce. These curriculum practices have had a very positive effect. A survey of students conducted by external observers in 2008 and 2013 showed that students had a high degree of satisfaction with the "activities" in the school-based curriculum, believing that their development of intelligence and ability in the course of activities was much greater than that achieved through more traditional pedagogy. Teachers think that school-based curriculum promotes the improvement of students' overall quality, which manifests through improved student confidence, braveness, and problem-solving abilities. As showed in the interviews with teachers and the principle, school-based curriculum serves as an effective way to widening teachers' horizon, contributing to their transformation of education idea, and also, teaching ability has been improved into a new level (EIWPT, 2008; Liu & Huang, 2013).

The High School affiliated to Beijing Institute of Technology was constructed in 1950 at the south bank of the Long River, which is an important part of Beijing's urban wetland system. Since 2001, the school has developed school-based environmental education curriculum, using the Long River as a learning site, drawing on forms of project-based learning embedded in an integrated practice activities learning module. The first curriculum stage is to set up the concept of the purpose of "love water" activity to encourage interested students to participate. Establishing "water-loving" student groups carry out many projects, such as investigating water usage of their school and family, making a "water-loving convention," publicizing knowledge in the local community, visiting water saving pavilions in Beijing, posting water-saving proposals on the school's official website to effectively spread the importance of "water-loving" as a key concept in environmental education in the school. So successful is this concept, that "water-loving" activities have become famous brand of the school, serving as an important role in motivating students' exploring interest

and inquiring desire, which lay further foundations for more activities. "Loving the Long River" concept promotes water knowledge, water conservation, and water appreciation and is instrumental forming a water-loving atmosphere within the whole school, which is distinctive of this high school's identity.

Experiential learning activities enable students to research their local water area (the river and their water supply) under teachers' guidance and then devise actions for care of Long River. After a preliminary investigation and analysis, students identified projects such as the Long River water environment survey, the Long River lawn growth status research, the efficiency of Long River lawn watering facilities, and the investigation of Long River branch as some examples. Students groups conduct research in geography, biology, chemistry, physics using established scientific techniques; design plans and choose research methods; allocate and self-manage group tasks, rethink obstacles they encounter in breakthrough ways, and communicate with other groups and teachers. In the course of study, new problems and ideas have always been found, in which way students' interest can been stimulated so that the entire research process is able to continue.

Equally important is using information technology to record, express, and communicate students' research process and results. With the help of a technology teacher, who is also a member of research group, files can be easily saved as an electronic document, all scanned and classified, numbered, and accompanied by instructions. These materials have become important teaching resources for information technology curriculum. For instance, students were taught making "water-loving" website using these materials and students from different grades have cooperated to designing "water-loving action" website, which is available on internet. Through this website, students can easily access and communicate their own research content, processes, and results. In this way, students are actively generating a wealth of curriculum resources for information technology class, while the latter serve as an effective media for the former as an integrated practice activity. The results of student inquiry also contribute to the evolving formation of school-based curriculum inclusive of the disciplines of history, geography, biology, art, and social studies.

A survey of students conducted by external observers in 2008, 2013, and 2016 (EIWPT, 2008; Liu & Huang, 2013; Huang, 2017) also shows a high degree of satisfaction toward school-based curriculum in this school. The water-loving curriculum organizational concept has been very effective for learning environmental education with its focus on a key Beijing waterway. Through carefully designed curriculum and pedagogical processes, the students' abilities to think independently have been cultivated and they show initiative to learn; teachers also update their education concepts, and enhance their ability to adapting to curriculum reform. This case has been widely recognized by experts (EIWPT, 2008).

Using urban wetlands as sites and resources for environmental education does improve students' thinking level, perception of nature, and sense of belonging. In participating in practical and investigative activities, students find their interest and become more confident. More importantly, these activities evoke students' concerns about the environment and social issues and may have a profound positive impact on

students' future life and learning. Therefore, this kind of environmental education model using urban wetlands as learning site and school-based curriculum as curriculum carrier can be regarded as a successful exemplar of Chinese school environmental education.

Improving Chinese Childhoodnature in the Anthropocene

At present, environmental education is mandated to be widely carried out in primary and secondary schools in China, and since the start of this century, educators have accumulated a lot of experience, which contributes to the popularization of teaching and learning environmental knowledge and environmental awareness. China is facing an unprecedented opportunity to continually improve the quality of environmental education. As a country with a relatively backward education level, China can learn from all the forerunners' sufficient experience and lessons. Rapid economic development also enables China to invest more in environmental education. Sustainable development has become one of China's national strategies, and the concept of scientific development, resource conservation environment-friendly society, green growth, green GDP, ecological civilization are key and popular concepts. The ongoing Eighth Basic Education Curriculum Reform pays great attention to environmental education. These factors together have formed a good atmosphere for the development of environmental education providing meaningful learning opportunities for students (Yang, 2013).

Our case studies show that using urban wetlands for the development of school-based environmental education is highly effective. Urban wetlands are an important part of contemporary urban ecosystems with important ecological functions to regulate urban microclimate and alleviate urban environmental pollution (Zhang et al. 2016). Learning with urban nature benefits students' physical and mental development and improves their overall environmental awareness and satisfaction with school learning (Zhu, 2007). In addition, urban wetlands do meet city residents' psychological needs to interact with nature and serve as leisure areas for local residents and tourists to learn history and as sites for school students to conduct research and undertake meaningful learning(Gu, 2012; Liu et al., 2013; Zhang, Lv, & Wang, 2007). Therefore, within the context of curriculum reform, using urban wetlands to develop school-based environmental education curriculum becomes a means for promoting students' individual development, as shown in this chapter detailing two case studies from Beijing.

However, the future development of environmental education in primary and secondary schools still faces enormous challenges. One of the questions worth exploring is that what kind of environmental education philosophy schools will hold. In respect of curriculum value orientation, the new curriculum reform is on the basis of humanistic ideas. Chinese education has been enduring a long time of focus on an excessive emphasize of intellectual achievement, manifested by exam scores, but often ignoring students' moral development, manifested by students' inner feelings, attitudes, and aesthetic ability, leading to unbalanced personal development

with possible the loss of values and moral decay. The idea of humanistic education helps to reverse this situation (Wang, 2012). Together with "humanism," anthropocentrism also plays an important role in Chinese education, which is deeply rooted in traditional Chinese values. In the light of social development stage, this anthropocentric tradition will not reverse in a very long term. Thus, "humanism" and "anthropocentrism" might still be two key points of ethics in environmental education of Chinese schools.

Generally speaking, being integrated into the national curriculum signals that environmental education is an important part of basic education curriculum reform. Current experience shows that environmental education poses a challenge towards the traditional quality standard of teachers, teaching content, methods, and ideology and requires a thoroughly reform of school management systems, ideology, and pedagogy. Moreover, environmental education combines environment and sustainable development as a way to educate future citizens. It is not just a change of teaching content. Knowledge, skills, attitudes, and values are taught to students by teaching methods used through a more progressive educational process. Environmental education therefore will and must lead reform of traditional school teaching methods in China, including a much greater emphasis on partnerships (Knowlton Cockett, Dyment, Espinet, & Huang, 2017). The reform requires to change the relationship between teachers and students, and also advocates experiential learning, participatory learning, service learning, and learning within the context of society. These are all consistent with the idea of modern Chinese education reform. Therefore, environmental education will be further combined with the China education reform as indispensable in providing a source and power for reform.

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Rats, Death, and Anthropocene Relations in Urban Canadian Childhoods

31

Narda Nelson

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Abstract

In the Euro-Western intellectual, or minority world, tradition death is often framed as something to avoid in the creation of "optimal" childhoods. Foregrounding a West Coast Canadian early childhood center's unexpected encounter with a dying rat, this chapter looks at the role ethical frameworks play in shaping uneasy more-than-human engagements to challenge taken-for-granted assumptions about animal death in urban early childhoods and grapple with the limits of ethical engagement. In it, understandings of childhood and nature are situated within the schism of romanticized narratives and challenges of

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a so-called new Anthropocene era, to reconfigure encounters at the intersection of life and death as generative in their ability to destabilize the precepts of a humancentric worldview that orders urban spaces and relations in particular ways. Using a hybrid multispecies ethnographic and common worlding approach, this chapter explores possibilities for cultivating new modes of attention to promote expansive approaches to thinking and doing in early learning pedagogy and practice. How might we resist shoring up colonial and other universalizing narratives when death emerges through everyday encounter? What stories help us matter differently as we continue to world with others in this time of rapid change? This chapter proposes tending to multispecies relations, including those considered uncomfortable, as deeply entangled and consequential to open up new possibilities for ethical responses to living and dying together in these troubling times.

Keywords
Early childhood · Death · Responsibility · Ethics · Anthropocene · Rats

> Exactly here, where to be alive is to be implicated in the lives and deaths of others; exactly here we are called into an ethics of proximity and responsibility. . .In one sense, simply to be alive is to bear witness, by virtue of one's own embodied life, to the others who came before, but the actual ethical burden entails embracing those relationships. (Rose, 2013b, pp. 3–4)

"Exactly here" is where we unexpectedly found ourselves one morning. That is, our group of 3- to 5-year-old children, educators, and researchers came across an animal in distress while walking with an intention to think together about "what. . .it means to really share a place" (van Dooren & Rose, 2012, p. 2) with more-than-human others. A myriad of historical, cultural, and taxonomic layers complicate this encounter. After all, it was not just any animal in any random time and place we stumbled on. Rather, we encountered a dying rat while walking in Canada's West Coast Garden City, also known as the Songhees, Esquimalt, and W̱SÁNEĆ peoples' territories, in a so-called new Anthropocene era (Davis & Todd, 2017). And in this age of extinctions and exterminations, not all lives are seen as equal nor all deaths worth remarking. In the immediacy of the moment, however, the rat's suffering drew us in close enough to demand we rethink relations with an urban dweller few want to claim and challenge widely accepted norms around what constitutes a grievable life (Butler, 2010; McArthur, 2016).

Precisely here, while walking the springtime pavement, we were held uncharacteristically still for a moment, caught in a juxtaposition of recoil and curiosity at the shape lying in front of us. A 4 year old broke the silence first (Fig. 1):

What's wrong with the mouse?
It's a rat.
What's wrong with the rat?
I don't know. What do you think?
It's looking at me! What's it doing?
Don't touch it! It's hurt.

Fig. 1 Exactly here (Photo by Veronica Pacini-Ketchabaw)

Can we give it a band-aid?
I know! I know! It's dead.
Nooo. Look – it's shaking.
It's cold. We could put some leaves on it.
Maybe it's an old grandma.
My kitty bringed one of those home. Minnie kills those and eats them. But she doesn't eat the tails.
Stay back! We're scaring it.
Poison?
Silent nods, in reply

Clearly seized by something beyond our sight and its control, the rat shook violently on its side near the edge of the sidewalk, not dead yet but dy*ing*. While trying to grasp what was happening and figure out what to do, the rat commanded our affections through its vulnerability and our human implication, leading us into new considerations about our relations with this place and its nonhuman inhabitants.

In this chapter I respond to Davis and Todd's (2017) call for "those studying and storying the Anthropocene to tend to the ruptures and cleavages, between land and flesh, story and law, human and more-than-human. . .[to tend] once again to relations, to kin, to life, longing and care" (p. 775). Arguing for inclusion of Indigenous knowledges in contemporary Anthropocene debates, as a means of breaking with the colonial logics that set this newly named geologic epoch into motion in the first place, they describe the responsibility we now have before us:

> If the Anthropocene is already here, the question then becomes what can we do with it as a conceptual apparatus that may serve to undermine the conditions it names?...The story we tell ourselves about enviro-crises, the story of humanity's place on the earth and its presence within geological time determines how we understand how we got here, where we might like to be headed, and what we need to do. (pp. 763–764)

Rather than perpetuating an overwhelming sense of despair that universalizing, eco-disaster Anthropocene narratives tend to produce, here I situate our dying-rat

encounter within a wider context to reconfigure young children's relations with "unloved" creatures as productive and worth considering. What might be required of us, as educators and researchers, to create new stories with children in a way that opens up possibilities for "doing different" in an era defined by narrowing possibilities for diverse life forms on earth?

Becoming-with Multispecies Mortal Relations

Death is, of course, always with us in some form or another. And never more so than in these times, when human-induced environmental destruction and climate change have twisted the necessary weave of life and death into what scientists now confirm to be the planet's accelerated, sixth mass extinction event (Heise, 2016; Malone & Truong, 2017; Rose, 2011, 2013a). From an ecological justice point of view, if one of the goals of education is to learn how to become better creatures to live with, we need to reckon with the fact that this necessitates becoming better creatures to die with too. Our encounter may fall outside of the realm of readily activated concerns for charismatic creatures on the brink of extinction (Heise, 2016), but the dying rat's suffering stopped us in our tracks, igniting new conversations within the childhood center community.

The subsequent affect and impact of this experience provoked me to seriously reconsider death as an unlikely early childhood "dance partner," flying in the face of romanticized notions about young children. To think more expansively about what is possible in these ecologically precarious times requires confronting death as phenomenon in uncomfortable places (van Dooren, 2015). What role do early learning practices play in the process of (re)storying urban spaces? Who lives here? Who dies? And *why*? How might we, for example, shore up colonial, class, and other narratives when death emerges through everyday encounter? What stories might help us matter differently in the worlds we inhabit? And can we use them to help create opportunities to rethink our urban connections to the accelerated life-death processes of so-called Anthropocene relations through close attention, reflection, and collective engagement?

In this chapter I argue that, while usually cast as antithetical to early childhood, emergent encounters at the intersection of multispecies life and death can be generative to think with because of their ability to destabilize the precepts of a Euro-Western anthropocentric worldview that orders urban spaces and relationships in particular ways. Paying attention to other creatures, including those that are "difficult to live with," helps expand perceptions of what constitutes participation in co-shaping the places we live and learn. Vital to this discussion, then, is a consideration of rats themselves as well as our uneasy and unresolvable proximity to both rats and death at all times (Sullivan, 2004).

Method and Conceptual Framework

I begin this discussion with an invitation to think beyond responses of fear and disgust, often associated with both rats and death, to reconsider the way we frame life and death relations with young children, particularly when encountering animals

deemed "out of place" in urban settings. In Euro-Western-influenced contexts, this requires us to stretch conceptualizations of children beyond popular depictions of them as emotionally fragile beings in need of protection (Pacini-Ketchabaw, Nxumalo, Kocher, Elliot, & Sanchez, 2015; Taylor, 2013). Furthermore, it requires us to work at foregrounding more-than-human lives within ethical terms, as actively engaged in co-constituting the places we live, something a growing number of scholars are calling for across a number of disciplines (Collard, Dempsey, & Sundberg, 2015; Gibson, Rose, & Fincher, 2015; Haraway, 2008; Malone & Truong, 2017; Plumwood, 1993; Taylor & Pacini-Ketchabaw, 2015; Tsing, 2012, van Dooren, Kirksey, & Münster, 2016).

We also need to ask ourselves if we take this intention far enough. Are we really rethinking tendencies to tell anthropocentric stories in the early years of research and practice if we limit ethical considerations to the realm of romanticized child-animal scripts? Questioning the motivations behind tendencies to tell some multispecies stories and not others, in research and practice with young children (Nxumalo, 2015; Taylor, 2017), is of increasing concern for early childhood scholars and reflects a wider interdisciplinary call to understand the places we live and learn as composed by a biodiverse, versus human-only, communities. For example, Kari-Anne Jorgensøn and Dawn Sanders (2017) asks if "[in] our urge to represent sensory attentiveness to the more-than-human world in early childhood science education…we, albeit perhaps unconsciously, tell stories in which wistful and romantic notions of 'nature' and childhood prevail?" (EECERA, 2017, presentation).

Our dying-rat moment produced conflicting feelings of remorse, fear, disgust, and compassion that are, in many ways, unresolvable. Taking rats' lives (and deaths) into serious consideration as part and parcel of living, however reluctantly, *in community* with them tests the limits of our ethical commitments to those who make us uncomfortable and pushes back on the habit of framing them as lacking "real-life" connections outside of irritating humans by their persistent, and unsettling, presence (Fawcett, 2014). This discussion put our mortal encounter into tension with the broader question of whether we are able and willing to create pedagogies that extend moral frameworks to the "unsettling" and "unloved," as well as the "cute and cuddly" or "majestic" of the world.

Speaking to the new ethical demands that such unsettling animal encounters spark, Common Worlds Research Collective co-founding members, Affrica Taylor and Veronica Pacini-Ketchabaw (2016), highlight what they refer to as a generative "nag" produced "in the distinctive 'affective and thus ethical logics' of…awkward multispecies relations…[precisely] because they are never fully 'comfortable, loving and caring' nor demarcated by unambiguous 'horror, abjection and phobia'" (p. 132). Rather than thinking "beyond" responses of fear and disgust, then, perhaps it is more apt to say that we need to think *with* unsettling responses to death, rats, and other creatures to more fully reconsider motivations behind storying place relations in certain ways, instead of denying or glossing over these responses. Deborah Rose's (2013) assertion comes to mind here wherein she reminds us that "the actual ethical burden [of responding in the death zone] entails embracing [these] relationships" (pp. 3–4). As her colleague, Thom van Dooren (2014) points out that responding to

living in the Anthropocene "requires we take on the fraught work. . .of weaving new stories out of this [biocultural] multiplicity. . . that bring together the diversity of voices necessary to inhabit responsibly the rich patterns of interwoven inheritance that constitute our world" (p. 20). In our case, biocultural multiplicity includes an ever-present rodent population.

Our dying-rat encounter took place within the context of the Cache Creek early childhood center's ongoing multispecies inquiry project aimed at engaging a group of predominantly settler, urban Canadian children, and educators in the difficult work of decentering anthropocentric ways of thinking and being with the world (Nxumalo & Pacini-Ketchabaw, 2015; Taylor & Pacini-Ketchabaw, 2015; Tsing, 2012). Over the past 2 years of walking, talking, reading, listening, questioning, feeling, writing, and noticing together, we have taken an interdisciplinary, common world conceptual approach to research and practice with young children (Common World Childhoods Research Collective, 2017). This approach seeks to reframe childhood as collective and relational rather than individualistic and developmental, situated and differentiated rather than decontextualized and universal, and entangled within messy real-world relations rather than protected in a separate space (Common World Childhoods Research Collective, 2017; Nxumalo, 2015; Taylor, 2013; Taylor & Giugni, 2012; Taylor, 2017).

Working with this framework is useful for thinking expansively about urban multispecies relations and opening up new perspectives on child-animal pedagogies because of the emphasis it places on foregrounding connections between children and more-than-human lives (and deaths) as active co-shaping forces in the places we live. While it may be easy to agree conceptually on this point, it can be difficult to do so in the context of childhood practices founded on developmental, humancentric, and heavily romanticized early childhood narratives (Taylor & Pacini-Ketchabaw, 2015). Working from the assertion that children's lives are entangled in messy, "real-world" relations help resist a temptation to "move to innocence" by attempting to transcend our material, historical, socioeconomic, and cultural human selves. Furthermore, reframing childhood as situated in messy, "real-world" relations offers potential for promoting richer and broader understandings of the delightfully complex and often unpleasant, interconnectivities that constitute the dynamic and ever-changing worlds children inhabit.

The common world framework is not chosen for our inquiry work with neutrality in mind. The realization that humans are inextricably linked with the production of rising global temperatures and narrowing possibilities for global biodiversity informs the center's educational team's desire to respond to living and working in these times by "doing different" together with young children through pedagogies and practice (Gibson et al., 2015; Pacini-Ketchabaw et al., 2015). Challenging ourselves to make room for new possibilities in pedagogy and practice feels hopeful and necessary, along with an ongoing, active, political commitment to work at undoing the deeply ingrained Euro-Western imperial preoccupations that continue to inform our practices (Belcourt, 2015; Jackson, 2014; Smith, 2014). Attempting to recognize and engage with new modes of "response-ability" (Haraway, 2008) through our weekly animal walks and an indoor worm compost bin project as well

as reading, questioning, making, and discussing theory and practice together during monthly seminar meetings are a few of the ways we try to cultivate an ability to do so.

Working with the conscious intention to reject human exceptionalism's underlying binary logic of a nature/culture split feels vital if we are to have any hope in resisting the tendency to tell stories that position "the natural world" as an instrumental backdrop against which childhood development can be enhanced (Nelson, Coon, & Chadwick, 2015; Pacini-Ketchabaw, Taylor, & Blaise, 2016; Plumwood, 1993; Rautio & Jokinen, 2016). Part of the challenge of doing so lies in learning to temper what we *think* we know about other creatures by recognizing them as sentient fellow beings with unique and often surprising ways of worlding the same places we inhabit. Pedagogically speaking, it is important to ask ourselves how we might open up educational practices to think with more-than-humans as co-shaping place participants with their own lifeworld intentions (von Uexküll, 1992; Watts, 2013). But, as Ginn, Beisel, and Barua (2014) point out, doing so also means avoiding the trap of enlisting simplistic and universalizing tropes such as "innocent animals versus bad humans" to tell stories. As they say, multispecies "flourishing does not imply an 'anything goes' free-for-all...[but asks] instead who lives well and who dies well under current arrangements, and how they might be better arranged" (p. 115). Environmental humanities scholars Deborah Rose and Thom van Dooren (2012) are, again, helpful to think with here, in asking if "are we able to engage meaningfully with very different ways of knowing and living in a place? What would it mean, in a multispecies context to really share city places?" (p. 18).

These questions follow in the shadow of thousands of years of Indigenous peoples seeing plants, animals, and landscape form as kin, wherein they are already taken seriously as co-constructing beings who impact everyday, culturally specific, place relations (Watts, 2013). Meaningful engagement with storying place on the southern tip of Vancouver Island necessarily involves situating child-animal-death relations within the brutal histories of colonization that brought rats, and settlers, to the Lekwungen-speaking peoples' territories in the first place (Davis & Zoe, 2017). It also involves recognizing the ongoing colonial application of the imagined nature/culture split to depict First Nations peoples as uncivilized and therefore subject to "order and improvement" as witnessed through their forcible removal from the places that we now go on "animal walks" and relocation to reserves, residential schools, and the ongoing disproportionate numbers of Indigenous children taken from their families and placed in contemporary foster care settings. These realities work as part of a broader intention to extinguish Indigenous ties to the land and structures of this place in accordance with colonial norms and economic gain. Acknowledging Songhees, Esquimalt, and W̲SÁNEĆ connections to the land and its inhabitants, and grappling with the question of what it means to honor and respect those connections, is an integral part of our attempts to experiment with new modes of early learning engagement. However imperfect, the moral imperative to keep striving for new modes of storying place in these times with young children is vital for creating pedagogies that more accurately reflect Indigenous resistance to colonial

erasure and possibilities for future flourishing for both human and nonhuman inhabitants (Pacini-Ketchabaw, Taylor, Blaise, & de Finney, 2014).

Ethics of Proximity and Response-Ability

If, as Deborah Rose (2013b) suggests, being alive means recognizing our human implication in the lives and deaths of more-than-human others, the question of how to do so responsibly with young children feels particularly complex. We were looking for liveliness on our weekly "animal walk" with young children when we stumbled into what Rose (2013b) calls *the death zone*: "a place where the living and the dying encounter each other in the presence of that which cannot be averted" (p. 4). As unsettling as this experience was, it speaks to the complexity of uneasy more-than-human relations when, as Ginn et al. (2014) tell us, "togetherness is difficult,. . .vulnerability is in the making, and death is at hand" (p. 114). They go on to suggest that,

> Many nonhumans we consider unpleasant or disgusting are companions. . .We are more familiar with them than we like, but at the same time they remain alien to us, catching us in what Hugh Raffles describes as 'the nightmare of knowing and the nightmare of non-recognition'. . .it moves beyond an understanding of 'togetherness' as simply life coming together. (pp. 115–116).

In the same way, we could not deny death's imminence at the point of encounter; we cannot deny the weight of hundreds, if not thousands, of years of "our kind" trying to rid our homes and communities of these creatures. Rats are largely reviled "in the wild" and simply not on the list of the animals we regularly look for during our walks, although they are also commonly kept as domesticated pets. The question of how to respond with young children to this moment is far from simple or straightforward.

Learning to Be Affected

For these and other reasons, creating pedagogies that open up possibilities for new understandings of how urban place relations are co-constituted by the "loved" and "unloved," human or otherwise, can be a difficult task. Working with the intention of "learning to be affected" emerges as one way to do so and has been cited as a positive means for taking us from the Euro-Western tendency to approach the world through a detached, anthropocentric, and disembodied lens to a place where ethical engagement with other species becomes open for renegotiation. Van Dooren et al. (2016) discuss "learning to be affected" as a conduit for developing the capacity for "passionate immersion" in the lives of others, including "the awkward, the unloved, or even the loathed" (para. 8). Taylor and Pacini-Ketchabaw (2015) see it as a necessary step in:

> [developing] more-than-cognitive modes of attention – to become attuned to the multifarious ways that human and nonhuman bodies are moved, disconcerted and enlivened through their common world encounters. . .We push ourselves to learn to be affected by and think with all of the actors. (p. 8)

But what happens when one of the actors is death? Mortality emerged in our inquiry with young children when we were looking for lively matters (crows, "woody bugs," deer, leaves, mushrooms, etc.). This encounter interrupted the Euro-Western binary dualisms, such as "life versus death" and "nature versus culture," that continues to operate with what Indigenous feminist and technoscience scholar, Kim TallBear (2015), refers to as "problematic dominant narratives . . .[that] condition[s] even. . .newer collaborative research" (online lecture). If we did forget the interconnectedness of life and death through a preoccupation with looking for "lively things" in our urban environment, death itself emerged as a dynamic force demanding we pay attention to our own implication in relationships we actively set out to distance ourselves from in urban spaces.

Whose Lives Matter?

Shortly after encountering the dying rat, one of the children brought an urn filled with a pet's ashes to present to classmates during the child care center's "Show & Share" time. Maya shared details about her beloved cat's, Rosie, life and food preferences, favorite things to do, and recent decline, which led to a discussion about taking Rosie to the vet (shared through educator, Sherri-Lynn Yazbeck's pedagogical reflections below) (Fig. 2):

> *He gave her cat medicine, to make her better someone asked? No to make her heart stop, she replied. Then she died. I was holding her paw, she said. Now she is here [holding up her ashes]. I explained how Rosie came to be ashes to a curious and intrigued group of 3 and 4 year olds, and someone mentioned that happened to their grandpa. Someone else said their dog was buried. There was silence and then one voice asked, maybe we should have done that for the dying rat on the sidewalk? [**for the dying rat**, that stuck with me] Yah, others chimed in, we left it there, another child said. Why don't we do that with all the things that die?, another asked. I said, I don't know, but I'm not sure that's true. How do I explain caring? Caring for one may look different than caring for another. Just then a child asked to see Rosie's ashes, (I was saved from a question I wasn't ready to answer). An eager group leapt up as the child began to open the jar to reveal the ashes.* (S. Yazbeck, personal communication, March 29, 2016)

Tensions raised in Yazbeck's personal reflection show how conflicting such moments in practice can be. Maya and her classmates' inclusion of the rat in a conversation about honoring beloved relatives and pet's lives with loving, postmortem rituals defies normative boundaries around who deserves this type of care and attention, usually reserved for next of kin. Demanding to know why the rat was excluded from this type of care lays bare the crux of the matter. What *does* "ethical inclusion" look like with a creature few want to live with?

Fig. 2 He got run over, but I put a band-aid on him (Photo by Narda Nelson)

Urban Pest Relations

However rare it may be for urban, Canadian children (and adults) to encounter dying animals, this moment reflects an everyday phenomenon around the world. That is, we witnessed the widespread, largely hidden, and particularly excruciating brand of death routinely doled out to those deemed "pests" through poison control efforts (Rose, 2013a; van Dooren, 2015). In fact, from a pest management perspective, it could be said that we witnessed a success insofar as the poison hit its intended mark. But feeling far from successful after this deeply affective encounter, we were left with more questions than answers. The children wanted to know "what happened to the rat?" and "where did its body go?" after returning to the place of encounter and finding it missing. Educators and researchers expressed feelings of remorse for not doing more in the moment, for example, in my own case struggling with the urge to put the rat out of its misery. What, if anything, should have been done differently?

In the days, weeks, and months that followed, the conversation continued and we talked about our unsettling encounter as part of the often overlooked, if not actively avoided, phenomenon of animal death in early childhood (Russell, 2016). In particular, we wondered about its ability to interrupt dominant narratives that continue to

influence understandings of urban place relations in early learning pedagogy and practice. Rats hold the distinction of being one the world's most identifiable embodiments of the label "pest." What can the death of such a reviled creature possibly offer up in terms of storying place relations with young children? And how might an ethics of response-ability (Haraway, 2008, 2012; Rose, 2013b) help us rethink taken-for-granted notions about what counts as nature in urban settings and who belongs? (van Dooren et al., 2016)

Imagining rats beyond their usual designation of "disease-carriers," as the children did after our encounter, is consequential; it helps us reconsider their lives as *in connection* with others, confront the categories we draw on to order the world, and comprehend our proximity to the casual brutality of industrialized poison techniques as a means of pest control and the deadly cascading effects these techniques produce. After bearing close witness to this unsettling event the children speculated about what happened to the rat creature in a way that challenges the widely accepted ethical divide between humans and rodents: maybe the rat was dying because it was a grandma, it was trying to get home when something happened, he/she could have got eaten by a predator, he/she deserved to be buried or cremated, etc. So deeply rooted is the response of hatred toward this animal that such careful considerations might be easily dismissed as "cute" or almost incomprehensible in mainstream opinion. But, as Robert Sullivan (2004) argues in his book *Rats: Observations on the History and Habitat of the City's Most Unwanted Inhabitants*, there is much more to the rat story than pestilence and loathing:

> If the presence of a grizzly bear is the indicator of the wildness of an area, . . ., then a rat is an indicator of the presence of [humans]. And yet, despite their situation, rats are ignored or destroyed but rarely studied, disparaged but never described. . .It is the very ostracism of the rat, its exclusion from the pantheon of natural wonders, that makes it appealing to me, because it begs the question: who are we to decide what is natural and what is not? (p. 2)

Sullivan's point takes on particular gravity in Canadian urban settings, where vast energy and resources go into pest control efforts and rendering both rats and death invisible due to the drive to keep densely populated communities hygienic, orderly, and prosperous places for (certain) humans to live. In this part of the world, a rat is also an indicator of the presence of the Europeans who first brought them to what is now called British Columbia in ship holds (Klinkenberg, 2017). Of course, a general sense of human revulsion toward rats comes from somewhere; they can and sometimes do carry serious pathogens such as Murine typhus, plague, and Bartonellosis (Sullivan, 2004; Vancouver Rat Project website). But as Dr. Chelsea G. Himworth, lead researcher with the Vancouver Rat Project (2017) and her team point out, universalizing the link between rats and disease is inaccurate and could impede our ability to better comprehend the complex, heterogeneous rat-human relations that might lead to new solutions for problems like infestations and disease control (Vancouver Rat Project website).

Rendering Rat Entanglements Invisible

Although widely reviled, we do, in fact, intentionally invite rats into our intimate lives in other ways. Besides keeping them as pets, our ethical considerations toward these creatures are further complicated by the reality that they are an animal of choice in pharma-medical-testing, keeping untold human lives extended through their own suffering (High, 2006). Scientists have fused rat and human genes together to create "transgenic rats" who pass these hybrid genes along to their babies to embody and enable human gene testing through intergenerational rat flourishings (High, 2006). Through our fascination with, and benefit from, rats' ability to embody and predict human disease outcomes, our proximate relations further undo boundaries between our species by moving into transgenic proportions. We cannot will, poison, test, or trap our entanglements with rats away. Inviting ethical considerations into conversations about a "lowly" street rat, then, means working against the momentum of systems we have created that rely on a latent moral consensus around a "hierarchy of being" to sanction the use of rats and other animals in medical and other types of testing. It is a thick and murky, techno-pest soup that we coinhabit together.

Pedagogical Significance

The rippling effects that our dying-rat moment with young children continues to produce are varied and complex. To date, an array of perspectives, concerns, questions, and responses from the children, groundskeepers, parents, an exterminator, educators, researchers in the field, and other community members has contributed to richly complicated and uneasy conversations on mortality, what poison does and were it goes, why we treat some creatures one way and others another, and how our wasteful patterns of living make being close to us attractive for some creatures and contribute to the cycle of ongoing problems. In terms of pedagogy, opening up space to listen to the children's speculations, concerns, and questions while being honest about our own conflicted feelings toward rats feels like a critical part of embracing the ethical burden of witnessing such an event that Rose (2013b) raises. In our case, this means talking with the children about the event through the simultaneity of being afraid of, repulsed by rats and sad and upset about the excruciating way the one we encountered died, and acknowledging the ability of poison to elicit ongoing effect in the wider community. In attending to our complex urban relations with the rat and others, such as deer, crows, slugs, and English ivy, we continue to try to open up space for complex conversations about problems for which there are no easy answers. In a world of increasingly polarized debates that invoke simplified "Truths" (or, "untruths") to incite hatred, increase profit margins, and wield power, perhaps opening up space for complicated discussions and uneasy debate about ethical response-abilities, as well as delighting in the complexities of the worlds we coinhabit, is one of the most important things we can make room for with young children in pedagogies and practice.

The Myth of Perfection and Easy Solutions

In retrospect, our dying-rat encounter felt urgent, perhaps oddly so, if we consider the sheer tonnage of Warfarin© and other anticoagulant rodenticides used in urban and rural pest management operations around the world (Rose, 2011; Sullivan, 2004). While poisoning rats is an everyday occurrence, the direct outcome is rarely witnessed. Facing up to the excruciating reality behind our attempts to manage the ancient triad between rats, humans, and food waste can be disturbing, but it is an important consideration in confronting another facet of one of the larger issues defining our crisis-ridden time.

In the 1950s, David E. Davis, "founding father of modern rat studies" (Sullivan, 2004, p. 15), traveled America consulting cities on the ineffectiveness of using poison to control rats, suggesting instead that garbage and food source removal was the only way to get rid of them. But as Sullivan (2004) points out, "nobody wanted to hear this: as it was the dawn of the age of ecology so also it was the dawn of the age of the chemical, of poisons and pesticides, and people seemed to want a sexier, chemical-based fix" (p. 17). This begs the question of what we want at this dawn of the age of "the Anthropocene." Rose (2013b) is compelling to think with here, in the way she weaves many of these issues together to expose the brutality inherent in promoting myths of perfection and control:

> We live now at the threshold of generational transition in which the future will either collapse into death or will flourish in new life. . .We seem to want to hold to the conviction that if we could expel or exterminate all those who annoy us, our particular version of paradise would be secure. I am referring to huge issues of colonization, extermination, dislocation, genocide, ecocide, speciocide and more. We know this story as ethnic cleansing, with visions of racial or religious purity, and we know it again and again in relation to animals. Let us consider the awful life prospects of animals who are condemned by the slippery label 'pest.' When an animal is declared a pest, death becomes its destiny. . .whatever it does is wrong in the eyes of those who are determined to get rid of it. And suddenly wherever it is, that is where it must not be. . ..perfection is imagined to be always on a near horizon, and violent death lurks in powerful policy and practice cloaked in the aura of management. (p. 15)

In my experience, young children are adept at poking holes in myths of "perfection," expressing curiosities and reflections about their encounters in sometimes difficult-to-answer ways. Their ability to call things into question that adults often come to accept as "given" can be arresting at times but highly generative if we work *with* the tensions created through such conversations to explore the question of "what might be happening here?," "why?," and "what else might be possible?" How, then, might we attend to death with young children in a way that opens up space to question our own role in perpetuating unnecessarily harmful or violent modes of relating? This is easier said than done. It calls into question whether we are able and willing to think beyond death's negative valence to reconsider it, in relation to early childhood, within a framework of what Rose (2013b) describes as part of life's "precious complexity. . .[through which] the shadow of death is entangled within the house of life" (p. 5). As stated earlier, this shift challenges a tendency in Euro-

Western society to focus on lively creature connections versus stretching our imaginations to recognize and value the postmortem ongoingness of a body as "in connection" and, in fact, life-giving for others (Rose, 2011, 2013a, b). Of course, beyond understanding a rat's life as in connection, or not, a poisoned rat's body goes on to carry consequences in the world that are different from ones who die from being trapped or get caught by a predator (Haberstroh, 2017). Understanding the liveliness of postmortem relations outside of the widely accepted life/death binary often used to discuss mortality with young children seems equally important to developing pedagogies aimed at "doing different" in response to living these challenging times.

Of course, class, taxonomy, culture, gender, community, race, geography, etc. impact the particularities of how we experience the processes of death. As stated earlier, none of us are exempt from being in relationship with it in some form, always. My interest in rethinking death within early childhood is not intended to trivialize the profound grief and pain felt on a personal, emotional, cultural, or spiritual level through loss. Experiences with death are as varied and unique as the children and families we work with. As educators and researchers, it is imperative that we respect and support families' wishes during such times. However, as children do not exist outside of the serious global, ecological challenges ahead, rethinking the way discourses shape understandings of "who lives (or dies)," "where," and "why" seems equally imperative in creating early childhood pedagogies capable of foregrounding alternative possibilities for living together. In this way, I feel that the way children's relations with places are constituted by entanglements with loss (death) should be considered as an inescapable but potentially generative life process for rethinking early childhood practices. It is also important to foreground corruptions, such as racism and misogynist violence that differentiate children's personal and cultural experiences with loss. Within the Canadian context, the perverse pattern of missing and murdered Indigenous women and girls (MMIWG) and forced Indian residential school experiments come to mind as very much associated with targeted attempts to order/discount bodies and sever connections to land (McCue, 2015).

Telling New Urban Stories

Telling *new* urban early childhood stories, with respect to our mortal relations in this part of the world, puts a number of terms into tension, including education, death, childhood, pests, colonization, and care. Perhaps doing so in the field of early childhood needs to begin with recognizing young children as being rendered, to some extent, politically null and void due to desires to protect while excluding them from being considered as fully active, equally co-shaping, capable participants in the world (Taylor, 2013). As explained by Taylor (2013) in her book, *Reconfiguring the Natures of Childhood*, 300 plus years of carving out a separate childhood sphere within which to reify the romantic ideals of Rousseau's Enlightenment project continues to leave its mark on the way early childhood is widely understood and reproduced in North American urban centers. And popularized Euro-Western

paradigms continue to enlist and reduce "pristine Nature" to play the role of what Taylor (2013) describes as an instrument "[doing] the work of purifying childhood" (p. 61); in so doing "childhood" is held up as an infantilized state of being at odds with the ruin of death and decay through what Val Plumwood (1993) refers to as "the fault-line logics" of colonial and capitalist dualistic systems. As such, tendencies to want to shield "innocent children from harsh realities," such as death, run deep (Taylor, 2013).

This begs the question, then, of how to refigure death within a heterogeneous approach to urban early childhood in a way that challenges romantic and sanitized assumptions about multispecies engagements, and in so doing, as Pacini-Ketchabaw and Nxumalo (2015) argue, "trace and story the actual, messy, unequal, and imperfect worlds" (p. 152) we inhabit with others. Educators, at the Cache Creek early childhood center, have found a common worlding approach helpful in at least attempting to do so in a society that overwhelmingly positions children as cognitively ill-equipped to comprehend the meaning of death and/or in need of protection from increasingly urgent "real-world" problems (Taylor, 2013).

Talking with children about these matters might be done with sensitivity in a way that talking to adults may not require. But this does not diminish the recognition that children have fascinating, sometimes off-putting, questions to ask and opinions to express in relation to death and other phenomenon that are shaped by their own "in place" relations and understandings. I am concerned about putting these connections at risk if we, unconsciously or otherwise, continue to disconnect early learning pedagogies from the heterogeneous specificities of place relations by meeting children's thoughts and questions with reproduced, universalized narratives about the places we live and learn together. What if, for example, we discuss ivy and rats as being creatures "that the colonizers brought with them to this place?" in our Canadian West Coast inquiry work? (C. Hamm, personal communication, February 9, 2017). However small this act may seem, perhaps doing so might open up space for new conversations and perspectives that might not otherwise happen if we continue simply refer to them as "invasive species" outside of the histories that so profoundly continue to shape this place. Furthermore, seeing creatures, however reviled, as having their own cultural expressions of worlding urban spaces challenges anthropocentric accounts of who "belongs" where and what means are legitimate for killing, removing, and/or living with them.

The Challenge of Reconfiguring

Reconfiguring death, and awkward multispecies relations, within urban early childhoods presents us with a number of challenges. These times are overshadowed by a dizzying rate of biodiversity loss due to an overwhelming unwillingness, both politically and personally, to alter the dominant pattern of unsustainable modes of everyday existence around the world (Dirzo et al., 2014; Heise, 2016; Rose, 2013;

van Dooren, 2014a). Telling new stories in these times, with an expressed intent to unhinge anthropocentric worldviews from the telling, means trying to do so in contrast to Anthropocene narratives that overwhelmingly herald an undifferentiated "Anthropos" (Man/Humanity) as the monolithic agent of disastrous change (Rose, 2013; Stengers, 2015; van Dooren, 2014a). We must now come to terms with the sad irony of being poised to diminish our vastly stratified, material selves in the shadow of Anthropos amplifications; this task can lead to feelings of paralysis in the face of the Anthropos' seemingly impervious omnipresence and monstrous ability to foreclose on futures generations' abilities to flourish. Anthropocene narratives also maintain the Euro-Western intellectual tradition's "view from nowhere" while putting journalists, academics, and other public storytellers in the dangerous position of trying to convey urgent information about our current state of affairs by shoring up humancentric narratives when a sharp turn away from anthropocentric ways of seeing and doing is what is sorely needed.

Noticing, Together

However daunting the challenges of working with this task in mind can feel, thinking expansively through early learning pedagogy and practice *is* an incredibly hopeful project. It is also one that necessitates understanding, from the earliest of ages that we do not stand apart from the lives of others. We are not isolated in the act of living, making, doing, caring, fearing, nor dying as we learned from our encounter with the dying rat (Fig. 3).

Fig. 3 Remnants left behind (Photo by Narda Nelson)

What happens when we stop to notice in new ways together with young children? Speculating with them about what happened to the squish of a worm against pavement or tufts of rabbit fur and other body bits left behind by an owl in the forest affects understandings of place relations. It raises questions about necessary life and death entanglements and our how far we understand the reach of ethical obligations to be. Bringing plant, animal, and other nonhuman lives and deaths into the realm of early childhood education also opens up possibilities for articulating what Rose, van Dooren, Chrulew, et al. (2012) and others refer to as a "'thicker' notion of [childhood within] humanity" (Meehitiya, Sanders, & Hohenstein, 2017, p. 2; Pacini-Ketchabaw et al., 2016). This "thicker notion" of humanity requires us to cultivate the response-ability of seeing our lives as inextricably connected with the lives of others and therefore obligated to answer increasing calls to enact new ways of living together in the face of serious ecological issues confronting us.

A number of pedagogical challenges arise in thinking together about extending ethical frameworks to those who are always with us, remaining largely invisible until we "meet with" them through a breach in our everyday patterns of relating (Haraway, 2008; Hird, 2010). How do we open up our approaches to learning with young children about living with *uncharismatic* creatures, such as rats, who thrive in processes of putrefaction and transform our food waste through their labor? (Pacini-Ketchabaw & Nxumalo, 2015; Rose, 2011; van Dooren, 2014, 2015). Rats have followed human food excess for millennia along trade, war, and pilgrimage routes; the diseases they are capable of carrying are fused with collective loathing toward their species. And yet, they persist through highly toxic chemical pest control efforts (Sullivan, 2004). Are deaths-by-our-own-hand grievable? (Butler, 2010; Rose, 2015; van Dooren, 2014a). While I do not grieve the absence of rats in my home, I grieve the suffering of the one we encountered and the indiscriminant way poison lives on in the wider food chain. Perhaps, it is the consideration of rats' lives as in connection with others and their ability to feel immense suffering that is lamentable and that is capable of drawing us into a closer consideration of our uneasy relations and responses to living with this "uncomfortable" creature.

As referred to earlier in this discussion, after our encounter the children wanted to know where the rat body went. A few of the children suggested that a predator came and took it, which suggests some level of understanding about the "ongoingness" between death and life relations (Haraway, 2015; Rose, 2013a). Of course, hawks, crows, coyotes, cats and other predators do eat poisoned rats (Haberstroh, 2017; Holm, 2014), the remnants of which get taken up through water and soil communities in different ways as well. Consequently, telling new stories about pest and death relations demands that we take children's reflections on rats' wider community entanglements seriously. In so doing, the possibility of exposing the fact that managing their numbers with poison affects others well beyond any intention of ridding ourselves of rats by foregrounding mutual vulnerabilities (Hird, 2010) and limitations in the way we construct our everyday modes of urban existence.

Sadly manifesting through the growing list of the world's critically endangered and extinct species, death is increasingly everywhere, but as Maria Puig de la Bellacasa (2015) points out, "we can only engage locally with it" (p. 54). Our chance

Fig. 4 Proximity and responsibility (Photo by Veronica Pacini-Ketchabaw)

encounter with a poisoned rat afforded us an unsettling opportunity to witness, not just any kind of dying but a particular kind of targeted death (Rose, 2015). In the opening quote to this paper, Deborah Rose (2013b) reminds us that, while unsettling, it is precisely here that our group was called into an "ethics of proximity and responsibility." With her words in mind, I am interested in thinking beyond death in this moment, as spectacle, to reconsider what it offers and demands of us in the context of early childhood education. Our moment of noticing was an unexpected and deeply affective event. For Puig de la Bellacasa (2015), "[what] we do with that event is what matters: our responses are part of the relational infrastructural arrangement" (p. 55). Can we reject tendencies to view such emergent moments through the hyper-separated lens of morbid fascination, to think with them instead as a conduit for rethinking what it means to live and learn through a commitment to an ethics of proximity and responsibility? (Fig. 4)

Proximity Matters

Exactly here, on that day, the familiarity of our walking route became suddenly distorted by the shape lying in front of us.

What's wrong with the mouse?
It's a rat. . ..

While impossible to quantify, the dying-rat moment set in motion a persistent "something" and "storied activation" (Haraway, 2015) that continues to ripple through children's, educators', and researcher's minds, emotions, actions, documentation, and bodies (which get animated in retelling the story and may perhaps even experience some sort of biochemical affect generated by the vast amounts of rat poison circulated each year in this place): requests/demands were repeatedly made to go back and look for the body, and we still occasionally stop to examine the place of encounter and remember what happened when walking by. A short film was made

about our encounter to share with the parents and wider community to raise some of the ethical concerns and complexities of our implication in poison-death relations.

This moment pulled all of us into an unexpected confrontation with the consequences of our toxic relations with pests in urban landscapes. Tensions produced through our unexpected proximity with the rat pushed back on the anthropocentric tendency to see ourselves as bounded entities, separate from other creatures in neatly contained bodies. Undine Sellbach discusses the close, yet often hidden, negative presence insects (like rats) produce in the way they "return us to the sense that an organism isn't a whole thing. . .[by being persistently close, they are] constantly unraveling the boundaries that we draw around ourselves and the environment" (in Gelonesi, 2014 [Audiofile]).

However unsettling, this moment interrupted the impediment of what Jessica K. Weir (2015) refers to as "'separation thinking'. . .[which] denies our co-produced realities, our life sustaining connections with sentient others, and leaves no grounds for us to engage with ecological life in ethical terms" (p. 17). Paying attention to our entanglements with other species, including those we have uneasy relations with, helps pull us away from "entrenched patterns of 'human exceptionalism'. . .prompting new kinds of questions about what [death] teaches us, how it remakes us, and what it requires of us" (van Dooren, 2014a). For Marcus Baynes-Rock (2013), the "multispecies commons" "challenges us to reconceptualize the ways in which human and non-human lives are lived. . .and loudly demands that we reconfigure the paradigms that guide our understandings of what are social processes" (p. 224). Doing so also helps us provide a richer account of what urban, multispecies relations are, and the histories that brought us together in this place versus romanticized versions of the plants and animals we imbue with more noble attributes than, for example, rats are afforded.

In mobilizing Rose's notion of a responsibility afforded through proximity with others in the death zone, I wonder if we can embrace such moments as unknowable in advance, profoundly affective, and calling on us to recognize our deep implications to act versus turning away from the tensions and, in so doing, potentially abandon moral responsibility. If so, perhaps we can better attune ourselves to the call for ethical modes of engagement with others and start the important work of extending an ethics of responsibility beyond strictly human relations and the tendencies to stick to romanticized scripts of early childhood animal engagements to think more deeply together about Puig de la Bellacasa's (2015) question of "who benefits?," or *cui bono*, through everyday encounter?

Conclusion

Our unanticipated dying-rat encounter became somewhat of a pivotal moment in our multispecies inquiry, but it did not happen in isolation. It took place within the context of other salient "mortality moments" that year, including walking through a science lab full of taxidermied birds and skeletons, finding dead (and sometimes killing) insects and worms, and working through the challenges of an intense

attachment between the children and a large deer form made from willow branches. (Similar in shape to Sweden's Yuletide Gävle goat forms.) This attachment led to them lugging their "stick-deer-friend" along on our long walks to see other animals. When stopped and asked about their "big friend" by curious passersby, one of the children repeatedly produced awkward silences by responding, "the deer is very, very dead."

The point I want to make here is that, while we live in a time overshadowed by accelerated mass death, these moments did not occupy morbid early childhood corners. They happened in connection with the flow of stories and energies that comprise each day, week, and month-turned-year, including seasonal shifts, sibling births, gardening, disagreements, worm compost bin lifecycles, a local drought, excitement, illness, politics, etc. In this way, death is actively intertwined with the sociality and embodied experiences particular to our early childhood center that, over time, helps create a sense of "ecological connectivity" in place (Gibson et al., 2015). This affect runs contrary to the feelings produced through the universalizing Anthropocene narratives that have become popularized in eco-disaster stories.

Exactly here, we were called into an ethics of proximity and responsibility (Rose, 2013) that continues to challenge the dominant frameworks of the times we live in and the romanticized childhoods we tend to reproduce through urban "nature" narratives. Our encounter opened up possibilities for paying attention to *this* place, its histories, and ongoing relations in new ways, necessitating a reconsideration of not only our mutual vulnerabilities but also our unique position as early childhood practitioners, researchers, and children to think about the ecologies of life-death relations in an era saturated with nature narrative elegies. The dying-rat encounter produced a generative moment that continues to inspire and demand more of us, in our everyday relations, calling attention to questions of urban, relational space and the issues young children are not only poised to inherit but that they actively engage with in the present.

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Responsive Environmental Education: Kaleidoscope of Places in the Anthropocene

32

Anneliese Mueller Worster and Jennifer Whitten

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Abstract

Since the 1970s, when international emphasis on environmental education increased in response to a growing awareness of industrialization's environmental

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impact, the field has often cast children in the role of future stewards of the "natural world." Environmental education's iterations have maintained an anthropocentric, binary view of nature and have failed to constrain the complex phenomena of the Anthropocene epoch. Now, the environmental theories and predictions of the 1970s are reaching distressing, ongoing fruition, in a froth of climate change-induced natural disasters which displace communities and raze or drown vegetation. An individual's sense of place can no longer be understood as rooted in a static locale: landscapes change overnight, and countless people lack the luxury to conceive of themselves as inhabitants of clearly definable, locally situated ecological and human communities. Place is ever-changing, layered, and linked across time and space through economic transactions, and it interacts with human identity in ways that are difficult to grasp. Therefore, we posit that people now live with a Kaleidoscope of Places which expand and contract from the local bioregion to unseen locations across the biosphere. This chapter contributes to an evolving environmental education model for the Anthropocene, integrating a dynamic place theory into a place-based pedagogy intended to encourage children's agency as co-constructors with and for our interdependent planet. We assert that the ability to create innovative solutions for mutual survival requires cultivating specific skill sets of adaptability, feeling, and agency, as we explore our socioecological contexts from a transdisciplinary perspective.

Keywords
Place · Environmental education · Anthropocene · Transdisciplinary · Deep ecology · Place-based education · Child as nature

Introduction

A 2012 image in the *New York Times'* "What's going on in this picture?" feature, geared to educators, depicts a joyful looking child leaping from one gigantic mound of ragged leather hides to the next. The viewer sees tall buildings in the background, veiled in smoke and soot. A dark river appears between the mounds of hides and the buildings. This photo ran on a Monday, and school children throughout the world were invited to guess the implied narrative. On Thursday of that week, the *Times* revealed the photo's caption:

> A child jumps on the waste products that are used to make poultry feed as she plays in a tannery at Hazaribagh in Dhaka, Bangladesh on Oct. 9, 2012. Luxury leather goods sold across the world are produced in a slum area of Bangladesh's capital where workers, including children, are exposed to hazardous chemicals and often injured in horrific accidents. . . None of the tanneries, packed cheek-by-jowl into Dhaka's Hazaribagh neighborhood, treat their wastewater, which contains animal flesh, sulphuric acid, chromium and lead, leaving it to spew into open gutters and eventually the city's main river. (The NYT Learning Network, 2012)

This glimpse of Bangladesh uncovers the interconnected actualities of the Anthropocene epoch, a time when a Bangladeshi child's hazardous, makeshift,

"found" playground of leather by-products is loosely stitched to the life of a woman who wears leather shoes in New Hampshire, while she rakes leaves into a pile for her own child to leap into. The Anthropocene is a geologic time marked by human impact (Crutzen & Stoermer, 2000), primarily the result of social interactions such as reproduction, colonization, consumerism, and oppression, which have caused ecological instability, prodigious extinctions, and mass displacement. Although the child in the photo has never visited the United States and the woman raking leaves has never physically stood in Bangladesh, in a very real sense, the people and places of Bangladesh and New Hampshire impact one another. For instance, it has been predicted that in Bangladesh, where many communities live 20 ft below sea level, 15 million people will be displaced by a climate change-induced sea level rise. This climate change has been caused or exacerbated by large energy consumer countries like the United States; meanwhile, in today's mobile world, some of these displaced inhabitants surely will emigrate to the United States.

Such connections illuminate how the meaning of a "sense of place" today differs from what it meant just a few decades ago, when place theories centered on dwelling in and connecting with local communities. Our changing world now compels us to develop more fitting theories, which in turn inform our pedagogical approaches to environmental education. For instance, the established "child as steward" approach might emphasize educating students about the human responsibility to develop technological solutions that mitigate climate change repercussions, including the literal sea change the population must face. Early environmental education models also might preference the connotation of "nature" as pristine, wild, and natural beauty and direct our endeavors primarily toward preserving such "nature" in the places where our feet stand. However, a perspective that upholds "child as nature" (childhoodnature) will embrace how the holistic character of all places includes a continual transmutation, a contracting and expanding motion between the spot where we stand and the entire planet, and will note that the web in which we exist, and of which we are a part, also includes our consciousness, knowledge, and actions.

Some parts of the web, like the Hazaribagh tannery, may unsettle us, causing cognitive dissonance. We may feel utterly disconnected from the living conditions, the ecological state of the earth, and the pollution in Dhaka. However, the locale we inhabit is no longer shaped by simple geographic lines. Our strands of interconnection are uncountable and must be acknowledged, broadening our definitions of childhood, nature, and environmental education. A culture that includes children playing in a tannery may not resemble our time-honored conception of what childhood experiences should be, any more than the child's surroundings resemble our notions of "nature." When considering children like the one in the *NYT* photo, we might even be tempted to determine that their surroundings are devoid of nature. But in spite of our previous mental constructs, the image of a child playing on the raw materials of a consumer economy is one iteration of what child-nature/nature-child/place-child looks like in an interconnected Anthropocene epoch. The child is playing in and among elements of nature, such as cowhide, flesh, and air, near water, surrounded by evidence of human endeavors, and within an economic growth model by which we either oppress or are oppressed.

Besides playing in a place that *is* nature and also embodying one face of nature, the child, by its own nature, *plays*. As Froebel said, "Play is the work of children" (Liebschner, 1992). No matter where children are, they adapt to their conditions and play. The resilience of young children in a shifting, uncertain world is remarkable and must be incorporated into considerations for educating the young children of the Anthropocene. Such considerations may even help adults who grew up with a stewardship model of environmental education to transcend the limitations of their prior learning and address the challenges posed by the climate change impacts in imaginative new ways.

Retiring the Stewardship Model and Establishing that Humans Are of the Earth

A guiding principle of one of environmental education's foundational documents, the *Tbilisi Declaration of 1977*, reads: "Whereas it is a fact that biological and physical features constitute the natural basis of the human environment, its ethical, social, cultural, and economic dimensions also play their part in determining the lines of approach and the instruments whereby people may understand and make better use of natural resources in satisfying their needs" (UNESCO, 1978). This statement, while it recognizes our interdependent relationships, also sets up a binary construct that positions humans as other than "biological and physical features" of the environment and other than a "natural basis of an environment." The goals and guiding criteria of environmental education have continued to build from this binary understanding. Writings which often have been interpreted in ways that uphold an "other than" construct appear very early, in the Hebrew *Tanakh*, the Christian *Old Testament*, and the Greek *Septuagint*; numerous religious scholars have cited "man" as the ruler of, and therefore a step removed from, the rest of the earth:

> Let us make man in our image, after our likeness and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth and over every creeping thing that creepeth upon the earth. (Genesis 1, 26)

Deeply entrenched in multiple cultures, it is no wonder that a binary model of dominion and stewardship infiltrated one of environmental education's "founding documents." However, a half century after the Tbilisi Declaration was crafted, an increase in the scientific comprehension of planetary interrelationships, combined with an evolving historical understanding that this positioning upheld colonization as it contributed to the neoliberal economic growth model, exposed shortcomings in the Tbilisi statement. It can be argued that an anthropocentric, binary view of humans and nature has been a primary lever catapulting the earth into the Anthropocene. The Anthropocene age illuminates our interconnection and our "intra-actions": we co-create one another. *Intra,* meaning *within* or *between the layers of,* speaks to the fact that we are not divergent beings linked through disparate strands of connection that stretch between us; rather, we are one material, closely

knit, interwoven of the same strands. It is impossible to fully distinguish our being from the being of others, human and nonhuman, for "each species is constitutive of each other" and our relationship to the world is ". . .as much influenced by behavior and existence of other co-existing species as it is by our intentional or unintentional actions" (Rautio, 2013, p. 448). Our impact is greater than if we were merely interconnected and interacting. Instead, as "intra-actors," we "support the capacity for intra-species encounters to co-merge with all things as 'agentic'" (Malone, 2016, p. 393).

To reflect the fact that humans are situated as "part of" rather than "other than" nature, intra- and interdependent, environmental education must work toward undoing its binary constructs and transcending the nature/culture divide (Rautio, 2013). Taylor's argument that due to "the onto-epistemological implications of the inextricable entanglement of human and environmental fates and futures, environmental education will not have the impetus to systematically interrogate the force field of default stewardship pedagogies" challenges us to transcend earlier postulations about the human place in the world (Taylor, 2017, p. 1453). The ontological examination of difference in the realm of *humans-are-nature* and *child-is-nature* is a necessary component of reshaping environmental education so it moves away from an anthropocentric standpoint and foregrounds holism:

> During the past forty years, those Earth photos, along with Gaia theory and environmental challenges, have provoked the emergence of a new way of thinking about ourselves. No longer just citizens of this country or that, we are discovering a deeper collective identity. As many indigenous traditions have taught for generations, we are part of the earth. (Macy, 2012, p. 31)

While acknowledging that inherently, a human being is as much a constituent part of nature, created from nature's processes and means, as an interconnected root system or Yosemite's Half Dome may be, we of course must draw an important distinction to account for biodiversity and difference. Humans are animals, part of the diverse interacting, interrelating, mutually shaping web, and it is through the capacity of our idiosyncratic differences that we generate one another to create in the ways that we do (Deleuze, 1994). "Difference generates beings in continuous, unique, and unpredictable encounters" (Rautio, 2013, p. 448). But our unique characteristics do not mean we are more exceptional than or more immune to influence from nonhuman forms of existence. Deleuze's philosophical analysis of difference, a schema of dominance and subordination, underscores this point. While the predator/prey relationship is intrinsically ecological, it also supposes a dominance/subordination construct; however, when teased apart, the predator evolutionarily shapes the prey and vice versa, without one being more exceptional than the other: there is mutuality in the shaping.

Although we don't know whether other species feel exceptional or whether exceptionalism is solely a human construct, it is safe to say that the environmental education stewardship pedagogy is fraught with what environmentalists Dunlap and Catton (1979) have described as the human exceptionalism paradigm. Throughout

the decades, various pedagogical models, including education for sustainable development (ESD), have fallen prey to this paradigm. ESD positions humans as nature's caretakers, preserving the nature-culture divide, and includes a distinct focus on how business sector developments can be more planet-friendly, including searching for technical solutions to environmental problems caused or worsened by industrial advancement. This approach places a disproportionate emphasis on enterprises that – even when corporations concede their roles and attempt to redress problems via technology – only manage to attenuate, rather than eliminate, continuing environmental harm.

Embodying a deep ecological perspective, Kopnina (2012) notes that ESD is problematic because it "undermines ecological justice between humans and the rest of the natural world" (p. 712). Stewardship models falsely suggest that humans, while causing ecological destruction, can simultaneously find solutions to that ecological destruction. Kopnina advocates for the necessity of including an ". . .ontocentric or ecocentric perspective in environmental education," rather than a species-centric perspective "that seems to amplify anthropocentric concepts that often put people and profit before the planet" (p. 712). Stewardship in ESD, one such anthropocentric concept, is clouded by its relationship to and consideration of the economy. With one eye focused on the permanent roots, root hairs, and feeder roots of the forest and the other focused on profitable development, it is easy to become myopic.

Additionally, wildly different environmental orientations, including less binary and non-binary indigenous perspectives, abrogate the idea that there are comprehensive "best" or "correct" approaches to "solving environmental problems." Since humans operate as one force within nature, rather than merely acting *upon* nature, educating based on a paradigm of human exceptionalism and stewardship is not only binary and species-centric, it is bound to fail. It is critical that environmental education mature away from its foundational anthropocentric aspects as it develops future frameworks, pedagogy, and investigation for the Anthropocene. It is not that we must abandon all efforts to attend to the health of the planet, but we must relinquish the notion that we operate *about* and *for,* zoom in on operating *within,* and champion understanding the ways that we are *of* that planetary environment.

"Where" Children Are, So Is Nature

Concomitant with retiring the lens of stewardship, environmental education must embrace humans-as-nature in order to fully evolve for the Anthropocene. Because environmental education teaches learners ranging from young children through senior citizenry in formal and informal settings, its curriculum and pedagogy are differentiated across cognitive, affective, and physical domains, spanning an extensive range of developmental stages and settings. For the purposes of this paper, we will primarily consider the process of educating children in formal and informal settings and thus primarily will reference child-as-nature. However, because young children are developmentally "closer" to embodying nature than adults are,

examining environmental education for children provides an excellent place to revamp educational theories and practice so that the holistic, mutually shaping "nature-child" will mature into an embodiment of "nature-adult" later in life. Hart (1997) noted that Piaget's developmental studies provide insight into the nature-child relationship's possibility for influencing adult caring:

> [Children] are both closer to, and further from, nature. . .Closer perceptually because they are physically closer and less mediated in their response to things, but they are further conceptually because they think everything is made for people. . ..Piaget also describes a phenomenon that could form roots for children of a different kind of a relationship to nature as adults: 'animism', the tendency to find intention and consciousness in things, including those that are inanimate. The most famous of Piaget's accounts is of a child who gathers pebbles together so they do not feel lonely. . .this less differentiated perspective on the human and non-human attributes may have the potential to serve as a base for a different vector in the development of human caring for the non-human world. (pp. 17–18)

Increased consideration of children and nature has ensued from the popular "nature deficit disorder" literature, which advances the notion that children spend too little time outside, interacting with nature, and this creates a wide array of problems. This framework is predicated on two flawed constructs: (a) an idea that children are not *of* nature but are *separate from* nature and hence can fall prey to a "nature deficit disorder" and (b) a romantic conception of nature as restorative (Louv, 2005). While Louv's research and writing has had significant impact, encouraging parents to consider the extent and effect of children's "screen time" and other occupations, Louv's premise is problematic. Nature is everywhere, not only in romantic outdoor settings where people feel refreshed and restored but also in urban settings and even less romantic settings which are painful to acknowledge.

Malone's examination of nature-child encounters between dogs and children on the streets reveals ". . .that nature–child relations are messy and complex, rather than simply restorative and idealistic" (Malone, 2016, p. 404). The holistic view of child and nature mutually shaping one another suggests that wherever children are, so also is nature. Mutually shaping relationships take place in a socioecological context that is comprised of humans and other kinds of being(s), and the "where" of nature exists wherever they encounter one another. Whether place is conceived of as the socio-ecological context of a geographically bounded landscape or a reservoir of individual trajectories of place meaning and attachment, nature-child can be further interrogated to consider place-as-nature.

Viewing environmental education through a nature-child framework facilitates shifting its goals from those of stewardship to those of mutual survival, a crucial priority for the Anthropocene. It invites us to make space for manifesting yet-to-be-imagined objectives and results. "Education as an inherently human-centric discipline faces particularly messy struggles ahead, and thus its theorists and practitioners must find new concepts and practices that are sorely needed for species' survival in deeply troubled times" (Duhn, Malone, & Tesarc, 2017, p. 1359). Innovative approaches to survival-oriented environmental education will require us to provide children with opportunities to explore nature wherever they are,

encountering not only the romantic, restorative aspects of their places but the less pleasant facets, as well. While experiencing their socioecological contexts, children must be allowed to feel all their emotions; this will help them transform their thinking, co-construct decisions, and take actions that lead to survival for all the beings in our places (Macy, 2012; Duhn et al., 2017; Selby, 2015; McGregor, 2015).

By considering children as nature and place in mutually shaping relationships, environmental education can help children discern and experience the joys and sorrows of embeddedness in their socioecological contexts. If children are nature, then not only are the world's bio-geo-physical aspects part of their socioecological context but so are its social actors, their lived ideas, and their institutions. Children gain a greater sense of agency when they learn that, far from being isolated particles, they and their actions are linked to and affect many points in the biosphere.

Place

> You are a part of a part and the whole is made of parts, each of which is whole. You start with the part you are whole in. (Gary Snyder)

To construct a Kaleidoscope of Places framework for effective environmental education in the Anthropocene, we must first examine several ways "place" is construed. Interest in place and all its iterations, including perspectives rooted in bioregionalism, became a prominent force in environmental education based on the idea that connection to place encourages responsible behavior. Our understanding of place theory, an overarching umbrella that has evolved over time and across disciplines, begins with the understanding that *place* is both objective and subjective. As such, it includes (1) *geography*, a biogeographic objective definition; (2) *locale*, how a place is bound by descriptors, distances, and boundaries; and (3) *sense of place* (Dentzau, 2014; Zia, Norton, Metcalf, Hirsch, & Hannon, 2014; Resor, 2010). Of these three characteristics, geography is the most objective characteristic; locale, although rooted in geography with objective elements, also can fluctuate according to the subject's point of view; and sense of place is a wildly subjective construct. Place theory has inspired multiple environmental education frameworks and pedagogies, including place-based, place-responsive, and place-conscious education.

An Evolution of Place Theory

Bioregionalism

In the 1970s, the term *bioregionalism* initiated much of the conversation that encouraged environmental education to facilitate students' development of "roots" and a "sense of place." Bioregionalism includes both the geographical boundaries of a local place and the recognition of how to live in a way that is responsive to the socioecological biorhythms and limitations of that place. This movement focuses on

learning to live in healthful relationship with the local land, water, and inhabitants (Berg & Dasmann, 1977; Pezolli, 2015). Its attention to an individual's habitation in a local place, dwelling in its socioecological community, grows from indigenous ways of knowing. It asks us to attune ourselves to more than the human cultural context of where we live and to consciously consider and respond to our immediate ecological context (Barnhardt & Kawagley, 2005; Cajete, 2000; Elk, 2016). Bioregionalists suggest that in order to live sustainably, we must live with intentionality, explicitly heeding our interdependent relationships with our human and other-than-human community, and that this will help us develop a sense of place where we reside.

Sense of Place, Place Meaning, and Place Attachment

Bioregionalism's core commitments include localism and developing a sense of place. Worster and Abrams (2005) theorized that a *sense of place* is composed of several characteristics:

> (1) ecological knowledge of the place, which leads to ecological identity; (2) knowledge of the local institution/social context (social behaviors, structures and norms) which facilitates the development of a social identity; and (3) place attachment to a region.

(1) and (2) comprise the socioecological context of a place, which gives rise to an individual's socioecological knowledge, which engenders that individual's socioecological identity. Place attachment germinates and grows through direct experience with socioecological context.

An alternative framework for sense of place posits that it is formed through place meaning and place attachment (Kudryavtsev, Stedman, & Krasny, 2012). *Place meaning*, the "symbolic meaning ascribed to place" (p. 231), is a multidimensional, individualized construct that reflects an individual's perspectives, including race, culture, power, personality, political, artistic, economic, historical, and/or ecological perspectives (Ardoin, 2006; Nespor, 2008; Relph, 1976; Russ, Peters, Krasny, & Stedman, 2015; Tuan, 1974). While place meaning radiates from the locus of an individual's knowledge and identity, *place attachment* is formed by the binding relationships between people and places. Scannell and Gifford (2010) theorize that place attachment has three aspects: the *person/actor, psychological processes,* and *place dimensions:*

> The first dimension is the actor: who is attached? To what extent is the attachment based on individually and collectively held meanings? The second dimension is the psychological process: how are affect, cognition, and behavior manifested in the attachment? The third dimension is the object of the attachment, including place characteristics: what is the attachment to, and what is the nature of, this place? (p. 2)

Place theory, including sense of place, the socioecologically contextualized meaning of place, and place attachment, is predicated on the notion that there is *a place*. But

where is this place? Connecting to the geographical location, we inhabit is critical, but the "where" of place must not be limited to our immediate locale. Relph (1976) states, "A place is not just the 'where' of something; it is the location plus everything that occupies that location seen as an integrated and meaningful phenomenon" (p. 3). Neither a wholly objective, fixed locale, nor a fully subjective mental construct, place is a combination of both, with a fluid character that acknowledges the importance of one's bioregion and simultaneously extends far beyond one's bioregionally delineated locale.

Place Fluidity

Our understanding of place, the fluid, interactive space between the geographical, social, and cultural attributes present in an individual's defined locale, is inevitably a human construction and not an objective truth. People's beliefs and perceptions are shaped by assumptions and prior experiences, as well as by the reality with which they interact (McInerney, Smyth, & Down, 2011; Soja, 2009; Maxwell, 2013, p. 43). Two people who stand in the same spot may ascribe widely variant place meanings to that location, based on identity differences. People are "a bundle of individual trajectories, each with their own histories" (Charlton et al., 2014, p. 156). Massey (2005) asserts that place is a dynamic "plurality of trajectories" consisting of living and nonliving entities and that individuals shape places just as much as places shape individuals (p. 12). Place is "constantly configured and reconfigured" as it intersects aspects of living and learning. Wattchow and Brown (2011) also highlight place's non-static quality, linking its dynamism to its interrelation with people:

> People and places always exist in mutual bonds of interdependence. Both people and places have a physical reality, but it is the identities of both people and places that are continually emerging as an unfolding, interdependent phenomenon-always evolving-always becoming. (p. 75)

Mosaic of Places

The concept that place and people define one another and are always evolving is further complexified by Hay's (1998) theory that each individual possesses a bioregional sense of place based on time spent in that place and personal bonds with its socioecological context, but if an individual is mobile, he or she will be influenced by a unique mosaic of places, the collection and convergence of all the places a person has been:

> Our lives must 'take place' somewhere, but in modern, Western society people tend to shift places often through residential mobility, and the places themselves change rapidly through economic development and migration. A mosaic of places thus influences most people over the course of a lifetime. (Hay, 1998, p. 6)

The metaphor of a mosaic of places acknowledges that while it is important to develop a sense of place, knowing, and identity within a local socioecological context, a sense of place established elsewhere may strongly influence attachment to new locales. Place, already a fluid construct, becomes even more fluid for mobile individuals, whose trajectories are filled with twists, turns, doubling back, permeable peripheries, and unexpected fissures, the result of memories, perceptions, judgments, and attachments to particular aspects of all the bioregions they've experienced. These influence interpretations of their present bioregions. Even when people never return to some of the places they once inhabited, as occurs for many displaced refugees, those locales remain within them and shape how they relate not only to the geography of subsequent places but also to aspects such as culture, ecology, politics, art, ethnicity, values, and more.

Hay values rootedness in one place as a way to increase social participation, a component of civic engagement, and has voiced the concern that mobile people's mosaics of places may in some cases lead to "generic place dependence where there is some attachment to a number of similar places" (p. 26) rather than an increased capacity for people to develop strong bonds to a number of places during their lives. Relph (1976), in his seminal piece on place and placelessness, argued for the need to avoid "placelessness: the casual eradication of distinctive places and the making of standardized landscapes that results from an insensitivity to the significance of place" (Relph, 1976, Preface).

Seamon and Sowers (2008) have suggested that we aim to balance a local and global awareness of places and that in order to step compassionately into the world, we are best off having a true sense of love of "[o]ne particular place to which [we] belong," so that from this place "...we may recognize that what we need in our everyday world has parallels in the worlds of others" (p. 50). However, in addition to Hay's observation that rootedness in one single place is increasingly rare due to the mobile traits of modern, Western society, climate change and other calamities are predicted to yield growing numbers of displaced people searching for new homes in the Anthropocene. If Marsh (1988) and other theorists are right that humans seek deeper place bonds and a sense of place in a locale they call home, the call for strategies to develop place bonds in the increasingly globally mobile Anthropocene are critical.

Hay notes that we have "genetic types" of places: when we arrive in a new place, we have a sense of what we like and dislike based on past experience, which in turn shapes our positive or negative place attachment to a new place. The framework of a mosaic of places suggests an opportunity: once we identify the places in our mosaic, we can begin to comprehend how they may be influencing our relationships to our subsequent places. Such understanding can better equip us to develop social and ecological bonds to new places that we temporarily or permanently will call home.

To gain the greatest benefit from our multiple senses of place, place bonds, and place experiences, the places in our lives need opportunities to intermingle, be honored, and breathe. The past need not suffocate possibilities inherent in the present or future but instead can enhance them. The more places it contains, the more one's

mosaic of places can offer narratives about how to survive and thrive, modes of engagement, the process of becoming rooted, etc. Once one is conscious of its influence, one has the chance to knowingly and purposefully decide how to assign new meaning(s) to prior information. By attending to students' mosaics of places, environmental educators can increase their abilities to remain culturally responsive, build stronger relationships with students, facilitate diverse learning communities that draw on the richness of a range of place learning, and increase social participation within and extending outward from the learning community.

However, a mosaic of places implies a collection of discrete pieces arranged in fixed relation to one another. This is inconsistent with the realities of our interconnected Anthropocene world. Therefore, we look to a kaleidoscope as a metaphor, to illustrate the manner in which place expands and contracts in perpetually fluid motion for each person, allowing every individual's sense of place to include not only the mosaic of places he or she has physically inhabited but also the unseen places to which he or she is linked by the creation, transport, and transfer of items purchased and consumed. This new framework for fluid place reframes earlier place-based pedagogies, to foster relevant, effective environmental education in the Anthropocene**.**

Kaleidoscope of Places

In response to the increasing decentralization caused by the Anthropocene, which requires us to broaden our perspectives beyond the scope of one geographically bounded locale, we propose expanding place theory to incorporate a notion of ongoing expansion and contraction: one can both dwell in a fixed geographic place and, at the same time, be formed of elements from all the places one impacts and by which one is impacted. In other words, in the Anthropocene, no single consistent, bioregionally based comprehension and inhabitation of a place will be applicable; instead, we need a framework affirming that we each consist of a Kaleidoscope of Places (KoP).

The Kaleidoscope of Places theory builds upon, rather than replaces, earlier sense of place and associated place theories. Just as a kaleidoscope operates on the principle of *multiple reflections* which display the metamorphosing relationships between the pieces in its chamber to create *a unified image*, a person's Kaleidoscope of Places operates on the principle that an individual possesses *multiple vantage points from multiple locales* at the same time; experienced together, these display the changing interrelations between one's self and one's myriad of places to create *one's sense of place.* We can create our mosaics of places by attaching the other places we've stood to the locales we currently inhabit, learn from our mosaics to develop place meaning and place attachment that is specific to our new places, and from there, progress to our Kaleidoscopes of Places, where we incorporate all the strands of place to which we're connected throughout the world.

One may embody and ascribe multiple meanings to one's KoP as one's vision expands across the biosphere to both remembered and unknown places, contracts

back to the patch of earth where one stands, and then flows out again. Examining our Kaleidoscopes of Places is one way to reframe place understanding in a world where consumer goods and services come from afar, worldwide immigration is sure to increase, and many places quite literally have been and will continue to be fragmented, reconfigured, and re-fragmented by world events (hurricanes, market crashes, resource wars, international trade) and our relationships to them so that fewer and fewer individuals can claim to experience place from one single vantage point. A KoP approach acknowledges that our ties to other places are so inextricable, even those with no perceptible connections to one another shape each other, both socially and ecologically.

From the theory that we are comprised of a Kaleidoscope of Places (and all those places are comprised of us) emerges a Kaleidoscope of Places-based, place responsive, place conscious pedagogy that we propose as one possible basis for environmental education. This KoP pedagogy must be deployed for young children in the Anthropocene, particularly in light of environmental education's current recognition that children are nature and places, regardless of the privileged or oppressive socioecological contexts where they live or from which they've emerged. The framework for students' Kaleidoscope of Places is built directly off the sense of place framework: it evolves from socioecologically contextualized knowledge and identity, ascribed place meaning, and place attachment. Onto this initial sense of place framework, however, we map an additional, mercurial layer that expands from an individual's immediate locale to multiple far-flung parts of the biosphere and then returns to the immediate locale.

To recap, when we embrace a KoP framework, *place* includes:

1. The "where" of our dwelling, as described earlier, living bioregionally, consciously, and intentionally within a geographically delineated locale, attending to the importance of inhabiting our local place on the earth.
2. The places we have visited, lived, and experienced.
3. Those unseen places we have not actually visited but with which we intra-act daily through our consumption within a global economic framework. Imagine that an invisible thread is tied to the woman who stands raking leaves in New Hampshire, wearing shoes crafted from a hide that was once a part of the mound at the Hazaribagh tannery. This thread stretches from the leaf-raker to the Bangladeshi child who jumps from mound to mound. Another thread reaches from the tannery to a cattle feedlot; yet another thread extends to the corn field that supplied the feedlot. Soon, a web of threads is overlaid on the biosphere, and within this moving, reflective web lies the Kaleidoscope of Places that form our being, including the space, the people, and the biogeographical nuances that link Bangladesh to New Hampshire.

This is true even though we cannot be certain where all the threads connect. Where did the cattle whose hides were piled high at the tannery originate? Leather goods stamped "Made in Italy" may obscure the fact that their leather was tanned in Bangladesh. Source obfuscation further disconnects people from the places they

affect and those which impact them and helps to propagate colonialism and oppression. Keeping our minds open to our Kaleidoscopes of Places can help us be mindful of such obfuscation. A person who feels strongly rooted in New Hampshire, buys locally grown meat and produce, and tries to "live bioregionally" still must buy leather boots made elsewhere, since the New England shoe industry folded in the middle of the twentieth century. In the instant a consumer buys leather boots, she is catapulted from an integral connection to a bioregional locale into a connection with the broader biosphere. She is part of the place where she dwells but also part of the places the cattle were raised, the cattle feed was grown, the leather was tanned, and the metal for buckles and zippers was mined. Even with bioregional connections, we embody a full Kaleidoscope of Places.

Environmental Education in the Anthropocene: A New Pedagogy of Place

As Haraway (2015) contended, we have no idea what the Anthropocene will be like or whether it truly will be a new epoch or a boundary event. However, we do know that we live in uncertain times, when not only individual lives but whole communities and landscapes are more likely than ever in our remembered history to change rapidly – not only in more foreseeable locations, such as lava flow routes or fault lines, but also in areas where climate change repercussions will spark war and weather events that can't be predicted by current technologies. The environmental education model for the Anthropocene should therefore prioritize *survival* – not of the stewardship variety, nor in any form that promotes a hierarchy of values regarding land and life forms, but in way that stems from an understanding of our mutuality.

Environmental education can no longer afford to remain embroiled in human exceptionalism perspectives; it must be inventive, transdisciplinary, and geared toward facilitating and trusting children's agency so that as they grow, they will be poised to respond to sudden and systemic changes. To make informed decisions, children will need more time and space than ever to explore the socioecological contexts of their Kaleidoscope of Places. A Kaleidoscope of Places-based pedagogy encourages teachers to facilitate expanding and contracting students' attention from their currently inhabited bioregions to the mosaics of other bioregions they have inhabited, out into the biosphere wherein are located numerous possible connections to places they have not seen, and back to their inhabited locales. Such exploration encourages mastery, develops skills for critical evaluation which support children's decision-making advancement, and, in turn, helps to preserve the survival of multiple socioecological contexts and the self.

What does it mean to survive? Often, we refer to the "survival of our species." However, interrogating the interdependent, mutually shaping relationships between people and nature suggests that survival of the ecological contexts of our places is critical to survival of the human species and the self. Mutually generative relationships require "the other" to exist. Therefore, in the Anthropocene, environmental

education that is geared toward survival must attend to the survival of many socioecological contexts. Survival calls for an environmental ethic that will help us decide our actions based on our nature-human and human-place identities.

Kaleidoscope of Places-Based Pedagogy: Sprouting from the Roots of Place-Based Pedagogy

Within the existing place-based environmental education model, the ability to strengthen place attachment has been attributed to a combination of frequent visits to outdoor spaces, participation in outdoor activities, civic engagement with environmental "stewardship" activities, and opportunities for social interaction. These elements reflect the goal of place-based pedagogy: to strengthen place attachment and ecological place meaning as an avenue for environmentally responsible behavior (Kudryavtsev, Stedman, & Krasny, 2012). Historically, place-based education has endeavored to reconnect the process of education with the local community as a way to improve community life and facilitate experiences that foster students' awareness of their interdependence with the place they inhabit (Sobel, 2004; Gruenewald & Smith, 2008).

Gruenewald and Smith's approach (2008) expands place-based education to be *place-conscious* education, which attends to a person's consciousness of socio-ecological contexts and fuses environmental education with culturally responsive teaching. Too often, the critical pedagogy of cultural oppression and privilege is absent from the environmental education model. A culturally responsive, place-conscious pedagogy accounts for both social and ecological forces that affect the community, honoring the full range of place meaning represented within a particular student body. Wattchow and Brown (2011) further expand place-based education, emphasizing the necessity to teach students to be *place-responsive* in a mobile, changing world: "To respond is to enter into a relationship of mutual interdependence that requires sensitivity and empathy for place(s) and those who dwell there, both now and in the future" (Brown, 2012, p. 67).

Effective place-based education for the Anthropocene stems from these place-based pedagogies. However, the peculiar constraints of the Anthropocene require that environmental education must also (1) acknowledge place-nature reality that context and human are mutually shaping parts of one another, (2) embrace the increased mobility of the human population, and (3) recognize that individuals are enmeshed not only with their locales but also with places they have not knowingly encountered and that human beings and their unseen places also mutually shape one another.

Most place-based environmental education has honed in on locale, but in the Anthropocene, humans are integrated into the fluid movement between the locale and the biosphere generated by global mobility and trade economies. With the goal of educating to promote adaptive survival in a world of fluctuating socioecological boundaries, we propose a framework for a new place-based pedagogy. Connection to our place(s) is already a pedagogy for environmental education, but a Kaleidoscope

of Places pedagogy is distinctive in that it is inherently exploratory of both our tangible and our intangible places, contains at its nucleus the goal of survival, and requires three precise skill sets, bulleted below. These nonhierarchical skills, which can be developed independently from one another, will help students evolve a sense of their Kaleidoscopes of Places in order to responsibly inhabit composite, mercurial place realities, engage in community action, and develop future vision for the survival of all beings in their local and global sociological contexts.

To inhabit one's expanding and contracting places from locale to biosphere and back, a Kaleidoscope of Places-based pedagogy requires:

- *Adaptability*: when we are mutually shaping places and places are mutually shaping us, we must adapt to fluidity and change.
- *Remaining open to feelings, including despair and hope*: the underlying skills needed to explore, inquire about, cross-examine, and engage in one's socio-ecological contexts require openness to feeling despair, from which hope and future visioning can emerge.
- *Agency in action*: participation in one's Kaleidoscope of Places must place equivalent value and equal attention on mutually shaping places from the local to the biosphere, preferencing neither, extending acquired learning about the local outward to learn more about the global.

Adaptability. Adaptability applies to:

1. Adaptability in the place where one currently stands, lives, and breathes.
2. The adaptability required during relocation to a new place, including consideration of the mosaic of places where one has lived and visited and the awareness that "genetic place types" may create preconceptions that interfere with place attachment to a new locale.
3. The ability to adapt to those unseen places that we affect daily (and vice versa) through twenty-first-century living, aka consumption.
4. The ability to adapt to changes that newcomers introduce to the place one resides, as well as the ability to help newcomers adapt, at a time when global mobility is growing. Bioregional "inhabiting" and rootedness in one place, formerly perceived as purely beneficial, now carry new, palpable dangers intrinsic to life in the Anthropocene. Like unused muscles, our adaptive abilities may atrophy when we fail to use them. This sometimes occurs in stable locales where we have relied on habitual modes of functioning because those modes have proven advantageous in our specific bioregions. Used to operating from a paradigm of steady rootedness, we may lack the heightened adaptive abilities required to address rapid changes in our ecological and social contexts, whether these result from sudden environmental events that cause structural change to both land and community or from an influx of newcomers who change the social fabric, culture, and sensory or aesthetic aspects of our locales.

When we consider nature-as-child and child-as-nature, or place-as-child and child-as-place, in light of the fact that mutually shaping forces change nature, child, and place, we observe mathematical conditions for constant change that will require people to adapt by rapidly and repeatedly creating new ways of organizing knowledge – or schemas, as Jean Piaget calls them – while simultaneously maintaining a sense of self. Piaget's theory of cognitive development suggests that when a child learns something, she develops a schema which helps her make sense of the world. She uses this schema to understand new experiences. Over time, events that disrupt the child's schema will occur, causing cognitive dissonance and what Piaget (1954) terms disequilibrium. The child then must adapt the new information to the old schema, or change the old schema to integrate the new information, in order to reestablish equilibrium and create a new schema by which to move forward. This theory, the foundation of a constructivist approach to learning, honors the fertile adaptability of the human mind.

Piaget also theorized that there are times when too much disequilibrium can hinder future adaptability, in a sense causing a person to forgo attempts at adaptive learning and action. When educators implement a Kaleidoscope of Places pedagogy, teaching children about their many interconnected places, they will need to scaffold the exploration and learning so that it does not create too much dissonance. Scaffolding exploration, feeling, and place meaning requires careful, individualized differentiated instruction. Beginning with the child's current conception of place, whether it is a single sense of place rooted in one locale or a mosaic of places that results from mobility, will help the sociological educator differentiate instruction, thereby modeling adaptability.

Feeling, examining, and sharing emotional responses: an essential skill set for developing a sense of kaleidoscope of places and future visioning. We cannot genuinely explore and inhabit a Kaleidoscope of Places without sharpening our ability to *feel in response to experience.* In order to learn about, develop an identity in relationship to, form attachment bonds with, and make meaning of our Kaleidoscope of Places, we first need to access the compassion, despair, and hope precipitated within us by the conditions of our planetary nexus. At the same time, our bonds with our Kaleidoscope of Places inform our ability to "feel with" others, enriching our understanding and helping us to better envision change.

The realization of suffering, coupled with a sense that we lack the agency to change it, often leads to despair. For instance, when we experience meeting homeless people or learning that our water supply is so polluted as to be undrinkable, we may feel a combination of sorrow or grief (in response to our own or others' distress), fear (that nothing can be done or that harm will be done), and anger (that harm has been done, that our society let this happen, that the government let this happen, that God let this happen, that we feel powerless to change the situation). Many of us have been conditioned to squelch, hide, or deny "negative" emotions. However, when we deny despair, we lose opportunities for informed connection, adaptability, co-creation, and mutual survival:

> It is a fallacy, inextricably linked to the myth of ever-upward progress, that 'doom and gloom' thinking is held to be disabling and disempowering for the learner. . .working through despair can be a powerful progenitor of new vision and commitment. (Selby, 2015, p. 31)

Our feelings serve as signposts. The more fine-tuned they are and the more genuinely we feel them, the more we gain the understanding required to use our power in the world responsibly. Inhabiting our full range of emotional responses provides us with a more nuanced understanding of the world. Feeling despair honors our connection to the painful conditions around us, thus challenging the idea that we are powerless to create change – for a point of connection is also a point with latent power, if we can learn to access it. Feeling is part of the constructivist process of developing a sense of our Kaleidoscopes of Places, contributing to our capacity to recognize, explore, and inhabit the entirety of our socioecological contexts, not only the places that "make sense" or "feel good" but the entire spectrum of places: the good, the bad, and the messy. Feeling despair which contains a kernel of dissonance is often the initial step toward a critical evaluation of our experiences, which then facilitates the creation of new schemas to guide future transformative adaptations. Despair may spur a range of agentic responses, such as interrogating the systemic values that helped to create these conditions and probing the ways our Kaleidoscope of Places is linked to this system. It may help us connect more authentically to those most intimately affected by "the bad" – who, by virtue of their own Kaleidoscope of Places, have information, ideas, and power that differ from and can complement our own. Understanding the mutuality of our becoming means that when we witness the plights of others, we are witnessing a plight with which we are intraconnected.

As we enter a new epoch or boundary event, the likelihood that we will be forced to relinquish "what once was" is high. Such letting go will often be emotionally, cognitively, and physically uncomfortable. Our choices will be to suffer, to stagnate, or to engage in transformative learning:

> Transformative learning involves conscious, deep and sustained processes of engaging with pain, despair, and grief over what we are losing, moving towards acceptance while searching for radically new meaning and values, and equipping ourselves for personal and collective empowerment and action: what has been called despair, accept, act. (Selby, 2015, pp. 31–32)

In workshops initially called "despair and empowerment workshops" and later known as "Deep Ecology" workshops, Joanna Macy (2012) developed a series of exercises for people to work through despair and avoid denial of the ecological crisis. Macy's exercises also teach future envisioning strategies that emerge from one's emotional journey. The envisioning process helps produce hope and empowerment if – and only if – we acknowledge and move through the emotional disorder of despair. The only way out is through, and to be effective, education must take up the spiritual and emotional mantle of feeling. Our "pain for the world" is important because ". . .these responses manifest our interconnectedness. Our feelings of social and planetary distress serve as a doorway to systemic social consciousness" (Macy, 1995, pp. 262–263). Environmental educators who foster students' ability to allow and share their feeling responses to socioecological contexts wrought with complex

problems can help them to develop their "capacities for nurturance and empathy." Empathy and an awareness of mutuality change how we conceive of agency, not as "power over" but as "power with" or "synergistic power," a prime component of co-creation. *Feeling with* the planet inspires fresh perspectives and novel solutions. "Through the systemic currents of knowing that interweave our world, each of us can be the catalyst or "tipping point" by which new forms of behavior can spread" (Macy, 1995, pp. 262–263).

Agency, decision-making, and social participation, locale out to planet and back to locale. The UN Convention on the Rights of the Child (CRC) (1989) delineates children's civil, cultural, economic, health, political, and social rights. These include children's right to participate, which is ". . .an essential part of 'agency in action'" (Brown, Jeanes, & Cutter-Mackenzie, 2014, p. 40). Agency in action is civic engagement or engagement in community decision-making, the enduring goal of place-based education. Mapped onto this foundational goal, the Kaleidoscope of Places pedagogy aims to facilitate children's agency in both local and global action. While researchers call for increased focus on local civic engagement and participation (Hart, 1997) and KoP pedagogy acknowledges the critical importance of the local, it equally esteems conscious global participation, since children's consumption, waste/pollution, and mobility affect both local and global spheres.

How can educators help increase children's global and local agency? Paulo Freire (1972) asserts that critical pedagogy, the convergence of critical theory and education, can awaken critical consciousness and thus empower individuals to take action that creates changes they would like to see in their world. Many educators are already well versed in culturally responsive teaching (CRT), a critical pedagogy which relates the learner's cultural context to specific content (Gay, 2010; Ladson-Billings, 1994). CRT is geared to create meaningful learning environments that encourage children's agency (White, Cooper, & Mackey, 2014). Similarly, KoP is a critical pedagogy that relates the learner's socioecological contexts of his or her Kaleidoscope of Places to specific content. However, while CRT and KoP pedagogies are both critical pedagogies, their objectives differ slightly: the critical pedagogy of CRT aims to empower children to make changes *that better their social and cultural contexts*, whereas the critical pedagogy of KoP aims to empower children to make changes *necessary for the survival of their socioecological contexts*. In the Anthropocene, it is critical that educators who are interested in facilitating children's agency expand the culturally responsive critical pedagogy to include individuals' socioecological contexts. Without our socioecological contexts, humans and their culture would be meaningless. As Greenwood (2014) writes:

> . . .in an era of perpetual war, mass extinction, unprecedented inequality, food, water, and energy insecurity, a warming planet, all manner of environmental degradation, and the social stress associated with global development and sustained population increase, cultural study can no longer be divorced from the larger socioecological contexts in which culture now unfolds. (p. 20)

To increase children's agency concerning their sociological contexts, we need forums and contexts that cultivate children's participation. In the decades since the CRC laid the groundwork for considering children's rights, researchers in the

environmental education field have begun to theorize about and research children's agency. Building from Hart's 1997 theories of children's participation, Barrett-Hacking, Cutter-Mackenzie and Barrett (2013) examined the potential for undertaking environmental education research with children serving as active researchers, rather than as objects of research. Several contemporary studies, such as Green's (2016) study of children as active researchers and Malone's (2016) examination of children's agency through nature-child encounters, suggest that making space for lived experiences and opportunities to explore the socioecological contexts of their Kaleidoscope of Places fosters children's agency and social participation in these contexts, which can lead to inventive solutions that promote survival.

The process of lived experience and exploration contributes to children's experienced confidence as they negotiate their places, make authentic decisions that impact their lives and those around them, and achieve social participation: agency in action (Cutter-Mackenzie, Edwards, & Widdop Quinton, 2015; Green, Kalvaitis, & Worster, 2016; Hart, 1997; Lim & Barton, 2010).

> Being an active place explorer is not simply about how much children know or how long they have lived in a place. It is about their attitude and intentions to engage in a place that drives them to become active participants in their place. Children's sense of place is neither a passive response to the environment they are positioned in nor a mere product of long-term residency. Rather, they are actively and purposefully exploring their urban environment and nurturing their sense of place. Children critically read into their place and create layered significance and meanings of a place with critical awareness and assessment. (Lim & Barton, 2010, p. 336)

The layered experience speaks to both the intrinsic layering of the Kaleidoscope of Places, expanding and contracting from local to global and back, and the transfer of skills from one socioecological context to another, to achieve agency in action. Brown et al. (2014) suggest that educators must explicitly resolve to provide "agency in action" experiences in a multitude of contexts:

> The challenge therefore is to provide individuals with experiences of agency but recognise that this alone is insufficient to develop capacity to make change. We must also recognise how the various layers of the socioecological framework may support empowerment – or create disempowerment – and subsequently equip individuals with the necessary tools to gain agentive capacity within wider contexts/environments that currently disempower them. (p. 40)

Critical pedagogy aims to empower children and students in disempowering contexts. A Kaleidoscope of Places pedagogy supports empowerment by encouraging children to explore and learn with a transdisciplinary mind-set, broadly and deeply considering the shifting layers of their sociological contexts while building the skills to adapt, feel, and civically engage in a multitude of local and global ways.

Conclusion

The Kaleidoscope of Places theory posits that each individual is comprised of and contains innumerable socioecological contexts. Freedom of exploration in socioecological contexts and a transdisciplinary approach to decision-making

about complex problems emerge as teaching strategies that support children's transformative learning in the areas of adaptability, feelings, and agency. By developing and achieving these three overarching skills, a Kaleidoscope of Places pedagogy teaches children not only how to inhabit their expanding and contracting Kaleidoscope of Places but how to adapt to sudden changes, move through their feelings in order to accept all aspects of their socioecological contexts, make decisions, and act for the survival of all beings and places, in the great unknown of the Anthropocene.

KoP and the Freedom to Explore

Brown et al. (2014) advance the belief that socioecological educators should support lived experience and exploration, "...acknowledging the personal and embodied experiences... in sociological and ecological descriptions and theories in education" (p. 38). A KoP pedagogy is inherently exploratory, and the teaching strategies utilized to implement it should provide avenues for a child's exploration of his or her local place of residence and also the globally situated, unseen places he or she inhabits as a result of consumerism and mobility. Recent research examining the exploration of nature-human in varied place types such as urban, suburban, rural, and wilderness (Duhn et al., 2017; Wattchow & Brown, 2011) supports the notion that the exploration of nature-human can take place in multiple socioecological contexts. Because some of our places are not physically accessible to us, it is important to use all available tools, learning methods, and entry points into these contexts if we are to comprehensively explore and embody our KoP. Based on the explorer's abilities and the accessibility of the place, the exploration of places can take multiple forms, ranging from physical, experiential exploration of places to differentiated learning through books, film, visual art, and other transmissions of experience.

KoP and Transdisciplinary Learning

When children explore freely, they will discover complex issues or problems in their socioecological contexts. Teachers can aid them in honoring their feelings and expanding their thinking about these issues, by modeling a transdisciplinary mindset and drawing on multiple disciplines in discussions, examples, and learning exercises. Fiercely adaptive, full of opportunities to feel, and innately agentic, transdisciplinary learning "... necessitates that people find ways to cope with the resistance of shifting perspective...Transdisciplinarity presumes that consciousness and information can flow, meet and shape, creating a moment of breakthrough, an 'aha' moment, when new knowledge emerges" (McGregor, 2015, p. 95). It is in transdisciplinarity, when people think outside of and in the interstices between content area silos, that they are most able to generate creative and innovative decision-making. Transdisciplinary learning asks teachers and problem-solvers to leave their silos, bring to one shared table the divergent, reciprocal, and independent academic skills from diverse disciplines, pool knowledge and perspectives and –

blurring disciplinary boundaries – work together to produce new knowledge for a common cause.

What better approach to the Anthropocene? For the places in our Kaleidoscopes are so varied today, linked through scientific and social means to so many disciplines, that it is impossible to comprehend or address their complex relations through any one field of study. Transdisciplinarity is, itself, an interrelated web. It is the natural home for a Kaleidoscope of Places pedagogy that says: *multitudes as one, the individual within a larger web and a part of it,* an ongoing figure and ground exercise filled with illumination and transformation. An educational pedagogy that explores our Kaleidoscopes of Places via transdisciplinary modalities offers children an adaptive, empowered, agentic approach to meeting the exponential challenges of mutual survival in the Anthropocene age.

Cross-References

► Children in the Anthropocene: How Are They Implicated?
► Childhoodnature Pedagogies and Place: An Overview and Analysis

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Part V

The Companion

Becoming Companions: Compositions of Childhoodnature Relation, Sense, Poetics, and Imagining by Children and Young People

33

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Abstract

This "Companion" to the Childhoodnature Handbook is a co-creation between children, young people, and adults, curated by four academics and five graduate students to bring children and young people's voices to the foreground. The Companion disrupts conventional academic publishing to present an exceptional aesthetic work of children and young people's creative, sensory, and imaginative musings that reflect their chosen modes of engagement with their childhoodnature. The compositions of childhoodnature experiences within this section enable the reader to become "companions" with the children and young people in sensing, feeling, and thinking of the world a little bit differently.

Keywords

Children and young people's voices · Stories · Imaginative · Sensory

Introduction

What does it mean to create a Companion? How might the voices of children and young people become "companions" with the other chapters that make up this Handbook? We began the process of compiling and editing this section with these open questions in mind. We wanted to explore how a notion of companionship could grow and develop organically and perhaps become something more than what we'd expected. Maybe a Companion could disrupt as much as connect, deviate as much as collect, entangle as much as (re)present?

In early 2017, we extended an international call for contributions from children and young people all over the world. The call asked for children and young people (from early childhood to 25) to submit essays, photographs, poetry, drawings, creative writing, or personal narratives that expressed their experiences and understandings of childhoodnature. We asked for "*anything and everything that you, as children, teenagers, and young people (ages 0–25), might contribute that draws on your ideas about nature, your experiences with animals, or your thoughts about environmental issues*." As we received a dazzling array of submissions over a period of 8 months, we began to realize that something new was happening. A Companion was beginning to emerge that did not follow the conventions of academic research, publishing, and authorial prestige. Children and young people were submitting their own work, their own ideas, and their own creations that were unfiltered and unfettered by the tacit rules and expectations of academic research and publishing. They were collectively re-inventing what a Companion could be.

As we began to work through the submissions, we discovered a rich tapestry of voices emerging from a wide range of geographical locations. We were taken on a sensory journey through experiences of childhoodnature all over the world: swamps, cities, mountains, oceans, schools, rainforests, deserts, suburbs, shanties, remote villages, lakeside retreats and more. All of these experiences had found their way to us, and into the Companion, through the openness, generosity, and sensitivity of children and young people. We would like to acknowledge our deep appreciation for

children and young people who chose to respond. In the very act of creating and submitting these works, you have demonstrated a powerful sense of care and togetherness that resonates through each page of this Companion.

In the work here, it was important to us to honor the UN Convention on the Rights of the Child and the voices of these youth as important contributors in the work around childhoodnature in and of themselves. The Handbook Editors regard The Companion as an essential section of the Handbook, to bring children and young people's voices to the foreground and be represented alongside academics and other adults. Positioning The Companion in the middle of the Handbook is indicative of the status of this section. It was our intention as section editors to respect and honor the agency of children and young people in assembling The Companion, to avoid treating these contributors in a tokenistic manner and instead, learn from their important perceptions and conceptions. Indeed, contemplating their work as editors has already helped us to shift into new and generative modes of knowing and being in this world.

Our editorial approach to constructing the Companion has attempted to preserve the quality and diversity of the submissions that we received. We also worked with youth reviewers who helped to shape our approach and understanding of the material. Helen worked with two students (Tayla and Ricco) in Melbourne, while Joshua worked with three students (Chanel, Mary, and Allison) in Buffalo to review and discuss the submissions according to various iterative criteria. We started with simple questions regarding appropriateness of the submission, asking whether children's voices were central and whether they addressed their own ideas about nature, experiences with nonhuman animals, or thoughts about environmental issues and futures. We also encouraged the youth reviewers to identify what they thought were consistent and relevant themes across the submissions and how various submissions might be woven together. From those conversations, we began to think about ways to organize the submissions and even opportunities to send back questions or suggestions to authors in order to make drawings, poetry, stories, or other writing clearer for a wide audience. Writing alongside the youth reviewers focused and shaped our editorial thinking and included the youth "voice" in the process of assembling The Companion. We are grateful for the amount of work that these youth reviewers put into this process.

The Companion is a something new in academic publishing – there were no models or templates to guide us. In response to the overwhelming number of creative, aesthetic, sensory, and imaginative pieces that were submitted by children and young people, as well as our feedback from youth reviewers, we decided to foreground the children and young people's voices in an open and aesthetic way, reflecting the manner they chose to express their experiences of childhoodnature. Rather than attempting to represent, interpret, or categorize the experiences of children and young people, we created four distinct *compositions* of interwoven feelings, places, sensations, and ideas:

Composition 1: stories of human and nonhuman relation
Composition 2: practices of sense and sensation
Composition 3: eco-poetics of childhoodnature encounter
Composition 4: the childhoodnature imaginary

In putting these compositions together, we have endeavored to give each submission space to breathe, inhabit, and saturate the page, while also weaving together different voices and geographical locations to produce a range of feelings and sensations for the reader. We hope that these compositions give you a sense not only of what children and young people think and feel about childhoodnature, but also how they actively choose to grow and develop these connections through sensory and creative practices. We are reminded that the qualities of care and togetherness that these compositions portray are not simply given but must be actively imagined, sensed, crafted, practiced, and sustained with each passing moment.

The children and young people's submissions have opened up a new and intimate space of engagement that is more harmonious with the emergent and storytelling spaces of Indigenous ways of being than with the rigidity of academic publishing. Following the children, young people and youth reviewers' lead, the compositions deliberately resist the interruptions of academic interpretation and analysis in order to foster the reader's subtle engagement with the children and young people's artifacts, ideas, and expressions. This required some careful maneuvering of submissions from academics reporting on behalf of young people in order to free the children and young people's expressions from the interpretive conventions of academic writing. Some of the more traditional background information about projects and methodologies is included at the end of The Companion as biographical notes on the authors and contributing research projects. We are grateful to these authors for graciously allowing us to de- and recompose their submissions in order to disrupt traditional academic writing formats. We also encourage the reader to refer to the notes on the contributors at the end of this Companion section to add richness and context to the compositional assemblages.

Our framing of The Companion as gentle, aesthetic compositions of children and young people's practices was not without problems. We often encountered aspects of submissions that did not seem to "fit" into the various compositions, and which challenged us to think differently about the aesthetic relationships between form, content, and expression. Frequently our youth editors took a different view and this casts some of the more unconventional submissions as authentic, honest expressions of children and young people's thinking and meaning-making that needed to be included in The Companion. Eventually however, the section editors were the orchestrators of the final editorial movements and interweavings of submissions. For Companion author Liticia Gardner this raised some valid concerns about lack of opportunity for the young authors to control and contribute to interpretative and theorizing dimensions of the discourse:

> When I first heard about this project it felt very empowering to be a young person welcomed into something that might really have the power to shift conversations and perhaps even actions of people in places of power and prestige. . ..The idea that the younger people were merely submitting "personal narratives" on the topic of nature is quite misleading, as anything "personal" is always social (and deeply political). My work, while trying to take up this probe of a "personal narrative" was actually theorizing our world much further than simply my own subjective experience. What I'm trying to get at is that it seems that the

> adults are granted access to theorize the world in less subjective (and more privileged terms) through block text and the ability to draw out their argument, while the younger people are being made to be highly subjective.

Liticia troubles our approach taken in this Companion to the Childhoodnature Handbook. She questions the focus on children and young people's sensory and subjective practices of engaging with/in/as nature and our decision to take an aesthetic and compositional approach that leaves spaces for further interpretation and theorization. We acknowledge the insights embedded in these concerns, while also suggesting that the compositions that populate this companion are "more than" personal and that they do engage a wider social, political, ethical and aesthetic domain of childhoodnature experiences and sensibilities. By taking a compositional approach, we have aimed to highlight the relational connections between children and young people's sensory practices, concepts, and theorizations from many different cultures, histories, and geographies. By leaving spaces for the reader's aesthetic engagement and critical interpretation, we hope to invite others into this relational space and thus resist the normative conventions of the adult interpretative "voice of reason" which too often overwhelms the voices of children.

Although the compositions presented here draw from a range of author ages and locations, they do not thoroughly express the diversity of childhoods and natures across the world. Where the call-for submissions landed, who was receptive and responded to this call: this is its own story. The editors' networks were strongly represented among the submissions, while serendipitous connections and the generosity of practitioners and researchers in the field enriched the compositions significantly. While we have global expressions of childhoodnature practice included in The Companion, there are a smaller percentage of low socioeconomic, indigenous, and peripheral (nonwestern) context contributions, and no submissions from children or young people with disability. This Companion to the Childhoodnature Handbook captures a tantalizing glimpse into children and young people's experiences of their childhoodnatures. We therefore see this Companion as both a touchstone and a point of departure for future projects that might assemble a more comprehensive collection of children and young people's experiences, practices, concepts, and expressions of childhoodnature.

For now, we invite you into the following compositions of childhoodnature experiences. We invite you to become "companions" with us and our contributors, as we learn to sense, feel, and think the world a little bit differently.

Composition 1: Stories of human and nonhuman relation

I started to know to keep pigeons from a friend, then I became interested in buying 4 pigeons through him. At that time I decided to keep my pigeons when I was at age 10 at Sekolah Bisa school. My parents gave me a full support for keeping pigeons. Each day my pigeons multiply, the number of pigeons has increased to 16. Every day I feed the birds with corn. The advantage for me to keep pigeons is that I become consoled and my family too.

Because I was still in school, the money that I used to buy bird feed was from my mother and sometimes I had to use my pocket money to buy bird feed. The pigeon coop is located 3 m behind my house. Once a week I cleaned the cage with water. The obstacle I face was when the bird likes to lose itself and does not return. Sometimes when I did not have a pocket money I sell some of my pigeons. I sell it RP 20,000/each, at the pigeon shop.

The benefit I am raising pigeons is that I like to play with it as before that I always hang out and play with my friends. Sometime I feel, it feels better to play near my house so that I would have time to study at home. In time, I have lost my pigeons one by one, and I have only two left, however I am still happy to keep 2 pigeons.

> – Ikki, age 10, Jakarta, Indonesia (translated by Mr. Adimas Grahito, *Sekolah Bisa!*)

On a particularly sopping wet day in Vancouver, I watched as an elderly woman dropped a pile of decaying food on the ground while a sea of feathers encircle her and the unassuming passers-by. Watching this encounter I wondered what causes certain people to be indebted to the creatures that tend so regularly to fall outside of being worthy of acknowledgment.

Pigeons, starlings and mice all fall under the category of "synanthrope," most easily described as animals who benefit by living near humans. Unfortunately synanthropes tend only to receive attention in the moments where the eradication is in hot pursuit. Synanthropes are deemed pests due to their ability to impede the flow of labor, or their ability to destroy property. Pigeons are capable of destroying a business with merely their existence and feces that follow, meanwhile mice have the power to bring fire to the homes of any nuclear family who misses the memo about steel wool as a preventative measure. Synanthropes are furthermore devalued due to their perceived association with filth and disease and their ability to reproduce rapidly putting human forms of flourishing at risk. Having an orientation towards beings who are deemed to be of no value to human production is a radical orientation, and one which is surprisingly symbiotic in the case of aging people. This orientation towards things that have no value in capitalism is radical because it is actively practicing life through a shared material existence that also happens to be in contradiction to profit, the acquisition of private property, and engagement in waged labor. I'd like to argue that having a shared material existence means that they have a vested interest in the liberation of one another. Those who are pushed out of social life tend to find themselves sharing the material conditions of existence.

I remembered my great grandmother, and that when she immigrated to Canada it was her first experience living in a post-industrial capitalist society. This was her first encounter with waged labor after living in a small farming village in Slovenia that was entirely self-sustaining, before their violent displacement at the end of the Second World War. I remembered her dedication to her garden. No matter how scant it was in contrast to her old ways of relating to land, plants, and other nonhumans, she continued to hold onto the little semblance of relations that could remain in her new home. This made me wonder if these aging women had experienced this same kind of loss, and chose to hang on to the little autonomy they had left in the face of such crushing alienation in the city.

– Liticia, Gardner 22, Vancouver, BC, Canada

I was happy when I saw the black swan in Australia.
It was first time I saw them and I found they were so beautiful!
I like meeting different kinds of animals in different places.

– Kasumi Furukawa, 7, Christiansburg, Virginia, USA

It appears that we humans have lodged an idea into our minds that we must fulfil every need of ours; every craving, desire, anything that could help to increase our over-enlarged egos. This is the main reason as to why climate change has been worsening. Our species has developed a sophisticated society, where each new generation paints many new ideas and lifts the rate of environmental destruction. This continually reduces the natural world, a world which we cannot live without, a world that's far away from today's high-tech gadgets and devices.

Sadly, we are virtually blind to our destructive habits, actions that are the center to the expense of our own wellbeing and flora and fauna that inhabit the Earth. We appear to be so self-serving and lacking of self-awareness that we've become selfish and short sighted to the bigger picture. Always wishing for bigger. . . better. . . more; so much so that we never appear to be satisfied or pleased. We find ourselves currently facing a global climatic crisis due to each and every one of us, where each new thing is only admired for a short period of time before we establish a new desire, a cycle which repeats continually. We must change our values and what we believe is important to us- this change mustn't only occur in a small minority of the population, but almost all seven billion of the humans whom inhabit Earth.

Our lifestyles directly contribute to not only us humans, but to the lives of many diverse species of animals, plants, and bacteria too. Life as we know it must change for health and the wellbeing of our future. Everything has a life center and needs fresh air and water to remain alive. As humans, we may think of ourselves as being superior and better than all other life forms due to our advances in the creation of "technology." Yet we've missed the crucial part of the "big" plan. By stepping forward and learning how to make our lives better and outliving many, we've been progressively destroying the habitats of many, causing species' extinction rates to rise to unprecedented levels in history.

The health of the planet is directly correlated with our own health. We are so wrapped up in what's happening in our focus upon sports, fashion, and the media that we have just evolved to disregard/not care for what really does matter. We are in a routine of selfishness and consuming more, and more. We have missed out on the basics of nature, our connection to it, and its role in our wellbeing and how it's essential for our survival. We've been destroying animals' lives and their habitats daily without even realizing the downfall to our selfishness. We as humans have created and succeeded in numerous positive and improving feats, yet while doing this, we've also succeeded in destroying much of the physical world. And yet we have failed to notice this when it's completely obvious.

The only possible solution is if humankind realizes that we must evolve to become more realistic with our lifestyles, opinions, focuses, and choices; we must take action towards saving our tainted planet, before your thoughtless destruction of environmental resources has gone so far that there can be no reversal. This issue must become the top priority within every single nation. We must band together to reverse the effects of climate change to which we ourselves have caused. The difference must begin with us. We must make drastic changes to how we think and make choices about our everyday activities and focuses. We were not placed on this Earth to make an acquisitive and ideal life that supports the human race only; we were placed on this planet to foresee a life for all things, whether they are living, or nonliving, plant or animal. Not to destroy the climate by means of our own self-centered needs.

– Nikki Whitehead, 12, NSW, Australia (*Climate Change and Me*)

The Little House is a one-room shingled structure on the seven-mile peninsula called Sandy Neck, in Barnstable, Massachusetts. Barnstable is a small village on the bicep of the Cape. This place's simplicity and dishevel have served me well and provided a wonderful environment for me to grow up in. Inside the Little House are straw floor mats, a fireplace, some chairs and a table, and a small rusty grill. The simplicity of the Little House is part of its beauty, but the real spectacle is surrounding the small shingled box, displayed in the sprawling dunes and golden marsh of Sandy Neck. Upon arrival, chairs are quickly dragged out onto the porch, so that one can lounge in comfort while lazily gazing upon the constantly shifting shades of blue and green that paint the vista with a delicacy that Monet would envy. The Little House has no running water, no power, no toilet, no Wi-Fi. It is simple, and it is enough. In his book titled *The Little House at Sandy Neck*, my grandfather writes: "It doesn't sound like much: and it isn't. But come evening, looking down from a dune after dinner, the lighted window speaks eloquently to some fundamental need we all share for enough warmth and light to fend off cold and darkness."

The second I hop off my grandparents' tiny Boston Whaler and dip a pointed toe into the cold water, I feel waves of electricity shoot through my bloodstream, and I am *alive*. Nothing brings a person to the present as quickly and effectively as slipping on the slimy marsh-bank, where the ocean and marsh meet to form the perfect opportunity for a sudden and unplanned swim. As I make the slow trek up the well-beaten path, I welcome the feeling of pointy sea grass itching my feet as I sink lower and lower into the sulfury muck. My flipflops splash brown mud onto the back of my legs, and I smile and look back at the marks like the excited dots of exclamation points sprinkling my calves. When I'm there, each intake of breath brings a flood of salty air and each exhale releases pent up tension. I let go of my worries – overdue homework assignments, looming deadlines, whether or not a certain person has texted me back – I embrace my surroundings. I really *look*. I observe. I reflect. My Aunt words it well: "It's an escape from, and it's an escape *to*. You're getting away from things, but you're also getting *to* that place that's so beautiful." Looking around, the beauty of the surrounding nature seems to flow through me, tinting all my thoughts and feelings with the same sunny warmth that polishes everything in my sight.

One of the many things that are special about the Little House is that its environment continues to function without human presence. The ospreys will go about their day the same way as when they are being watched from afar through binoculars. In the winter, when the marsh grass turns rusty brown, the tides continue to rise and fall under the weathered porch, with or without spectators. Cloudless nights on Sandy Neck allow the stars to shine triumphantly, reminding us of their power when not contaminated by the light pollution of a city. Out there, I have learned how to identify animal tracks in the sand and examined the carefully whittled perfection of an ancient Native American arrowhead. I have been exposed to the delicacy that is a sea cucumber, picked fresh from the salt marsh on the way back to the boat. I have been on long walks through the pine-needle coated forest, gotten lost, and had to find my way back using my own intuition and the help of a tall sand dune that served as a look-out point. I have explored, grown, rested, and lived.

– Lucy Handy, 17, Providence, RI, USA

In summer vacation, my grandparent come and camp at sleeping giant. They usually let me stay and camp with them for about a week and we go hiking or biking. My grandparents started taking me on small and easy hikes. But then when I was 6, my dad had to start losing weight for surgry so he started hiking. When I was about 9, me and my mom started hiking. Our first hike was about 8km of the casque Isles trail. But then we started doing bigger and longe ones.

The hikes that I do are usually between 12 and 20km. I go hiking more frequently with my mom then my dad. (mind you I go mountain biking with my dad) My most frequent hikies are Tee harbour, Eagles Ridge, Ruby Lake, Palisades, The hikes that I've done are sawyer bay, Lehtinens Bay and top of the giant. The hikes average 5-7 hours long. We mostly go to parks like Sleeping Giant and Ruby Lake. Then I've done hikes in Nipigon and North Dakota. And finally my favourite hike is probably the Palisades.

– Gabriel Lemelin-Wiersma, 10, Thunder Bay, Ontario, Canada
Image: Ruby Lake Provincial Park, Elaine Wiersma

One of my better friends that I had from middle school through high school owned a dairy farm that had over 200 dairy cows on it, as well as their own manure pond to convert cow poop into reusable energy. He studies agricultural science now and plans to take over his dairy farm when he can but now I know how the dairy industry works most of the time. I think back to all the times I walked through the aisles of dairy heifers and now I regret just walking by and petting their wet noses. Was their welfare actually better than the dairy factory farms? I think so, at least a little bit better, but it's still awful. Was the dairy farm really such a cruel practice if they were using the cows to be green about their energy source? I believe that helps me see them as persons who aren't blind to the fact that there is important causes to fight for, like reusable energy. However, I didn't learn about factory farming until I left rural Ohio completely and found myself surrounded by grey, dank, city with hardly any natural spaces around.

Crazy to think that I learned the most about wildlife, nature, and practices that concern the natural world and those nonhumans within it in the grungy city. I assumed that I had learned a lot while I walked through state park trails or tore through corn fields on my mountain bike growing up, but I really hadn't learned that much at all. My eyes were opened to all the ins and outs of the natural room while in a college classroom, the furthest thing from nature.

What this deprivation from natural spaces did do is make me seek out chances to go forth into nature more. I actively sought out urban green spaces to explore, and this made me appreciate that time outdoor and the chance to learn about those small ecosystems. Although I have come face-to-face with chimpanzees in Gombe National Park, listened to humpback whales sing in Hawaiian water, quietly watched exotic birds and sloths in Costa Rica, and even got to experience the jaw-dropping brilliance of the Antarctic Peninsula I would say that those are the times I will never ever forget. However, I also won't forget being five feet away from a red-tailed hawk that landed on a grave stone in a local cemetery when I was sitting and taking a break from a run, I won't forget looking at all the hundreds of slugs on the sideway of the college street I lived on after a good rain, and I certainly won't forget the breath of crispy fresh air in a local park in the late evening when I needed to de-stress from everything. Those experiences close to home, in the city, I remember and think back on just as much as the epic travel adventures I had.

What the move from rural to urban taught me was all experiences are worth it. Any experiences with nature were the experiences I yearned for. They did not have to be insanely expensive trips in faraway lands, they could be in a puddle in the street or in a local garden. Any time in nature was a learning experience and impacted me in some way. I remember all of it because I remembered to take the time to look for these experiences, stop, and appreciate them for what they were, little blissful moments. If anything my relationship with nature has been strengthened ten times over now that I live in an active city environment. Not only have I learned more, but I appreciate nature more and truly take the time I get to spend in any natural space to heart. Nature is everywhere not just where you assume it will be. That is what I have learned.

– Allison Maynard, 21, Circleville, OH, USA

"What would you do when you meet a frog under your bed?"
"I would take care them." The girls group answered it.
"I would make it my pet, because I like frogs"
"I would put him in the aquarium, in a huge aquarium"
"I would throw them on the river," "I would throw them on the river again," "I would expel him from home" "me too." Some children answered.
"I would catch him, to save, to leave it there in his lake" "I'd leave him also at the lake"
"I would put some food on the floor so he could follow it until he left," a boy said.
"Kill them," few children, most of them boys, answered.
Later, discussing if it was right to kill the frog, the boys said "not" to killing the frog.
"Because he is from nature"
"It is because if kill them, after, we do not have frog"
"Because we have to let them here, because they are good to us."
"Because they are made of nature, and he is . . . Jesus takes care of animals, and if they die, they will not live, and all animals of nature will die."
"I'm going to get a frog to protect my house from the dengue mosquito."
"I love frogs" "I love too, but I am afraid" "Why are you afraid of frogs?" "Because there was a giant spider wanting to eat a stone frog" "because they bite" "because they pees in our eyes" "I like cat, and I am afraid of frog spit in my face."

Being part of the DIAN (Debates and Investigations on Animals and Nature) team was an amazing experience! My graduate course is Environmental Management, it broadens the ecological view and inducts respect for all life. I entered in the DIAN team because I like working with children. Thus, the proposal to Debate and Investigate about Animals and Nature was a nexus to connect the theoretical inquiries of my course with practical activities of the group, as well as to contribute with creative ideas to do activities to children. In addition, approaching animal rights with 5-years-old children was, besides a novelty for me, a challenge, since there is a cultural heritage present in our society which causes our utilitarian point of view. The greatest stimulus and challenge for me, during my participation in this project, was the introduction of a systemic perspective, in an ethical way, in the kindergarten.

– Leticia Sanfilippo Rojas, 20, São Paulo, Brazil (*DIAN project*)

Nature has always felt like a comfort for my anxious thoughts. I have lived with Generalized Anxiety Disorder throughout my life, and in the times when my anxious feelings are mild or unyielding, the thought of the natural world is calming. Transporting myself into the depths of the wilderness, whether that may be through my own imagination, or physically visiting an unpopulated beach, a local forestry reserve, or even simply walking around the local parklands, I find comfort. I believe it is the feeling of being surrounded by pure and uncritical life forms, plants and animals that allow me to withdraw my focus away from the superficial things in life such as school, work, societal norms, and indirect, unrealistic expectations. The animals that fluster around, going about their day, seem strong, persistent, and resilient to the numerous daily challenges. They are all inspiring. It is these forms of natural flora and fauna that I believe can be used as a source of comfort, care, and love, particularly in times of stress, and psychological hardship.

I have been lucky to travel to various countries throughout my life, where I have been able to see and experience some of the wonders of the natural world. I guess I can say that I have also witnessed some of the worst aspects such as the heavily polluted cities of Beijing and Shanghai in China, and the uncovered landfill hills in Thailand. I have also hiked through some of the most majestic forests and mountainous lands of North East India, and I have explored protected islands in South East Asia that possess some of the most amazing tropical plants and animals. It is deeply saddening to see the potential human beings have in causing destruction to the natural world. However, I do remind myself that with the unity of others, we have the power to create change and this change can be achieved by simply altering minor behaviors in our daily lives. I have recently made the decision to become a Vegetarian, and I consider myself to be an environmentalist and an advocate for the sustainability of the natural world. The impact my direct actions have on the natural environment is a continuous, daily consideration in my mind.

Other living beings share this precious world with us, they do not live in our own creation. I have many vivid memories of experiences with animals, some that I have found quite confronting and disturbing. These memories take me back as far as my early childhood, and after some deep analysis, I have realized that these have undoubtedly contributed to my strong personal sense of empathy for other living species. One day at a rock pool in the Port Phillip Bay, myself and my cousins were exploring what seemed like the untouched beauty of the rock pools. An array of crustaceans emerged from beneath the water, and I remember 100's of small black crabs. It was fascinating to watch them scrambling along trying to find a hiding place, however my cousin thought that it would be a great idea to collect them as bait for fishing. I remember pleading with her to leave them, however, she refused. I felt as though I had lost the battle for the lives of the crabs, a deep feeling of sorrow, and grief come over me as I knew now of their doomed fate. This was a feeling I would continue to encounter whenever I would witness a confronting situation with other animals. The screaming of crammed hogs in the back of trucks destined for slaughter will never be erased from my memory as I remember the drivers speeding voraciously over the border between Shenzhen and Hong Kong on a blistering hot day. The pigs were clearly in distress, overheated, and banging and clashing into each

other and the steel bars that imprison them. Even the numerous fish I've seen over the years gasping for air as they lay to die on the sandbank after being reeled in as worth catch by my keen fisherman family members.

Through adolescence and as a young adult, I become more aware of the confronting aspects of the interaction between humans and the natural environment. One vivid memory I have as a child is when my Father explained to me how disappointing it was that some human beings have such little regard for the environment that they would leisure within, and exploit for their own gain. He explained this to me after asking me to help him collect fishing wire, discarded plastic buckets, empty water bottles, and plastic food wrapping on the beachfront as we exited one of our favorite holiday beaches in Gippsland. Seeing the carelessness struck me, I remember a distinct feeling of sadness and emptiness, however my Father did reassure me that it was the minority who were careless, for most people look to preserve and protect beautiful places such as the beaches. I never lost my sense of hope in humanity to protect and see ourselves and nature as one, and up until this present day, I haven't yet.

– Ricco Dezan, 24, Melbourne, VIC, Australia

Composition 2: Practices of sense and sensation

I hope that when readers see my photos that they can look at them and live the experience of a swamp – for anyone who has not had the chance to see one in real life. I feel that photography is the best form of art to capture nature in its element. I live in Buffalo, NY but travelled to New Orleans for a family vacation. We had been to Honey Island Swamp before and I knew it would be a good opportunity to take photos there. I wanted to capture more exotic wildlife and scenery than I normally see every day. For me, getting good shots is a reward in the end but I most enjoyed being able to experience the swamp first-hand. I felt very connected to the animals I captured on camera – more so than the ones I just viewed, because I got to study them more by trying to capture the right moment. I chose these six photos because I really liked the composition. All of them consist of water, which I think makes a picture more interesting because you get light and reflection. I also really like the way the trees made pathways or a trail in the water.

– Claudia Critoph, 16, Buffalo, NY, USA

There will always be some life if there is oxygen and water. Nature rises from the ashes. It will push on past the impossible.

– Grace O'Shannessey and Chiara Wenban, 11, NSW, Australia (*Climate Change and Me*)

Sensory station in a therapeutic garden:

- *Balance beam (Bricks underneath the ends of a wood plank to be balanced on)*
- *Wood blocks (Wood blocks placed on the ground to be stepped on)*
- *See saw (Log held by bricks underneath the middle of a wood plank to be traversed)*
- *Rocks (Rocks placed on the ground to be stepped on)*
- *Log (Log placed on the ground to be balanced on)*

Venturing at the edge of the property that borders some woods, unassuming piles of rocks and logs can be found. The locally sourced materials furnish some basic stations.

We considered the rocks based on their "personality," such as a temperamental rock with light colors and sharp edges or a round dark colored calm rock. We were looking for diversity and considering the rocks as a group that should display different personalities. We were beginning to feel like landscape architects and finding ourselves awakening to Japanese aesthetic sensibilities (*wabi-sabi*) as we noticed the depth and complexity in the simple rocks. There was something fulfilling as we were making choices, or rather listening to the rocks telling us where and how they were to be placed.

We encountered a log that became the most challenging and interesting station. The log had a slight bent and an unpredictable wobble when stepped on.

Luna: "I like the wood [logs], because you get to balance and fall." Stella: "We need to make it harder."

– Tomoaki Imamichi with Stella, 5, and Luna,7, Chestnut Ridge, NY, USA (*A Therapeutic Garden*)

It is a battle between the environment and the humans trying to cut things down. The humans will win.

– Riley Ball and Blake Wilkin (both 9), NSW, Australia, (*Climate Change and Me*)

Summer

In August,

path itself back to being a path,

moss dried,
branches broken,

Easier to get to my site…
with it being less blocked,
more people could be interested in going

down that path,

I wasn't sure how I felt about that.

Fall

The weather was getting

darker and wetter,

and I felt confused about
what I wanted to do with my life.

One of the cottonwood trees
that had surrounded my site
had fallen…

For the first time, I really felt that

the site wasn't welcoming me in.

Winter

There were no footprints in the snow

aside from mine

and everything was quiet….

Unlike in the human world where

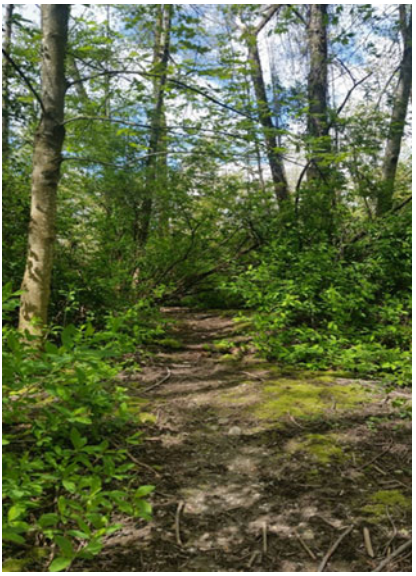
everything still keeps moving

despite how cold it is,

in nature things take

a pause.

Spring



A pleasant surprise to come back and see

a mass of green,

and life…

I could hear different birds again.

The wind rustled the leaves

and the sun was

shining through the branches.

– Jenna Masuhara, 21, Burnaby, BC, Canada

I am going to draw air.

I'll fill the whole page with blue …

And stars.

This is where an owl was flying back to its home in the morning.

– Teya McAdam-Chase, 5, Vancouver, BC, Canada

The wise old tree

The owl lives in the tree

I call it wise because it's old

– Kai McAdam-Chase, 5, Vancouver, BC, Canada

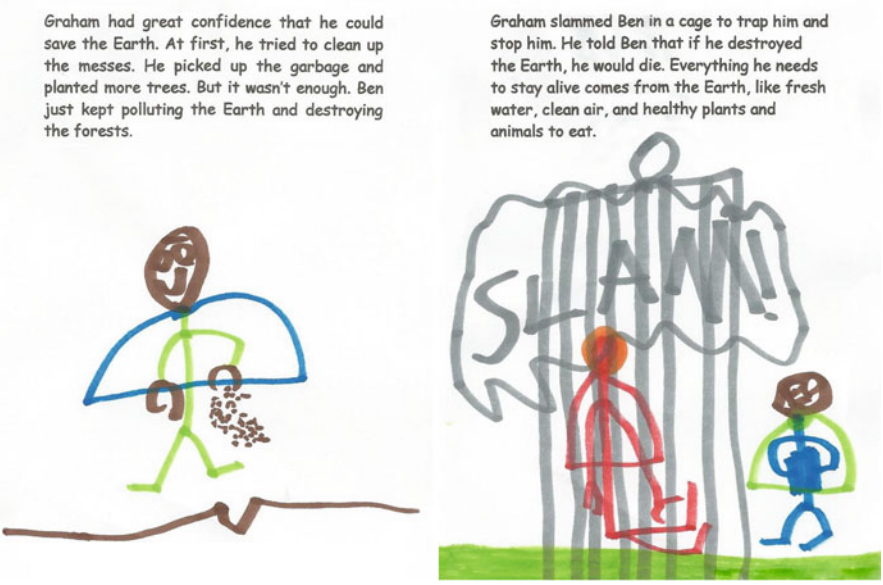
Holes like this in the glacier would appear every so often, though they would not last long. It was predicted to melt and fall apart within a few days.

– Sam, 13, NSW, Australia (*Climate Change and Me*)

I like this mountain very much. I feel good (about the mountain).

There, on the top of the hill … The prayers are written on the flags and then the wind blow the prayers through the village… When it flows (the prayers) I like much.

– Srijal, 14, Ghoom, India (*Places that Matter*)



– Jack Whitehouse, 5, Orchard Park, NY, USA

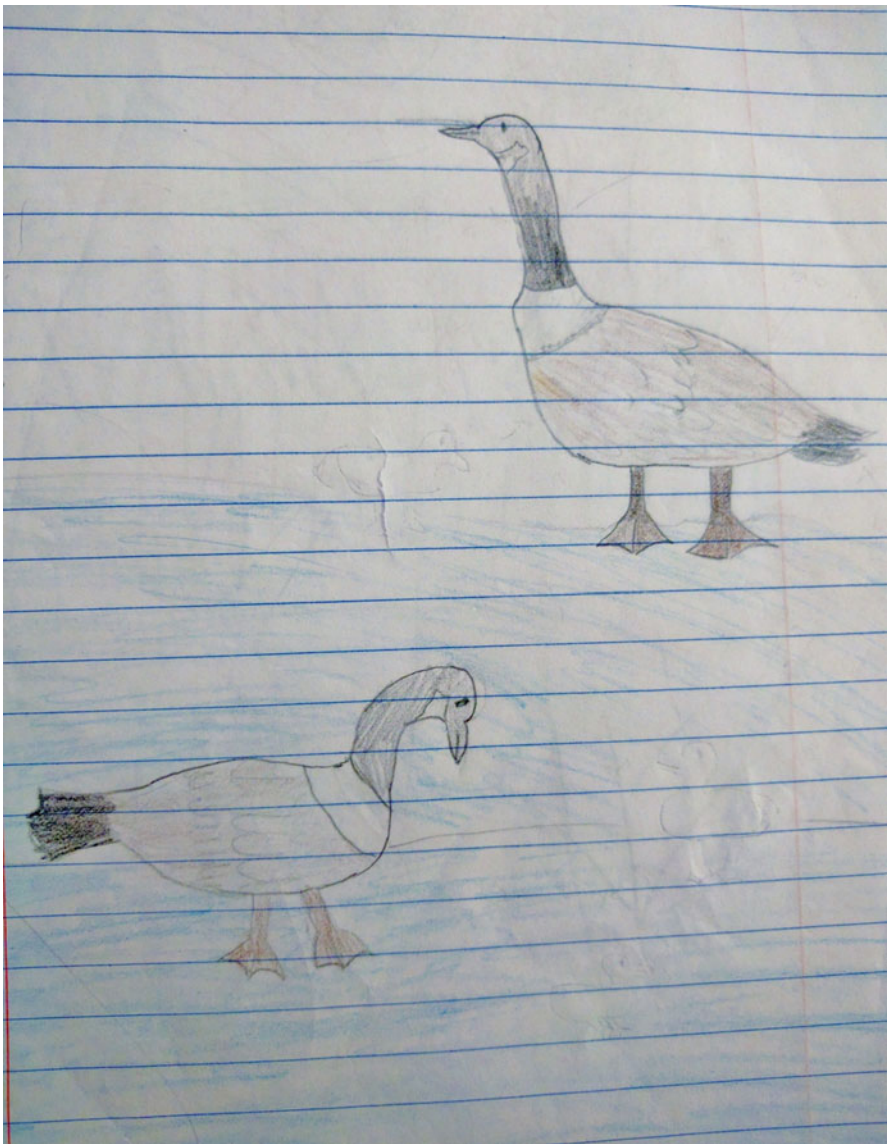
The story of Tica and Mao

- Mary Woodruff, 21, Ringoes, New Jersey, USA

The everyday lives of bugs and their food sources- the little worlds that exist around us.

With more CO2 in the air, these natural processes will be interrupted and eventually lost.

– Grace O'Shannessey and Chiara Wenban, both 11, NSW Australia (*Climate Change and Me*)



What I liked to sketch geese was that I felt calm watching them, sitting the lake side. The geese are calm even though they are sometimes noisy.

– Minami Furukawa, 8, Christiansburg, Virginia, USA

– Arpan, 16, Chuikhim, West Bengal, India (*Places that Matter*)

It is dark on the HORIZON… but through this project it is becoming clearer.

Clearer of the way out of the dark, to the age of natural information.

The heat, the cold; they cannot become extreme… or we will die.

– Kairo Byrne, 12, NSW Australia (Climate Change and Me)

Composition 3: The Eco-Poetics of Childhoodnature encounters

Nature

I step into a world,

Of silence and serenity.

Of soaring birds,
That sing at sunrise,

And leaves of trees,
That whisper softly,

All the joys and sorrows,
And secrets of the world.

– Liv Evans, 11, Brisbane, Queensland, Australia

Photo by Claudia Critoph, 16, Buffalo, NY, USA

Chirp and Fly

A dog came stumbling down the path
A fern he crumpled didn't last
A hole he dug beneath his paw
I don't believe he knew I saw

Until his eyes reached mine at last
I gave a look that looked aghast
The dog ran off to explore anew
To that dog, I bid adieu

The owner next came wondering through
I don't know why she looked quite blue
She walked on by without a word
I said to her, have you heard the bird?

What bird?
She looked up to spy
Just listen
as the birds chirp and fly

– Acacia Cresswell, 22, Vancouver, BC, Canada

Who Comes in My Dreams?

You come in my dreams
While I sleep and nap
You have the perfect smile and,
Laughing eyes, beautiful hair and,
Naturally Varnished lips,
That figure is simple, yet attractive,
That figure has no well,
Still spends the thought,
That figure has no spring,
Still I can swing and have fun,
You have come in my dreams,
You spoke the lovely words,
As the new snow in the old world,
We can drench, once the snowflakes melt,
You are too lovely and smart to secure my heart
Who comes in my dreams?
Climate change does

– Kiara, 10, NSW, Australia (*Climate Change and Me*)

Circle of Life, Circle of Love

For thirty years, my home
is the foamy sea.

Then it is time
to make a journey,
to bring life to the unborn,
who will soon come alive.

Trudging through thick sand
they will soon reach the foamy sea as well.

Thirty years later
they will make the journey.

It is a circle of life,
a circle of love,
that is what creates us.

– Sarah Margulis, 22, Chicago, IL, USA

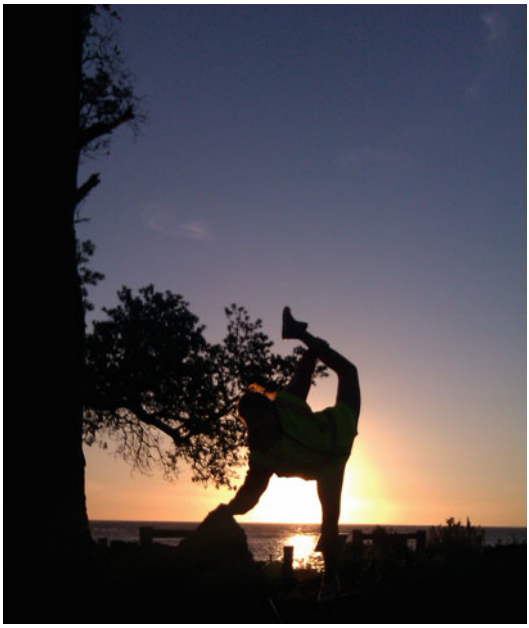


Photo by Anya, 14, Melbourne, VIC, Australia (*Places that Matter*)

A Lending Hand

A forgotten land
A heap of garbage
A lending hand
A smidgeon of soil
A touch of rain
A flicker of sunlight
A family of trees
A few chirps of a bird
A new land
A shared land

– Acacia Cresswell, 22, Vancouver, BC, Canada

New World

Devotion to technology,
Ill environmental care,
Food sources dropping
Fail to stabilize,
Everyone changes…
Regrow the planet,
Environmental reboot,
New world.
Can be saved,
Everyone should care.

– Blake, 10, NSW, Australia (*Climate Change and Me*)

How Much?

You hear the sound of the wind

And the sway of a tree

The flowers are bright

Even at night

As the clouds dance in the day

But will it be the same?

How much will climate change affect the earth…?

– Jade, 11, NSW, Australia (*Climate Change and Me*)

EC Stroll

Left, right, left, right
Breathe

Crunch, snap

Wooshh …

Chirp, chirp

Left, right, left, right

Breathe

Snap

Wooshhh …

Left, right, left, right

Breathe

Woosshh …

Breathe

Breathe

Breathe

– Acacia Cresswell, 22, Vancouver, BC, Canada

The Steps

Before the world was ending,
The beauty was incomparable,
But now the perishing heart of the world decays bit by bit.

A slowly rotting tree stump,
Filling and overflowing with rainbow hued life,
A sadness is not complete without a joy.

The better things in life stay if you treat them well,
But the fact is that we can't live in a rotten world,
It's just a fact.

Watching the wind whistling and the leaves fluttering you realise,
To save ourselves is selfish, to save but ourselves is selfless,
We must help save everyone.

That is the first thing you must realise,
The second is what I've said is almost true,
Our world is not completely ending, we can still help it survive.

To survive in our world, we shall help the trees and oceans first,
All animals need them to breathe so that is the obvious choice,
If our oxygen flow stopped so will our life.

Humans need to separate good and bad in their minds,
Then accentuate the good,
For if we do this we can better ourselves.

Before the world was ending,
The beauty was incomparable,
But now the perishing heart of the world decays bit by bit.

– Eva, age 10, NSW, Australia (*Climate Change and Me*)

All We Cannot See

I wonder about the trees at night
The dark, the bats, the park that sleeps

I wonder about the things that crawl
The path, the ants, the ground unseen

I wonder about the birds that chirp
The flight, the nest, the words unknown

I wonder about the hidden gems
The ferns, the berries, the dwellers that speak

– Acacia Cresswell, 22, Vancouver, BC, CA

Real Life

Real life haunts us
Real life will change us,
Real life will always be here,
But…
Climate change is our real problem.
Can we put climate change at a halt?
No!
Can we slow down climate change?
Yes!
But how?
By leaving nature how it is,
By not constructing useless buildings.
Please just leave our earth as it is.
Please don't touch our nature.
Please just stop.

– Hayley, 10, NSW, Australia (*Climate Change and Me*)

The Simple Site

The land is changing

the days are breaking

the simple site of the beautiful land is a gift above

the world is breaking

the light is fading

we have no clue to stop

the change is raging

why is it changing

as our gift is fading

we need to stop the land from breaking.

– Mekisha, age 10, NSW, Australia (*Climate Change and Me*)

Photo by Sam, NSW, Australia (*Climate Change and Me*)

I am the Earth

I am the earth
I am a cloud
I am the children
Noisy and loud
I am a tree standing tall
I am winter
Spring
Summer and fall
I am the grass
Thick and deep
I am the meadows
Luscious and sweet
I am the landscape
That meets my eye
I am the desert
Sandy and dry
I am the ocean
Endless and blue
I am the animals
I am me and you
I am the earth
I am a tree
I am the earth
And the earth is me

– Sarah Margulis, 22, Chicago, IL, USA

Composition 4: The Childhoodnature Imaginary

Selected works from the *ArtScapers* project

By children from Cambridge Curiosity and Imagination (CCI), Cambridge, UK

– A Hot Air Palace, Katharina, Cambridge, UK (ArtScapers)

A hot air palace

A shiny silver hot air balloon palace
fashioned from pure silver.
Giant garden.
Free hot air balloon.
Fly high with a hot air balloon of your own
and land in a giant garden full of breathtaking flowers.

Dream Flower

The dream flower is
a strong and powerful
flower. It catches all your
dreams. The bits on the side
are a bit like ears.
The circle means it is a dream flower
and it produces its own special water
which is poisonous to humans.

Tectonic Nature Island

Trees and berries,
Tree from the future,
Snails grow on trees,
and only maybe
one berry,
one leaf

– Kirsty, Hannah and Bea, Cambridge, UK (*ArtScapers*)

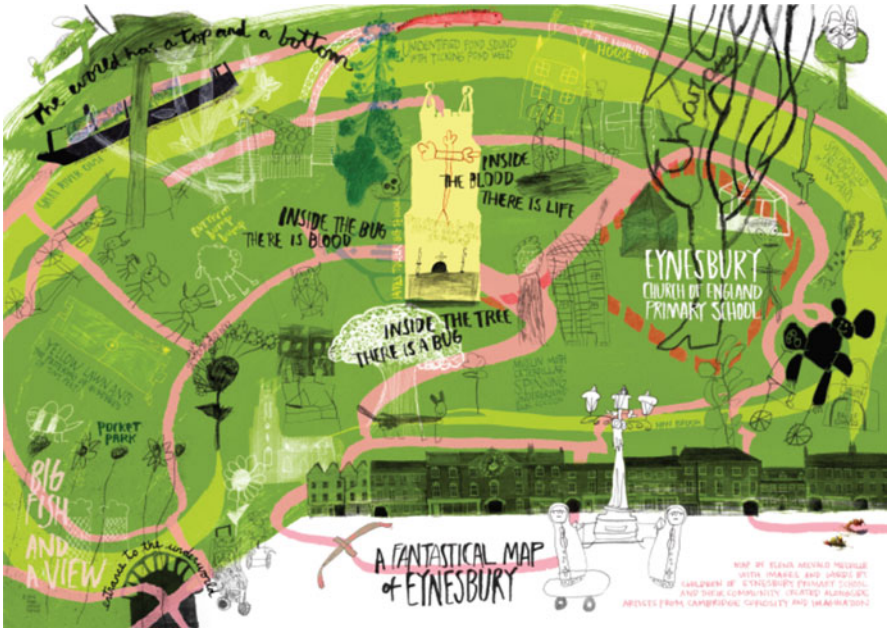
Each minute is a symbol.
Each heartbeat is a second.
One minute is a cheetah step.
When we are happy the days are longer.
How the ball rolls will tell the time.

If you take a leaf off every day
when you get to the middle you know it's been a year.

Selected works from the *Fantastical Cambridgeshire* project

By children and artists from Cambridge Curiosity and Imagination (CCI) Cambridge, UK


FANTASTICAL
CAMBRIDGESHIRE



Use your imagination…

Let your mind go free…

Be really focused and look at a LOT of different things…

Let everyone join in…

Use different materials…

Look at lots of different maps…

Use 3-D objects…

Measure, be inventive, think about shapes and how things stick and go together…

Do what you want. It could be a map of anything…

It's up to you. It doesn't matter…

Think carefully about the real and the fantastical. Like the real river running through and all the connections to this…

Think differently, think in different ways …

Thickest black

ink black, dark willow at midnight

midnight black, ashen black, rabbit-hole black, night tree black, diamond black

black mantle, midnight sky, sunset black, dark night, disappearing black

black oak, luna black, willow at night

beneath the trees, mud black, the dark lake….

A Fantastical Map for Roundhouse Primary School ©Elena Arévalo Melville 2017

If you learn to explore like a mouse you can learn to explore like anything.

They find a little hole and sleep in it for a night, then another hole

then they keep going.

I explored being my Nan, and I was called Nanny Mags.

I had a walking stick and I walked slow and I sat down lots.

I had to hold my back all the time.

I explored like a fox and a toddler.

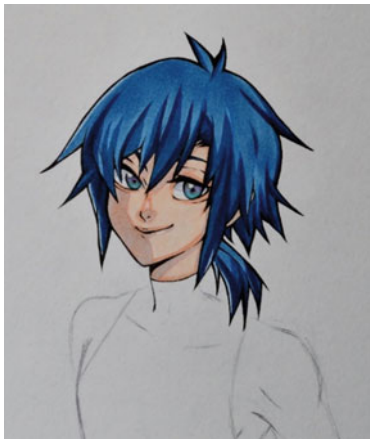
When I was a fox and I had four legs it was amazing.

When I was a toddler everything looked so high up.

Selected entries from *The Beginning of the Changes*

By Jasmyne Foster, 12, with collaborators from
the *Climate Change and Me* project, NSW, Australia

Entry I. November 17th 2014



NAME: AOI

AGE: 14

GENDER: BOY

HAIR: AN ALMOST NEON BLUE, SHORT, MESSY

CLOTHING: CASUAL, MOSTLY JEANS, BAGGY SHIRTS AND LARGE HOODIE JUMPERS AND LARGE SNEAKERS

ACCESSORIES: ONE SILVER EARRING AND A GOLD FAMILY RING

A room that looked like a bomb hit it, clothes scattered messily on the floor. A bed that didn't look much like a bed, more like a table with sketchbooks scattered on the end. A bag crumbled in the corner with a clatter of key chains and bulging with the shape of a lunch box. This was Aoi's room.

Aoi was interested in the workings of the universe and was a full blown realist. He had always cared about the earth's geological problems and biological workings. But when he thought about it, helping scientists in the lab might be difficult for someone who just loved to draw so much. But just when he thought of giving up on science and becoming some generic worker for a large company, he found out about climate change. He decided to search for some information and he was so strongly taken by the topic that he began to post about it on social media. Aoi was so interested in climate change and he wanted people to become more aware, but how could he make a difference?

He was only a child in the eyes of the public, not likely to be taken seriously.

Entry II. November 18th 2047

NAME: ELBERETH

AGE: 47

GENDER: WOMAN

HAIR: WHITE WITH SLIGHT STREAKS OF BLUE

CLOTHING: OLD CLOTHES WITH HOLES THAT HAVE BEEN EATEN BY MOTHS

ACCESSORIES: TWO PEARL EARRINGS AND A FOX MASK THAT SHE KEEPS IN A BOX UNDER HER BED

COMPANIONS: A WISE AND TIRED OLD DOG NAMED TURIN

The wind blows in the door again and I can hear the rush of the water breaking on the cliffs below. Turin barely moves at all, he just opens one eye and looks at me as if I've created the disturbance. The air is full of frozen salt crystals, they bite my cheek as I brace the door closed with the last of my heavy books. Soon I'll have used up all my esoteric books for fire-starters and everything in them will probably be forgotten. It's been too long since I've felt the power of the earth in my fingertips, the electric current that turns the waves away from the valley below. Now I lack the strength, and the memories flow back like the tides that nobody can stop from washing in.

But what's that? Turin is up, stretching and starting to growl at the same time. I hope it's not those raiders again, last time they cleared me out of rice and oats faster than I could get out of my rocking chair. Something is scratching at the wooden door. I grab the knife from next to the cutting board where I'd been chopping kale from the garden. It's only a bread knife, but it's better than nothing.

"Who's there!" I say in my deepest, scariest voice. I open the door just a crack and can just make out the shadow of a person against the pelting wind and rain. It's a child, no a man, with a face that looks so familiar and yet cloaked in shadow. I open the door all the way and he falls into my cabin, drenched and exhausted on the floor.

"Who are you?" I say sternly with the kale knife gripped steadily in my hand.

"Aoi," the voice faintly replies.

Entry III. December 5th, 2014

All the kids at high school had been invited to the research workshop about climate change. Aoi found himself doing a practice interview with a talkative girl named Elbereth. "I think the Earth has already transitioned into a new geological era," she was saying. "Humans have become like this viral force that's affecting every ecosystem on the planet."

That afternoon after school they went for a walk in the old forest behind the school, Elbereth with her notebook writing stories and Aoi with his sketchbook drawing the creatures that sprang into his mind. They came to a rushing stream that had swollen with water after the recent flood. Aoi started to make his way across the stream on the wet log. Suddenly, he slipped on a patch of moss and fell into the rushing water. His head hit a rock and his body was swept downstream.

Elbereth ran along the bank as fast as she could, but when she finally caught up to him his body was cold and lifeless. Desperate, she placed her hands on his heart and summoned all the power in her body to put warmth into him. She felt a vital energy enter her body from the forest floor, pulsing through her arteries like blood, producing heat that made her skin burn as if touching flames. Suddenly Aoi sputtered and sat up, looking at her with wild eyes.

Later they found Aoi's sketchbook soaked and lying upside down alongside the rushing stream. It was moving slightly. Aoi picked up the sketchbook and jumped back in surprise – underneath it was a frog-like creature with pale translucent wings. It jumped onto the nearest rock, then flapped its wings and flew away.

With trembling hands, Aoi turned over his notebook to the page he had been working on before he fell into the stream. There on the page was the very creature

they had just seen fly away- an amphibian with the wings of a dragonfly. Aoi looked at his drawing hand in amazement.

The flesh had changed to a strange blue color, and the nails had become like black claws.

Entry IV. March 23, 2021

The staff stood silently in the center of the task force building. Nerves were high. It was rare that the entire task force would be asked to meet unscheduled. Everyone was tense, even senior detective Shinohara looked tense. The eerie silence continued for another few seconds until Shinohara broke it. "Task force, we are gathered here today to see the latest technology from Astral Labs to combat the ever-growing aberrant infestation. I will now hand the floor over to Professor Arima."

A small man emerged from the other side of the room. He wore a white coat and carried a brief case with him. He stood next to Shinohara in the center. "This," Arima said pointing to the brief case, "is the future of aberrant hunting. It will allow you to find aberrants and neutralize them faster than ever before. Here, allow me to demonstrate."

Professor Arima pushed down on the handle of the brief case. The case split into two revealing a block of metal slowly taking on humanoid form. "This is Shudon, the latest in aberrant hunting technology. This is military funded weaponry with a built in psycho-pass able to scan aberrants to a 50 m radius; all that is required is a sample of blood. With on-board facial recognition system and a fully equipped medical kit, Shudon is by far the most powerful weapon for aberrant extermination ever invented."

Entry V. April 15th 2021

Elbereth buried herself into her coat. She walked steadily, looking at the graffiti scribbled across the side of the buildings. Many were political slogans so she paid no attention to the messages. She soon came across the task force headquarters where wanted posters of criminals were pasted along the side of the discolored brick walls. But criminals weren't the only ones with wanted posters.

The wall had a section for "aberrants." This was the dim name that the humans had classified those with powers under. She walked over to the wall and looked for her wanted poster. It didn't take long to find a poster of her with her mask on. It was labelled "Firefox." Elbereth could feel heat emanating from her hands. *Dangerous, volatile, and will kill without remorse?* They were all lies!

She grasped a corner of the poster and tore it down from the wall, using the heat emanating from her palm to set the poster ablaze with fire.

Entry VI. November 20th 2047

I wake in my rocking chair to the smell of oatmeal cooking over the fire. No, it wasn't all a dream. My oldest friend Aoi is crouching over the flames, stirring the pot with a long wooden spoon. He turns and looks at me, the piercing clarity returning to his eyes by the second.

"Aoi," I say. "I can't believe you're here. How did you find me after all those years?"

"There was just this map, Elbereth, a map in my mind. And I followed it to your door. But tell me, please. I think I've lost my memory for thirty years. Are we the only ones left in the world? Did my visions actually come true?"

"Many came true, and we are deep in the Changes as they have spread across the Earth," I explain. "The power grid shut down five years ago, and the Netscape was destroyed not long after. Wireless mesh networks still communicated for a while- I have a node here that kept me updated with the latest information until it rusted out from the saltspray last year. Transmissions were coming through from communities up and down the coast that had formed their own collectives, rebuilding their towns and villages to adapt to the Changes. The cities are apparently lawless and mostly deserted. People like us have been helping- using our earth powers to protect and heal the communities- and fighting off the raiders when we need to."

Entry VII. December 1st 2047

"Aoi, the food's ready."

"I'll be out as soon I can. Just have to finish this," I say softly, trying not to show Elbereth how desperate I am to finish the drawing. Drawing is the cure to my illness. When I have a sketch book near me I feel my power and memories rushing back. Drawing makes me feel invincible. It's like I draw power from the image, and the better the image the better I feel.

Then we hear a ghostly rapping on the door. I freeze, while Turin barks furiously at the door. "Who's that?" Elbereth calls from the kitchen. I can hear her kale knife coming down with force onto the chopping board.

"Come out meat," a voice calls tonelessly. I feel my heart skip a beat. I've heard that voice before. Then the door breaks open and an arm of steel emerges through the hole in the wood. The hand draws back and a pulsing robotic eye peers through. "I found you Anthropos!" the toneless, mechanical voice calls out.

I bolt up, sweat pouring down my face. "We have to leave," I mutter nervously, my voice cracking like glass as I speak.

Elbereth just stares. "Who is that Aoi?" The metal hand is scraping furiously at the wood like a caged animal.

"It's Shudon. He's finally found us." I start flipping through my sketchbook, desperately searching for the right page.

Notes on The Companion Contributing Authors and Projects

The Young Authors

Acacia Cresswell, 22, Vancouver, BC, Canada

I learned a lot about the possibilities of studying relationships with nature and outdoor learning having taken SFU's Semester in Dialogue – "Semester Outside in the City." We spent weeks learning outdoors, rain or shine, while developing our

facilitation skills and thinking of ways to get others interested/excited about outdoor learning. For an individual project, I presented some poems inspired by the park we were studying in. I spent much time in a small area of the park, trying to forget everything and focus on what was around me, and how I felt in the spot. I would write down whatever came to mind and later would look back and refine my ideas into cohesive poems. I had always written poems for myself for as long as I can remember, but until then, I had never really shared my poetry with anyone else. My poems are from that time, as well as new ones, inspired by my connection with different environments or "nature." I hope my poems inspire others to get out there and have new experiences with nature – to take part, research and encourage relationships with/in nature. Sharing my experience and my work would mean the world to me if it means inspiring others to take part, research and encourage relationships with/in nature.

Claudia Critoph, 16, Buffalo, NY, USA
I love all animals especially dogs. I hope some day to have a career that helps rescue dogs in some way. I shadowed our family veterinarian from Ellicott Small Animal Hospital, for a day. It was very interesting. I also was a Junior Teen Naturalist at the Buffalo Zoo last summer. I attend The Buffalo Academy for Visual and Performing Arts. My major is visual arts and photography. My images are of nature and animals. I like to photograph in Delaware Park and the Buffalo Zoo.

Ricco Dezan, 24, Melbourne, VIC, Australia
I am a newly graduated teacher after completing a Business undergraduate degree and my Master of Teaching. Preserving nature is something I am quite passionate about. In my submission, I am reflecting on some of my most vivid memories and encounters with nature.

Liv Evans, 11, Brisbane, Queensland, Australia
I just love writing and I also love the outdoors. I think this would be a great opportunity to share my ideas and be published! My submission is what I love about nature and what is worrying me about the future of it.

Kasumi and Minami Furukawa, 7 and 9, Christiansburg, Virginia, USA
Minami and Kasumi are sisters. After Minami submitted her sketch of geese, Kasumi also wanted to share her sketch and thoughts.

Liticia Gardner, 22, Vancouver, BC, Canada
I'm an avid window-looker-outer. I sit in my house a lot watching my surroundings, and I love listening to birds. I'm an undergraduate student at Simon Fraser University studying Women's Studies. I come from a low income household, with a 16 year old mother, and I feel that my relationship to nature has been most directly impacted by my class position, particularly the places I lived and schools I went to. I'm interested in this book because I very much still relate to being a kid. I feel like I'm in a world that's too big for me and I'm excited to have the opportunity to focus my

energy and writing on the topic of "nature" and my relationship to it. I worked with the Semester Outside program, through City Studio, and the program has had a lasting effect on my life.

My submission to the Companion covers my current thoughts on the nonhuman world. It will most directly relate to my experiences with the nonhuman world, but it will draw on a number of ideas that have impacted me and my relationship to the world lately. An excerpt from Liticia's full essay is included in the Companion.

Lucy Handy, 17, Providence, RI, USA

My submission is about simplicity, and the importance of nature as a retreat from modern day stresses of technology and social media.

Gabriel Lemelin-Wiersma, 10, Thunder Bay, Ontario, Canada

I enjoy hiking and seeing nature and wildlife like salamanders, frogs, dragonflies, birds, bats, and insects. I am glad that there is still forest left in the world, and hiking makes me feel happy, relaxed, and a sense of accomplishment. I want to tell people of my experience with nature, and that I love all types of nature. I want people to realize that there is still nature left and they should stop polluting and destroying it. We go hiking almost every week.

Sarah Margulis, 22, Chicago, IL, USA

I wrote these poems when I was 11 years old for a 6th grade writing project where I produced a book of poetry entitled "I Am the Earth." As a young kid, the landscapes around me intrigued me because they were something I could not fully conceptualize. That is why I chose poetry to write about nature; because poetry leaves room for imagination. The first poem "I am the Earth" I wrote based on a view I had of the sky and the sun while swinging on a swing set at the park. The second poem "Circle of Life, Circle of Love" was inspired by Sea Turtles I saw on a family vacation to Costa Rica. Poetry allowed me to imagine and create the inner workings of the natural world which I couldn't experience through my senses. Since I wrote these poems (over 10 years ago), I have continued with my love of writing. I have experienced all types of writing, research papers, essays, analytical papers (which I wrote many of as a philosophy major in college); and grants (which I currently write through my job as a grant writer). My favorite type of writing is writing that stretches my imagination to the limits. To me, writing is an exercise in creativity. That is why I am so interested in the Childhoodnature book; because nature is the perfect subject for creative expression. When I am not writing, I enjoy movies and TV, baseball, walks and hikes, exploring new places, cooking and baking, and hanging out with my 14 year old cat DD.

Jenna Masuhara, 21, Burnaby, BC, Canada

I am a university student at SFU, taking a Communications Major, and Business, Dialogue, and Publishing Minor. While growing up my family and I went on a lot of camping trips and hikes, and taking part in nature education programs. Nature was an important part of my life and I believe that children should be encouraged to

explore nature in any way possible. Last summer I was part of the SFU program Semester in Dialogue, Semester Outside the City, where we had lessons at Everett Crowley Park, learning about dialogue and ways to learn with nature as well as how to connect with it. It was a really eye-opening experience and I have kept those teachings with me as I continued my education. I thought that submitting something to the Childhoodnature book would be a good way to share some of the lessons I learned during the program as well as continue practicing them. My submission is a reflection piece of my experiences visiting my micro-site – a little spot of nature in Everett Crowley Park – over the past year, accompanied by photos to mark the changes the site went through as the year progressed. An extract of Jenna's year of photos and observations is included in the Companion.

Allison Maynard, 21, Circleville, OH, United States

As of 2017 I will be a graduate of Canisius College with a bachelor's degree of Animal Behavior, Ecology, and Conservation, as well as a degree in Digital Media Arts. My minor is in Anthrozoology and I have been passionate about animals and nature since I can remember. I hope to continue my education with a Masters and a PhD in child-animal-nature studies, or a related field. I am very intrigued by, attached to, and involved with the topic of childhoodnature. My narrative is about my changing experiences with nature and wildlife as I moved from rural Ohio to urban Buffalo. I focus on how I manage to get my fix of nature in such an urban setting; focusing on specific stories, relationships, or people/places that helped me to do so as my passion for nature and all of its inhabitants grew as I continued my college education.

Kai and Teya McAdam-Chase, 5, Vancouver, BC, Canada

Our experiences related to the trees and other plants and animals in our neighborhood.

Jack Whitehouse, 5, Orchard Park, NY, USA

Jack is homeschooled. A schooling choice made, in large part because Jack's family feel that it is crucial for children to have more time in outdoor, active, self-directed play. They have noticed a wonderful and unexpected benefit of this hands-on immersion approach is Jack's feeling of belonging to and personal responsibility for protecting the Earth. Jack loves to draw and write comics. He has created a short story about evil doers trying to destroy the forests and the heroes trying to stop them. All the language is Jack's. The family follow a homeschooling writing curriculum which encourages the child to dictate writing so their immature handwriting does not interfere with language and creativity. He dictated his story to his mother who typed it, and then helped him edit it down to a reasonable length. An excerpt of Jack's story is included in the Companion.

Mary Woodruff, 21, Ringoes, New Jersey, USA

I am an undergraduate student majoring in Animal Behavior, Ecology, and Conservation and Psychology. I am extremely interested in the study of anthrozoology,

particularly in regards children's relationships with nonhuman animals. I have experience working with children for over 5 years and most recently as a nature trail guide and ecology education for elementary to middle school age children. My story for children, Tica and Mao, follows the lives of two nonhuman animal friends. Tica, a Magnolia Warbler, and Moa, a Hoffamn's two-toed sloth, are both natives to the Costa Rican rainforest. Magnolia Warblers are Nearctic – Neotropical migrants that fly back and forth from the tropics to North America each year. In the story, Mao and Tica keep in contact with each other during Tica's migration through letters Tica sends Mao via "air mail." Tica tells Mao of her journey and the challenges she faces along the way. The story is 13 pages and incorporates an interactive component as readers open attached envelopes to read Tica's letters. An excerpt of Mary's story for children is included in the Companion.

The Projects

Climate Change and Me Project

David Rousell (Manchester Metropolitan University) and Amy Cutter-Mackenzie (Southern Cross University)

Between August 2014 and July 2015, 135 children and young people from across Northern New South Wales (NSW) Australia participated in the Climate Change and Me project as researchers. The children and young people attended research methodology training workshops with experienced educational researchers from Southern Cross University. They learned to engage with theory and methodology and use a variety of ethnographic and art-based research methods for producing data about climate change in their communities, including interviews, video, photography, field notes, drawings, poetry, and fiction. They were not given predetermined definitions or perspectives on climate change but were encouraged to investigate the diversity of children and young people's awareness, attitudes and actions towards the issue. The Climate Change and Me website was developed as a social media space for the researchers to post and comment on their research findings and creative works. Researchers also worked together to analyze and curate the data for the Past Now Future exhibition, which travelled to nine public libraries across Northern NSW. Researchers were actively involved with all aspects of the exhibition, including the titling, selection of works, locations, and artist/researcher statements.

Over the course of the project, certain researchers developed their own creative and scholarly research practices in response to climate change in their communities. A wide range of works were generated, including speculative fictions, short stories, essays, poems, artistic photographs, drawings and illustrations.

Cambridge Curiosity and Imagination (CCI)

CCI is a UK based arts and well-being charity that has been working creatively alongside children to play with ideas and make them grow since 2002. *ArtScapers* and *Fantastical Cambridgeshire* are both CCI projects that are briefly outlined

below. The artists' practices with children working at the intersection of nature and creativity are further explored in the Handbook Chapter: *Artists as Emplaced Pedagogues*. The CCI website is www.cambridgecandi.org.uk

ArtScapers

ArtScapers is developed and delivered by CCI and art education consultant Esther Sayers and is part of the Art program at the North West Cambridge Development. The ArtScapers workshops have been planned and led by CCI artist Susanne Jasilek to provide creative ways for children to connect with the changes happening in their local area, changes which effect both the natural and built environments in which they live. The project provides a space for imagination where extraordinary possibilities for living are explored and in which children's voices and ideas can be heard and recorded through creative outputs. "ArtScapers makes you think differently. . .. you're free to open your mind" (Jasmin, aged 8).

Through working with local schools, ArtScapers has focused on the overarching themes of community, place, sustainability, ecology, and archaeology. Pedagogic approaches have been designed to enable children to connect with their environment by slowing down and noticing the minutiae and the seemingly inconsequential aspects of place that are often overlooked. Time is taken for example to playfully record ways of walking along the chestnut tree lined lane into the site, to carefully place new work in the fields around the site and to joyfully be together whilst eating lunch or having a snack.

ArtScapers is commissioned by University of Cambridge as part of the North West Cambridge Development in partnership with Contemporary Art Society and InSite Arts.

Fantastical Cambridgeshire

Fantastical Cambridgeshire is an ambitious long-term project that connects people of all ages, their local area, adventuring and culture. A series of beautiful maps is being co-created through this work. These multilayered images are made of words and images from the children and their community, created alongside artists from CCI. They are fantastical because they combine real and imaginary places and stories. Each project starts with a primary school but reaches out to the wider community. People of all ages are invited to join in with creative adventures to discover the spaces in and around the school and develop a sense of wonder about the possibilities these offer. Together these communities have explored woods, orchards, new planting, ponds, rivers and wild spaces as well as more familiar parks and playgrounds. Discoveries are shared in the form of drawings, words, collections and even animations. Every single contribution is valuable and shapes the projects in exciting ways. Many of the wonderful ideas are incorporated into the final fantastical maps. The maps by illustrator Elena Arévalo Melville carefully weave together the fantastical drawings, words and ideas of the children, their friends and families. The creative invitations were designed by CCI artists Filipa Pereira-Stubbs, Helen Stratford, Sally Todd and Deb Wilenski.

DIAN: Debates and Investigations on Animals and Nature

Tânia Regina Vizachri, Letícia Sanfilippo Rojas, Luís Paulo de Carvalho Piassi, and Adriana Regina Braga, São Paulo University, Brazil.

In São Paulo, Brazil, we create and apply activities to discuss Interspecies Ethics with children through the D.I.A.N. – Debates and Investigations on Animals and Nature. This is a science outreach project oriented to socioscientific activism. DIAN aims to design outreach activities to discuss human-animal relationship from an ethical, cultural and scientific viewpoint. Through playful resources as theatre, music, plays, we investigate the process of rising conscience about animal ethics in children, checking how they construct their reflection about the cultural way to deal with animals. The DIAN team is driven by graduate and undergraduate students. The undergraduate students are responsible to create and conduct the activities and ludic resources to apply in the schools, as well as they conduct these activities. They are advised by the graduate students with theoretical frameworks to help them think which resources are suitable for the children.

Places that Matter

Helen Widdop Quinton (Victoria University, Melbourne)

In connected research studies in 2012–2016, adolescents (aged 13–17) explored the places that mattered to them, including the role of nature in their lives and how they perceive the natural environment as part of the places and spaces they inhabit. The framing of place created a generative, flexible focus for the adolescents to explore their everyday experiences of nature through photography, maps, Facebook posts, and conversations. The adolescents "narrating" these stories of nature in their lives are drawn from contexts of difference – different geographic locations, socio-cultural settings, and times – from urban Melbourne, Australia, and remote villages in the Himalayan foothills in north east India. An extensive range of photographs were generated through the research. The *Places that Matter* images shared in the Companion were taken by young researchers who particularly characterized their lives as connected with/in nature.

Sekolah Bisa!

Mr. Adrian Thirkell (founder Sekolah BIsa!)

Sekolah Bisa! is a tiny school of 25 students, originally conceived by IB students at The British School Jakarta as part of the IB "CAS" program, in partnership with The Body Shop Indonesia. It's now 8 years old and continues to offer shanty-dwelling children extraordinary opportunities to develop a capacity to rejoin society as educated, fully fledged citizens. Its commitment is to the organic life of the whole child: it does not placate poverty with charity but, by bespoke educational programs, seeks to ensure the worth of every child is valued and provision made to affirm their collective presence in the world as capable, healthy, and aspirational citizens. The literal translation from Indonesian of the school's name is, "I Can School." Sekolah Bisa! provides the opportunity for shanty children such as Ikki to attend school he'd otherwise have forfeited, and also functions as an environmentally friendly

sanctuary. The school's garden-like design, and profuse greenery, compensates for the conditions at home, where toxicities released into the air from burning rubbish have a negative impact on children's health and wellbeing. Any child subjected to toxicity, where the family's livelihood is partly dependent on recyclables, has a remarkable story to tell about nature, particularly how he or she remains aware of its value, and how it functions to compensate for the materially degraded circumstances of the shanty.

A Therapeutic Garden

Tomoaki Imamichi and daughters Stella (age 5) and Luna (age 7), Chestnut Ridge, NY, USA

The Therapeutic Garden account is about some of the experiences of a joint project of a parent and two children building a therapeutic garden. Therapeutic delight in a backyard came in unexpected ways. It started out with a plan by a parent and two children (ages 5 and 7), something to entertain them, something to support their development and their "sensory integration" – the buzzword at our beloved alternative school. In order to create varied surfaces that foster vestibular (spatial and balance) and proprioceptive (bodily and coordination) senses, inspiration was found in everyday objects lying dormant under the porch, such as wood planks and bricks leftovers from past projects, to be awakened for their newfound purpose. The real therapeutic effects were achieved, not so much through the sensory-integration, but via the creative design process. These experiences of seemingly simple childhood pleasure link to deeper philosophical concepts, Japanese aesthetics, Zen and the existing literature on children and environments.

Part VI

Childhoodnature Significant Life Experience

Exploring the Significant Life Experiences of Childhoodnature

34

Elisabeth Barratt Hacking, Debra Flanders Cushing, and Robert Barratt

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Abstract

By foregrounding childhoodnature experience and its ongoing influence, significant life experience (SLE) offers a formative field of research for consideration

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by childhoodnature researchers. The first part of this Chapter summarizes key findings and insights from previous SLE research and, as a contested field, aspects that have been challenged. In the second part, we introduce the nine chapters; here, a collection of contemporary studies interweaves the fields of SLE and childhoodnature through time and space. Together the studies in this section supports previous findings and affords new understandings of how childhoodnature is experienced and how this influences environmental behavior.

In the third part we group the Chapter findings into five childhoodnature insights: embodied experience, nature as family, cultural participation, childhoodnature loss, and developing methodologies. The studies reaffirm that SLE in childhoodnature can be a combination of continuous or single experiences, but that self-awareness within experience is significant. Further, SLE are often sociocultural in character involving cultural participation. Authors have also demonstrated the value of exploring the notions of SLE and childhoodnature with educational professionals.

In the final part, we raise issues for future consideration, not least the need for longitudinal research and the advancement of child-framed approaches in these fields. We contend that there is an urgent need for more research in disadvantaged and culturally diverse contexts as a response to the contemporary realities of, and changes to, childhoodnature in the Anthropocene. Importantly, we appeal for a paradigm shift to bring childhoodnature experience into the heart of all education systems.

Keywords
Significant Life Experiences · Childhoodnature · Sociocultural perspectives · Cultural participation · Retrospective research · Real-time research · Child-framed research

Introduction

Childhoodnature rejects the anthropocentric view of childhood and nature. It argues that children are nature and, as such, are interconnected with and part of the natural world. As children are nature, we can therefore assume that the social and cultural worlds of children are a subset of the natural world. Bringing together the natural and, within that, the sociocultural worlds of children enables us to understand more about the significant influences on children's learning and development as natural beings. This section explores how significant life experiences (SLE) research both informs and challenges our thinking around childhoodnature. We argue that understanding the importance of SLE in childhood is a fundamental prerequisite for the exploration of our developing notion of childhoodnature. SLE research provides a methodological approach that explicates insights and intentions within childhoodnature, both of which create our reality. Together, these two fields of inquiry, childhoodnature and SLE, challenge researchers to reexamine their beliefs, values, notions, and understandings of how children see themselves within and as part of nature, and further, how we think about research methodologies and design.

SLE are important phenomenological events considered critical in determining or influencing concerns, beliefs, and actions in later life. This body of research suggests that SLE in and with nature may directly influence environmental activism or opportunities to care for the environment in some way. We argue that the SLE field represents an important formative body of research that is inextricably connected to the concept of childhoodnature. This is because it foregrounds the importance of childhood experience in, with, and as nature, investigates the multiple-complexities of children's lived experiences in nature, and predicts their influence on environmental choices in adulthood. This section of the Handbook invited contributions from researchers in the field of SLE who were interested in exploring the relationship between childhoodnature and SLE.

SLE is a term introduced by Tom Tanner who developed a basic methodology and inspired an avid interest in this area of research (Tanner, 1980; Tanner, 1998b; Chawla, 1998a). Tanner's ground-breaking study, first reported in 1979 and then again in 1980 (Tanner, 1998a), identified affective experiences in nature that had an impact upon people's respect and appreciation for the environment. Building on Tanner's work, research by Chawla in the USA (Chawla 1998a, b, 2001, 2007) and Palmer in the UK and other countries (Palmer, 1998, 1999) also endorsed and confirmed the influence of SLE in nature (Tanner, 1980).

However, what is it about SLE that have such an impact upon people's lives? The quality of SLE have been shown to influence learning, not just in early childhood but throughout life. Chawla (1998a) noted that factors such as positive experiences in natural areas; environmental awareness and concern modeled by family members, teachers, books, and media; environmental organizations; as well as negative experiences that include habitat destruction have all been attributed to forming these SLE. In addition, research supports the premise that formative experiences in relatively pristine natural settings that include time with adult mentors, time alone at certain ages, family time, and time with peer adventurers are important (Corcoran, 1999). Further, personal attributes related to pro-environmental attitudes and behavior include having knowledge, competence, and an empathic perception of nature (Chawla, 1998b; Hungerford and Volk, 1990).

Building on the foundations of this field of research, the first part of this Chapter provides an overview of SLE research and associated understandings of SLE in childhoodnature. We discuss some insights into SLE, including research that also questions the impact of SLE. As an area of controversy, critical perspectives and antithetical research is important to consider in order to develop a balanced view of SLE. Yet, regardless of this controversy, Chawla (2001) reminds us that the personal stories highlighting sources of environmental interest and motivation can have a powerful impact on our understanding of significant moments and have generated this important field of study.

In the second part of this Chapter, we introduce the nine chapters included in this section, highlighting the common threads that connect examples of contemporary SLE research from around the world. The included authors provide in-depth exploration of SLE and extend the range of methodologies and tools used in childhoodnature research. Through this, the authors contextualize the influence

of society and culture on childhoodnature relationships. It is proposed that by developing a deeper understanding of significant childhoodnature experiences, this section will offer new perspectives on authentic practice in childhoodnature, and subsequent environmental action.

Finally, we present our insights from these chapters, reflect on what is missing from SLE research, and suggest foci, contexts, methodologies, and theories for future consideration by SLE and childhoodnature researchers.

Insights into Significant Life Experience Research

Pro-environmental behavior is often a goal of environmental education for children, and commonly relies on the assumption that engaging with nature, and, in particular, more than human nature, will foster a desire to protect the environment. The affective connections that people develop with the natural world are thought to foster this desire and may be the result of immersive experiences. For example, a study evaluating immersive field-based environmental education in contrast to classroom-based education found that only the field-based participants expressed sentiments toward conservation, a desire to return to the environment visited, feeling happy about themselves, and feeling safe (Cachelin et al. 2009). In addition, the field-based group more frequently discussed sensory experiences, while classroom-based participants were the only ones to express negative opinions of the wetland that was visited. The importance of sensory connections with the natural environment was also discussed by van den Born et al. (2001). Their findings support the idea that immersive, concrete experiences with nature, and those involving the senses, as opposed to theoretical learning, are associated with nature-friendly behavior in adulthood.

While children are often not able to recall these experiences, they act to shape lifelong learning, which develops into personal adult characteristics, as is demonstrated by adults' reflections upon their experiences. Eilam and Trop's (2014) study of formative experiences in environmental schools found that it can be easier to influence adults' behavior than their attitude toward the environment. Further, they found that media and formal education may be more effective at influencing behavior change since they can provide relatively quick, preplanned experiences. Whereas, influences on attitude require experiences over time.

Although wilderness programs may not provide a long-term experience, they provide an immersive experience in nature. A study with eight teenage participants of a 12-day wilderness program found that although the trip was a powerful experience for the youth, they did not anticipate that it would translate into changes in action toward the environment at home because they were too busy with their daily routines (Haluza-Delay, 2001). Based on the findings, Haluza-Delay recommended careful development of immersive environmental programs within pristine wilderness areas in order to more clearly help participants understand the connections between humans, more than human nature, and the local environment. In addition, programs

should be offered in environments at home where they are more familiar, rather than far away from children's daily lives (see also Barratt et al., 2014).

Overcoming fear of nature, especially wildlife, may be an important consideration for environmental education experiences. Investigating SLE through narrative interviews with alumni of three different environmental education programs, Williams and Chawla (2016) noted the importance of overcoming fear of nature or wildlife in natural settings, and the importance of mementos as objects that hold program memories. Fagerstam's (2012) study with high school teachers and Environmental Education Centre officers also found that students experienced fear of Australian nature and animals as a response to environmental education programs.

Providing children with opportunities to explore the natural world is important to their psychological and physical well-being. Through research at the Child Development Lab at the University of Nebraska, Benson and Miller (2008) describe opportunities for young children, aged 20 months to 5 years, to develop important skills that can lead to later learning and academic success. The natural environment provides opportunities for: social interaction through collaborative exploration and negotiation, physical development and fine motor skills as they examine natural materials and unfamiliar spaces, and language skills as they learn to express ideas and feelings about what they encounter. Although SLE research is commonly conducted with adults, asking them to reflect on their earlier experiences, Chawla (2001) supports and promotes the idea that we need to understand and consider the experiences that young people themselves consider important. Stating that environmental education and activism are "intergenerational affairs," she urges researchers to understand multiple sides that include generational differences (p. 457).

Significant Life Experiences Research as an Evolving Field

SLE research has faced varying levels of critique, with questions about the methodologies, methods, and theoretical frameworks commonly proposed. For more than 20 years, critics of SLE research have questioned the epistemological grounding of the research in relation to the use of autobiographical methods, and the apparent focus on validity, reliability, and generalizability (Gough, 1999). Further, Dillon et al. (1999) challenged the lack of theoretical frameworks for SLE research. Specifically, they suggested the use of identity theory as a way to explain how people develop their pro-environmental beliefs and enhance SLE research.

More recently, Williams and Chawla (2016) suggest the use of social practice theory to frame SLE research which implies that it should not be approached as a simple problem of identifying three or four most influential experiences. But instead, it is important to view the significant experiences within a broader context of practices in particular places and social settings, and how the various factors together shape the environmental identities that people form. There have also been challenges to the use of the term "significant" in SLE since research participants may not see childhood experiences as significant. Payne (1999), like Williams and Chawla (2016), argues that a series of experiences, or "continuity of experiences," may be

more important than one specific or significant moment or event (Payne, 1999, p. 366). Similarly, Ji's (2011) study with 14 Chinese environmental educators found that for almost all of them, it was the totality of their experiences, rather than one significant experience that led them to develop their environmental awareness and sensitivity. Russell (2006) encourages researchers to be open to learning from social movements and other theoretical positions, and that her own SLE work has been informed by women's studies, science studies and environmental thought.

In terms of methodology, SLE research has typically drawn on those methodologies that are sensitive to the research context and foreground the intricacies and richness of meaningful experiences, as participants view them. SLE research originated using qualitative and autobiographical approaches, including open-ended interviews, to enable people to provide a narrative of their experience in detail. Chawla (1998b) discusses this emphasis on qualitative research as a positive aspect, noting that the broader field of environmental education research traditionally relied on quantitative approaches. Similarly, Cachelin et al. (2009) highlight the fact that much evaluation of environmental education programs still applies quantitative methods, yet could benefit from supplementing this with qualitative approaches that add rich, nuanced descriptions of sensory experiences in the field. Further, Russell (2006) highlights the challenges of working with different methodologies, but also recognizes the importance of being open to other methodological, ontological, and epistemological approaches in order to bring richness and diversity to the SLE field.

Yet, the emphasis on qualitative, retrospective, reflective research is not without critique, including the challenge posed by the effect of the experience weakening over time and the limited accuracy of memory (see, for example, Stevenson et al., 2014). Although this is a characteristic of any interview and survey research that is based on personal views or behaviors, SLE research often requires adults to recall events from the distant past in childhood. In her article exploring SLE research methods, Chawla (1998b) highlighted this and other weaknesses of SLE research, including the lack of built-in comparator groups.

While the autobiographical tradition is still evident in SLE research, there has been some diversification of approach together with findings that do not necessarily align with previously accepted ideas. For example, Stevenson et al. (2014) conducted a quantitative study with a random sample of middle school students. They found that watching nature-related TV was actually a negative predictor of environmental knowledge. Students who had a teacher with a master's degree was the strongest positive predictor of pro-environmental behavior, but time spent outdoors and having an adult role model for environmental sensitivity were weak predictors of pro-environmental behavior. In addition, they found that minority students (American Indian, Hispanic, and African American) exhibited significantly lower levels of environmental knowledge than Caucasian students. Leppanen et al.'s (2012) study on gender and generational environmental attitudes was also quantitative, using questionnaires with sample of 237 young people and 212 parents in Finland. The findings showed that boys display more negative environmental attitudes than girls or adults, and in general, the Finnish children in the study held more

negative attitudes toward the environment than their parents. As this is contrary to other studies, Leppanen et al. postulate that the cultural context and life-stage barriers could have been influential.

Further, some critics noted the inclusion of predominantly white privileged participants in SLE studies. Yet, the diversity of participants has grown from predominantly white males, dedicated to environmental education or wildlife and wilderness preservation, to include more gender and ethnically diverse participants (Chawla, 1998b). For example, Corcoran's (1999) study with US members of the North American Association of Environmental Educators included 54% female respondents. Additionally, one study found that environmental justice activists often use their social position of disadvantage to embrace their negative social and environmental experiences and ground their work in empowerment and social justice (Ceaser, 2015).

Turning to findings, some research, albeit limited, has challenged the extent to which outdoor experiences during childhood, such as camping, playing in natural areas, and observing wildlife, are seen as influential (Howell and Allen, 2016). Howell and Allen's study found that involving 85 people connected with climate change education, found that those childhood experiences were not mentioned as a major formative influence for the sample as a whole. Although these outdoor experiences were important, and formative for some participants, they did not have the impact on climate change mitigation efforts that previous research findings would have suggested. In addition, the authors compared the matched age groups, and determined that this finding was not simply because children have fewer opportunities for nature experiences than in the past (Howell and Allen, 2016). Similarly, Ji's (2011) study with 14 Chinese environmental educators found that it was not their environmental consciousness that led them to work in environmental education, but rather a job opportunity or requirement. And unlike other studies, childhood experiences in natural areas were not seen as significant to developing their environmental consciousness.

These research findings raise questions about the influence of childhood SLE on future environmental behavior; nontheless, SLE research has overwhelmingly connected experiences, sensitivity, and activism in relation to the natural environment. One important area that has had less attention is the synergies between theory and practice. While SLE research has identified particular experiences as influential, and recommended appropriate practice (for example, see Chawla and Flanders Cushing, 2007), the extent to which this knowledge has informed practice in environmental education is less clear. Payne (1999) described this as "the biggest gap in the SLE literature… (that is) how these SLE research findings might 'translate' into culturally sensitive and contextually specific curriculum and pedagogical practices" (p. 366).

The rich and varied research on SLE, in addition to the many critiques of its traditions, suggests that it is an important of area of research that is still evolving. Much of the recent research raises additional questions that need to be explored. The next part of the Chapter introduces the research presented in this section and how it is responding to earlier critiques while progressing this field of research.

Significant Life Experiences and Childhoodnature: Introducing New Research

As discussed above, there have been a number of criticisms of SLE research in relation to its retrospective methods, less represented groups and under theorizing. In many ways, the chapters in this section start to address these concerns. Using novel and creative methodologies, which are sensitive to focus and context, and working with theory, the authors explore new and underresearched areas in the field of SLE. In doing so, they provide in-depth discussion about childhoodnature, specifically, how children encounter, interact with, and think about more than human nature, what influences this, and how nature experience in childhood may influence future thinking and behavior. This section discusses how the Chapter authors are reaching out to new contexts and groups, developing novel methodologies and portrayals of SLE and childhoodnature and concludes by exploring how the authors work within new theoretical frames.

Reaching Out to New Contexts and Groups

The contexts for the research reported in the following chapters are varied and reach out to lesser researched groups. This includes working with young children in early years settings in Alaska (Green), a deciduous forest environment in the USA (Porto and Kroeger) and forest schools in England (McCree); preservice educators in Australia (Black) and England (McCree) focusing on how educators think about SLE and their future careers; how global mobility and attendance at international schools across the world impacts on SLE (Van Zalinge), informal learning through parenting relationships in Australia (Blom) and through Family Nature Clubs around the world (D'Amore and Chawla); and children's TV in Sweden (Pettersson).

New Methodologies and Portrayals of Significant Life Experiences

The authors of this section provide in-depth analyses of children's experience in and with more than human nature, in some cases connecting this to childhoodnature practice. In beautifully crafted narratives, many of the authors provide rich portrayals of SLE in childhoodnature. So, how can researchers explore SLE in the present rather than reflecting on the past? This is addressed imaginatively by Green and by Porto and Kroeger who report research with children in real time using phenomenological approaches. These authors develop novel research tools for capturing early childhoodnature experiences and behaviors both at a prereflective and a reflective stage.

Green analyzes findings from two research projects with young children in Alaska, focusing on somesthetic experience, which Green describes as the "felt bodily experiences of childhoodnature." Children's use of wearable cameras followed by video-stimulated recall discussions gives agency to the child and enables the researcher to experience what the child sees, hears, and does during their sensory tours in the Tundra in order to discuss it with the child. Green finds childhoodnature embodied and storied entanglements as the children play and tour freely and develop a sense of being within this natural environment. Similar to

Green, Porto and Kroeger's participatory research is designed to give agency to the child; acting as co-researchers, children aged 4–5 years explore their prereflective and reflective experiences of a deciduous forest environment on a weekly basis for 9 months. A mosaic of tools (adapted from the mosaic approach, Clark and Moss, 2008) is employed to address the question, "what does it mean to be in this place?" The tools, for example, taking (and discussing) still and moving images, tours, bookmaking, and child interviews, enable children to choose how and when to share their meanings of experience. Porto and Kroeger argue that regular time to play freely in natural environments and time to talk about nature with each other may lead to pro-environmental behavior later in life. There is evidence in this study that weekly visits to the same natural environment supported children in discovering nature's needs and realizing that nature is family and, like other family members, requires care. Both of these chapters illustrate how research with children can give the child agency and how this fundamentally enriches the research. Here, both approaches invite children to gather data about their childhoodnature experience as it happens and then share their reflections using the data as a stimulus. This avoids the researcher interpreting and making assumptions about the child's experience, a tendency typical of research with children (Barratt Hacking et al., 2013), thus enabling rich and insightful findings.

D'Amore and Chawla similarly report research in real time, in this case with children and parents/carers attending Family Nature Clubs (FNCs) in the United States and Canada, as well as New Zealand, Peru, Germany, and England. FNCs are a relatively unique environmental organization as they bring parents/carers and children together with more than human nature on a regular basis. Thus, the study of FNCs represents a new area of research in SLE with opportunities to apply findings from previous SLE studies through a "triad of experiences . . . (for) children and their parents: time in nature, role models of nature appreciation, and membership in a nature-based organization." In this multimethod study, D'Amore and Chawla combine quantitative surveys with ethnographic observations and interviews. While SLE research has typically identified spending time in nature alone or with friends as important, this study identifies the significance of a collective, social experience in which leaders, parents/carers, and children learn and act together. The notion of permissive (childhoodnature) parenting is an example of how FNC leaders influence families by providing role models of parenting childhoodnature; similarly there is evidence that parents/carers learn from observing different childhoodnature parenting norms from other FNC members. While this study, like Porto and Kroeger's, and Green's real-time research, would require a longitudinal approach to demonstrate influence into adulthood, each of these studies enabled children (or parents/carers) to convey what is significant about the childhoodnature experience as it happens and consider how it is influencing their thinking or behavior.

Building on the tradition of retrospective SLE research, four authors in this section adopt novel approaches to reviewing childhood experience; Van Zalinge and Blom use an autoethnographic approach, while Black and McCree study their participants' memories of childhoodnature experiences in order to explore the links between SLE and their current professional concerns as educators. In a moving

account, Van Zalinge reflects on her experience of global mobility as a child and how this influenced her childhoodnature. This includes her experience of attending numerous international schools around the world as a "third culture kid," "by the age of 20, I had lived in 11 different countries and moved more than 18 times." She frames personal memories and critical moments through poetry and photographs to develop an autobiographical commentary. Her analysis suggests that a sense of belonging and security is a precursor to SLE without which the child may be detached from potential SLE. This is the case for all children, but especially relevant to children who experience disruption and loss in childhood through, for example, relocation. In a world where global mobility is growing, this area of research is especially pertinent and no more so than in the case of refugees. UNICEF (2016) report that child refugees increased by 75% in the previous 5 years and, at the time of writing, accounted for one in 200 children across the world.

In the second autoethnography, Blom reflects on her own experience as a child and as a mother in Australia to explore another new area of SLE research: childhoodnature parenting relationships. Her approach "draws on past memory data and artefacts to reflectively analyse visual research journal entries about my current perceptions of childhoodnature as a parent." Through this, Blom negotiates her own childhoodnature journey showing her experience with more than human nature changing "from a place of being, to a place of refuge and escape to now, nature as a parent." From this, Blom suggests that childhoodnature parenting should be a reflective process; this recognizes that parents are also role models for their children and thus can provide a "living inspiration" for how to be with and as nature, taking time to be present with nature.

In other retrospective research, Black's Chapter reports on research with two groups of 27 preservice early childhood educators studying a sustainability-focused undergraduate degree in Australia. The participants use narrative and arts-based methods to explore their personal childhoodnature experiences and then consider how this might support their current professional aspirations for working with young children. Black provides beautiful examples of her students' art and insightful narratives to reveal the wonder and importance of childhoodnature SLE and, similar to Green's findings, embodied ideas about nature relationships. In turn, this reignites the educators' commitment to working with young children and promoting experiences with natural environments. This recognized the way in which the educators themselves experienced more than human nature and natural environments "as places of being, belonging and becoming for children and families."

McCree similarly connects SLE to professional commitments by studying eight forest school trainees in England and their reasons to train. She asks "Why do Forest School practitioners choose their vocations? What role do significant life experiences play in their choices?" and responds through an ethnography of Forest School trainees using interviews and observation. Interestingly, McCree finds evidence of the impact not just of childhood SLE on reasons to train, but also views of the future environment using the concept "future shock" (Toffler, 1970). While SLE in childhood are a key driver for most of the trainees, a few disagree. Also influential are a passion for pedagogy, changes in the natural world, and a consequent

sense of loss, together with "a sense of responsibility, anger, fear and future shock." The role of negative experiences, including habitat loss and social justice concerns, aligns with findings from other SLE studies (Chawla, 1998a; Ceaser, 2015).

In a departure from previous SLE research, Pettersson's analysis of TV for children in Sweden draws on childhood sociology and visual studies; adopting a posthumanist stance, it employs discourse analysis to identify the child-nature relationship in TV, accounting for anthropocentric, and "adult-centric" views on childhoodnature. Pettersson justifies this focus by showing how public service TV is influential in the lives of Swedish children and that nature dominates TV content; hence watching TV could be seen as a potential SLE. The study samples TV content from 1980, 1992, and 2007 with additional discussion of content in 2017. Pettersson finds content represented in three ways: children outdoors, animals, and environmental issues. A detailed analysis shows overall that "the child-nature relationship represented here is more of a burden, because it positions children as becoming adults, rather than as being children in the present. And the responsibility for nature is thereby assigned to children." This study reinforces the view that SLE are socially, culturally, and historically influenced; Pettersson argues that, in the case of Sweden, "it is difficult to even imagine a childhood that is not lived in a close relationship with nature and that is not ready to save it."

Working with Theory

As discussed earlier, SLE research has been challenged for a lack of theoretical framing. While there has been some development in this respect (see, for example, Williams and Chawla, 2016), the authors in this section address this theoretical gap by working with a number of theoretical frames, as Pettersson's study, discussed above, illustrates. Some of the authors take productive forays into learning and child development theory as a lens for exploring and interpreting childhoodnature SLE. For example, Blom uses and develops Bronfenbrenner's socioecological systems theory of child development in exploring parenting relationships for childhoodnature. Like Davis and Elliot (this Handbook), Blom critiques Bronfenbrenner's model for its absence of nature and, as such, develops an adapted model to redress this. A number of authors reference social learning theories (Blom, Van Zalinge and D'Amore and Chawla) and this would seem to be a productive theoretical lens for SLE researchers; in part, this is due to the importance of children learning from more experienced others in groups and communities by observing and participating in (environmental) activity (Rogoff, 1990). More broadly, D'Amore and Chawla discuss learning and child development theories relevant to SLE research, arguing that "key experiences identified in past (SLE) studies are not surprising: they represent basic processes of learning agency in the world, learning what to notice and value, and developing a self-identity related to the environment." Theories considered include those associated with learning, agency, motivation, and a sense of competence; social modeling and apprenticeship; sympathy and stewardship; and environmental identity.

In response to the underuse of identity theory to inform SLE research, D'Amore and Chawla, McCree and Van Zalinge draw on environmental identity theory

(Clayton, 2003) and ecological identity theory (Thomashow, 1996). Both McCree and D'Amore and Chawla develop these ideas by arguing that ecological or environmental identity cannot be severed from social identity. McCree offers ecosocial identity theory, the ongoing construction of self as part of nature and society, postulating that "we do not have an authentic self that pre-dates our social self, or a relationship with nature that excludes society; we are social beings. Similarly, we do not have an exclusively social self without our biological nature; we are natural beings." D'Amore and Chawla argue that social environmental identity needs to be considered alongside ecological identity as manifested in childhood experience around environmental and nature-based organization in many SLE studies. In her autoethnography, Van Zalinge considers the influence of childhoodnature experience as a globally mobile child on her own environmental identity. In so doing, she, like the authors above, acknowledges the significance of the social and cultural contexts in the development of her personal environmental identity.

Insights into Childhoodnature

The research discussed in this section of the Handbook illustrates the ways in which SLE research can contribute to the concept of childhoodnature. As such, the following discussion elicits a number of insights from the chapters which may serve to support and challenge our childhoodnature work.

Embodied Childhoodnature

Childhoodnature experience is not just conceptual, it is embodied and cannot necessarily be put into words (see, for example, Green, Black). The idea of embodied experience in childhoodnature is sympathetic to Ingold's (2000, 2007) "dwelling perspective" in which it is argued that humans instinctively "dwell" in the world so that environmental experience represents an emergent intertwining of perception and world. This also reflects Cele's notions of embodied knowledge, "the kind of knowledge our bodies collect for us when we interact with a place frequently or intensely" (Cele, 2006 p. 9). Therefore, when developing methodologies, researchers interested in childhoodnature and SLE should be cognizant of embodied knowledge in developing tools that enable access to it. For example, a number of the authors in this section employ sensory encounters and art work. Two of the studies in this section adopt a phenomenological view (Green; Porto and Kroeger) in exploring children's prereflective experience in childhoodnature as it occurs; in early childhood, the more natural embodied dimension of experience perhaps predates the more complex cognitive elements that require language. This section has illustrated that the consideration, with children and adults, of SLE in childhoodnature can elucidate embodied knowledge and help us to understand more about childhoodnature.

The Family of Childhoodnature

Authors in this section have reminded us that children interact with non-human nature in ways that might be different to that of adults and that the child's developing physiology is stimulated when in natural environments, for example, through movement, exploration, and imaginary play (Green, Blom). This supports previous research findings that "children have different experiences of the (natural) environment to adults and value different aspects of it" (Barratt Hacking et al., 2013, p. 456). Authors also show how young children want to belong and be cared for (Van Zalinge) and that they seem to have a natural affinity with the rest of nature (Porto and Kroeger). Given sustained time and experience in natural environments, for example, visiting the same place repeatedly (see also Barratt et al., 2014), children recognize themselves as a part of the wider family of nature. The metaphor of family seems helpful in this respect; when the rest of nature is viewed as family children recognize the importance of caring, just as they want to be cared for, have friends and family, and belong. Blom and Porto and Kroeger remind us that in this way, we can think of non-human nature as family, parent and teacher. So, childhoodnature is not just in the individual realm, it is being part of nature, human and non-human, and recognizing oneself as nature within the wider family of nature.

Cultural Participation and Childhoodnature

A number of authors in this section have shown that childhoodnature SLE are culturally influenced. Thus, depending on the child's cultural traditions and norms, children may think about nature and interact with non-human nature in differing ways. Blom and D'Amore and Chawla found cultures of parenting and parenting style influential in childhoodnature, for example, permissive and reflective parenting. Pettersson shows how culturally Swedish attitudes to nature and the outdoors influences the type and quantity of nature TV that children grow up with in this context.

Ideas about cultural impacts on childhoodnature reflect sociocultural historical perspectives on learning. This theoretical lens suggests that children's learning and development is influenced through observing and participating in sociocultural activity within families and the wider community and environment (Rogoff, 1990) as D'Amore and Chawla point out. Rogoff's more recent research with indigenous communities in the Americas, "Learning by Observing and Pitching In (LOPI)" (2014), advances a model for understanding children's learning through experience. This model would seem to speak to SLE research in its explanation of the efficacy of participatory and apprenticeship learning in families and communities including environmental organizations. D'Amore and Chawla's research with Family Nature Clubs suggests that children find participating in collective environmental action stimulating and memorable. Others have suggested that skills around environmental action represent "empowerment variables," that is, variables that contribute to pro-environmental behavior (Hungerford and Volk, 1990). Children aspire to do what the more knowledgeable others or role models do (peers, older children and

adults/leaders) by participating or leading and by contributing to democratic decision making and change. A caveat is in relation to the political and cultural setting where opportunities to engage in political debate and activism of any kind may be constrained. Further, Pettersson suggests some caution is required in asking children to "shoulder the burden" of problems to do with the natural environment; children need to work alongside role models and see that others are contributing.

Childhoodnature Loss

The loss of nature and even some of the words used to describe nature (Macfarlane and Morris, 2017) is of significant concern in the Anthropocene. Emerging research on the new concept of ecological grief (Cunsolo and Ellis, 2018) identifies a "legitimate form of grief felt in response to experienced or anticipated losses in the natural world" (p. 279). This may provide new insights into the significance of ecological loss in childhoodnature. Cunsolo and Ellis argue that "ecological grief will become an increasingly common human response to the losses encountered in the Anthropocene" (p. 279). A response to this form of grief is evident in McCree's study of Forest School practitioners' SLE in which negative experiences of habitat change, environmental loss, concerns, and future fears became key motivations for the practitioners' childhoodnature practice. McCree, citing Toffler (1970), helpfully relates this to the concept of "future shock" where humans become disoriented and distressed when there is rapid and ambiguous change to deal with. McCree argues that, with the onset of the Anthropocene, "we all share a future shock upgraded for the twenty-first century and writ large into the geological record." Other section authors found that adult desires to go back to nature, as it was in their own childhoodnature, accelerates the desire to provide children with SLE and counteract potential loss (Porto and Kroeger; Blom). So, the loss these authors refer to is not solely about the loss of the natural world, but also the loss of experience. This reflects Pyle's notion of the "extinction of experience" where "the loss of neighbourhood species endangers our experience of nature. If a species becomes extinct within our own radius of reach (smaller for the very old, very young, disabled and poor) it might as well be gone altogether, in one important sense. To those whose access suffers by it, local extinction has much the same result as global eradication" (2002 p. 261). Previous studies in SLE have found that positive *and* negative forms of environmental experience can provide SLE; studies in this section support this and show further how ecological grief and concerns for the future hold significance as prompts for childhoodnature practice.

Developing Childhoodnature and Significant Life Experiences Methodologies

The authors in this section have demonstrated how novel directions and approaches in SLE research can further our understanding of childhoodnature in theory and

practice. While some of the authors in this section draw on the more established autobiographical methodologies of SLE research (Black; Blom; McCree; Van Zalinge; and D'Amore and Chawla), they adapt this approach by combining it with methodologies that access childhoodnature experience in the present. In this way, the research represents a sort of time shifting; by revisiting and connecting past and present, these authors are able to explore the relationships between past and present childhoodnature SLE. The authors focus on how practitioners' or parents'/carers' personal SLE in childhood influence the way they now think about and practice (or parent) with childhoodnature. Importantly, reflecting on past SLE appears to rekindle motivations for supporting childhoodnature in the present, for the future. Other authors focus more on SLE and childhoodnature in real time using child-framed approaches (Barratt et al., 2014; Barratt Hacking et al., 2013; Cutter-Mackenzie, 2009). These approaches recognize that "children are experts in their everyday experience, have a particular knowledge set in relation to the (local) environment and act as agents within it" (Barratt Hacking et al., 2013, p. 454) and that "children can develop and use innovative child-friendly research methods" (p. 456). Adopting a phenomenological lens, Green and Porto and Kroeger invite children, as co-researchers, to share prereflective and self-conscious awareness of childhoodnature experience as it happens in forms of their choice. This illustrates how children, including the very young, can have agency within childhoodnature research. Involving the children as co-researchers enables in-depth insights into childhoodnature experience, together with children's personal perspectives on its significance.

Overall

Research in this section has shown that SLE in childhoodnature would appear to be a combination of single momentous events and continuous or regular experience over time. Furthermore, SLE are often intergenerational and sociocultural in character and enable children to observe, participate, and/or lead in environmental action. The research also suggests that, for childhoodnature experience to be significant, children need to be self aware in the experience. And, in considering how to apply SLE to childhoodnature in practice, authors have demonstrated the value of exploring the notions of SLE and childhoodnature with educational professionals.

Looking Forward

Nevertheless, further work remains in seeking new avenues to pursue around contexts, methodologies, and theories for SLE in childhoodnature research. Child-framed SLE research in real time represents a worthwhile avenue for developing methodologies in the fields of SLE and childhoodnature. But what might such studies tell us in the longer term? What remains is a need for longitudinal studies that explore long-term impact of SLE in childhoodnature across the lifespan. Importantly, there is

a pressing need for further SLE research in contexts of disadvantage, to do with childhoodnature experience in the majority world, urban poverty or forced migration and refugees. For example, how does experience of disadvantage in such contexts influence childhoodnature? We would ague that SLE needs to better represent the contemporary realities of childhoodnature and natural environments worldwide.

In the context of unprecented change to (and loss of) our natural habitat in the Anthropocene, a key challenge is to reconcile the current trajectory with the impact on children's physical and psychological well-being. Children are having to accommodate accelerating change; this impacts on childhoodnature and more than human nature now and for the future. Together, the research represented in this section affords new understandings of how childhoodnature is experienced and what might influence children's current and future environmental behavior. Future work in SLE and childhoodnature needs to promote synergies between research and practice so that educational systems can be responsive to ongoing changes in childhoodnature. Experience within the natural world should not be a marginal activity in education; childhoodnature should be at the heart of any education system. This section, with its focus on what is significant about childhoodnature experience, invites us to rethink education and consider a paradigm shift in relation to the sociocultural implications of childhoodnature for education systems.

Cross-References

- ▶ Becoming Companions: Compositions of Childhoodnature Relation, Sense, Poetics, and Imagining by Children and Young People
- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Childhoodnature Alternatives: Adolescents in India, Nepal, and Bangladesh Explore Their Nature Connectedness
- ▶ Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development
- ▶ Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature
- ▶ Third Culture Kids and Experiences of Places

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Remembering and Representing the Wonder: Using Arts-Based Reflection to Connect Pre-service Early Childhood Teachers to Significant Childhoodnature Encounters and Their Professional Role

35

Alison L. Black

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Abstract

Early childhood educators are uniquely placed to support children's ways of knowing and being and to share in and respond to children's wonder and understandings about childhoodnature encounters and relationships. The context of this Chapter is a sustainability-focused course in an Australian undergraduate early childhood education teaching degree. As part of this course, two groups of 27 pre-service teachers used narrative and arts-based methods to explore personal childhoodnature experiences and memories. Supported by their stories and creative and historical artifacts, pre-service teachers remembered their childhood wonder of belonging to a universe – a universe they are part of and shape – but

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that extends beyond them (Bennett. *Thoreau's nature: Ethics, politics, and the wild*. London: Sage, 1994). This Chapter highlights how pre-service teachers' reflection and representation of their significant childhood experiences supported their subsequent communication of personal and professional commitments to working with young children in relational ways toward sustainable worlds (Rautio. *Children's Geographies*, *11*:4, 394–408, 2013b).

Remembering significant childhoodnature encounters assisted pre-service teachers' articulation of conceptualized and embodied ideas about relationships, including their sense of belonging, wellbeing, and connectedness to other people and the more than human world around them and their physical, mental, and spiritual health. Remembering the wonder has connected them afresh to their values and work as educators who recognize the significance of childhood experiences, the interconnectedness of human and more than human worlds, and early environments as places of being, belonging, and becoming for children and families.

Keywords

Pre-service teacher reflection and representation · Early childhood education · Narrative and arts-based methods · Childhoodnature encounters

Introduction

Remembering significant relational experiences and encounters can support children's and adults' ways of *being*, knowing, and becoming *with* and *within* human and more than human worlds. In his oft cited paper "Significant Life Experiences," Thomas Tanner discusses both the importance of educators and early significant experiences with nature and the environment (Tanner, 1980). Responding to Tanner's ideas, this Chapter looks to early childhood educators and the significance of their formative experiences. It explores how pre-service teachers come to understand early childhood education for sustainability, how their own childhoods and childhood experiences shape their ideas of sustainability practices, and how ideas are formed, enacted, and understood in the context of their lived experiences – including their senses, perceptions, and feelings. Additionally, through the sharing of pre-service teachers' stories about their "ecological homecomings," this Chapter offers ideas about how we might tend to our/children's awareness, delight, and absorption "in *being*" – attending to and remembering experiences that move us, experiences "when we resonate with the world that surrounds us" and are drawn "into relation" and "interbeing" (Bai, Elza, Kovacs, & Romanycia, 2010, pp. 362, 359, 360).

The context of this chapter is a sustainability-focused course in an Australian undergraduate early childhood education teaching degree. As part of this course, two groups of 27 pre-service teachers used arts-based methods to explore their childhoodnature experiences and memories. The arts-based methods chosen and used by the participants included narrative accounts, photo-stories and film, collage, painting, and sculpture and often incorporated historical artifacts such as childhood

photographs, drawings, and film footage. These storied representations supported pre-service teachers' recollections of their childhood wonder, of their belonging to a universe – a universe they are part of and shape – but that extends beyond them (Bennett, 1994).

Pre-service teachers described the experiences in their lives that connected them to their relationships with/in/as/to nature. Their remembering and representation connected them to their hopes for children and their educator role in bringing these hopes to life. This provided a platform from which they communicated their personal and professional commitments to working with young children in relational and everyday ways toward sustainable human and more than human worlds (Rautio, 2013b).

Education for Sustainability

Within the early childhood education sector, there has been growing recognition of the value of quality learning experiences and interactions in environments where the natural world has a central place and where a love of and relationship with nature is fostered (Davis, 2009). Sustainability is a strong feature of early childhood education discourse, through which young children are positioned as citizens and acknowledged as having ideas about and capacities to contribute to sustainability and environmental issues (Barratt Hacking, Barratt, & Scott, 2007). Learning in this context is often sensory-focused and embodied. Children are active beings in their everyday life environments. They/we act as one part of a complex mesh of relations, relating, and relationships (Rautio, 2013b).

Childhood is considered a crucial time for establishing commitments to environmental issues and cultivating lifelong dispositions of care for the environment (Davis, 2008). Childhood is a critical period in life when the foundations of thinking are established and relationships are shaped (Samuelsson & Kaga, 2008). Research shows that environmental and sustainability education is important and effective during the early childhood years (Madden & Liang, 2016).

Chawla and Hart (1995) concur that our concern for the environment has its origins in our childhoods, during which our early feelings and sensations of the world have opened our awareness and attachment to the world as a living being. Further, Bai et al.'s (2010) commentary suggests that love of life and nature takes root in a consciousness that *attends*. Attending. Attending to the senses. Attending to relationship. Attending to connection. Attending to *being*, not just to knowing or learning or doing. When we attend, our focus is on consciously indwelling our experiences. When we attend we become "unselfed" and experience "a dynamic presence that confronts us and draws us into relation" (Abram, 1996, p. 56). Abram (1996, p. 68) describes it like this: "To touch the coarse skin of a tree is thus, at the same time, to experience one's own tactility, to feel oneself touched by the tree."

In terms of intellectual knowledge, there have been shifts in the discourse. The dialogue around children and nature is changing as are ways of viewing nature encounters and relationships. Where once we worried about "nature deficit" (Louv,

2005), now we worry about the dangers of "anthropocentricity" and "human-nature binaries" (Malone, 2016). Whatever our preferred terms and emphases, may we not forget to *attend*, and to our embodied ways of knowing, may we not forget about the *wonder*.

Young Children's Sense of Wonder

Pelo (2014) asserts that children's ecological identities are developed through a sense of wonder and delight toward the earth – by a connection to place, a love of the environment, and a concern for its wellbeing, by relationship. Chawla's (2015) research builds on this to describe how natural areas provide opportunities for wonder – for children to engage in creative play alone and with friends, set self-paced challenges, find quiet retreats, learn about the environment from direct experience, and form emotional bonds with places and the natural world. When we watch children closely with openness and respect, we can see that childhood is filled with curiosity, creativity, and unlimited possibility. As Bateman (2000, p. 31) says, "Children are naturally enchanted by the world of trees, birds, plants, and rivers. . .."

Yet, learning and teaching in schools, and increasingly in early childhood settings too, is "far more into the explicative than into the evocative, and this imbalance, as reflected in our education system, is problematic in terms of the openness and connection we seek with/in nature" (Bai et al., 2010). Rachel Carson also described this problem (1987, p. 42) writing "A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood." And she reminds those of us who work with children that:

> Exploring nature with children is largely a matter of becoming receptive to what lies all around you. It is learning again to use your eyes, ears, nostrils, and fingertips, opening up the disused channels of sensory impression. For most of us knowledge comes largely through sight, yet we look about with such unseeing eyes that we are partially blind. One way to open our eyes to unnoticed beauty is to ask yourself, "What if I had never seen this before? What if I knew I would never see it again? (Carson, 1987, p. 52)

A love of nature is unlikely to take root in a consciousness that is focused on "learning information," "explicating facts," or "doing educational activities" (Bai et al., 2010). It *can be* nurtured when children and pre-service teachers return their attention and energy and absorption in their *being* and to their sense of wonder and delight.

The Role of Teachers in Supporting Children and Supporting Change

How might we support the awakening of pre-service teachers' sensory impressions and fuel their desire to engage children in practices that cultivate and sustain "aesthetic-affective openness" to their surroundings, practices that sustain "sensory

attentiveness, openness and imaginative interests towards the material world" (Rautio, 2013b, p. 400)? How might we support teachers to create beautiful learning invitations and offer formative experiences that resonate with children and that move children to wonder, exclaim, and share what excites and intrigues them? And, perhaps pick up a shell or a stone to put in their pocket (Rautio, 2013b)?

Engaging pre-service teachers in the art of awareness is critical given teachers play a lead role in shaping children's experiences and understandings and can mediate children's learning toward sustainability (Wals, 2006). Early childhood educators are uniquely placed to support children's ways of knowing and being and to share in and respond to children's wonder, appreciation, and understandings about childhoodnature encounters and interdependent, interconnected relationships.

This Chapter invokes the idea that recollecting and storytelling significant life experiences returns us to our bodies and senses and offers a place to produce people who will actively work to maintain "a varied, beautiful, and resource-rich planet for future generations" (Tanner, 1980, p.20). Remembering and cultivating the wonder supports care for the earth (Thomashow, 2002). Gathering and sharing stories offers an opportunity to understand how significant life experiences occur and how pre-service teachers can use their own childhood memories to support their work with children. Storytelling is an aesthetic-affective process that supports pre-service teachers in perceiving again their relationships with people and place. Storytelling is a way of connecting again with felt and embodied relationships, of remembering past experiences, and of recognizing the relevance then and now (Bai et al., 2010).

Accompanying Children

Rachel Carson reminds us of the importance of "the significant adult": "If a child is to keep alive his inborn sense of wonder. . .he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the word we live in" (Carson 1987, p. 55). While moving away from methods where *adults* define and determine how nature matters to children and away from situations where children become passive recipients of treatments and activities that adults are providing to them (Chawla, 2015), parents, educators, and adults still have a role to play. We have important roles to play as "awestruck pedagogues" working *alongside* children to nurture intrinsic ecological understandings, relationships, and identities. How we listen *with* and attend *with* children matters, ". . .how we sunbathe them, let the wind play on their faces and hair, how we bring them to flowers and trees, to look at and touch, how we call their attention to the birds in the sky and on tree tops. How we attend with them. . ." (Bai et al., 2010, p. 353).

Remembering our own childhoods can reestablish our inborn sense of wonder and can help us rediscover our own relationships and interconnectedness with more than human worlds. This can help us move from indifference to care, reverence, deference, compassion, and respect. Sharing *our* love and appreciation, our awe and wonder of the magnificence of nature, *with* children can foster *theirs* (Bai et al., 2010).

Attending to our shared stories of childhoodnature encounters supports our intentions as educators and researchers who promote issues of sustainability and builds our/children's love of nature. Our stories can support understanding of personal, practical, and implicit philosophies, values, and ideas, including the influence of our own experiences, understandings, and hopes, as key determinants of how and why and what we bring into children's learning (Noddings, 2006; Green & Somerville, 2015).

Teacher Education as a Site for Remembering

The University of the Sunshine Coast is one of many universities including courses on early childhood education for sustainability in their teacher education programs. As a result, pre-service teachers often recognize that they, with children, have an important contribution to make to the world and have an important role in shaping it and being shaped by it. Their educator role requires them to keep in touch with their sense of wonder and awe.

For the last 2 years, pre-service teachers in their second year of their early childhood degree have engaged in a course I developed focused on early childhood education for sustainability. "Young Children and the Environment" (Davis, 2015) is a core text. Developing and teaching this course, I designed the assessment to encourage connection. In 2016 and 2017, two cohorts (of 27 pre-service teachers each) engaged in reflection, writing, and art-making about childhoodnature encounters. The course encouraged us to look to our own childhoods; remembering our own tender relationships with people and place can be an important starting point for education for sustainability.

Exploring Significant Life Experiences Using Arts-Based Methods

Scientific discourse and research, the predominant and dominant discourse, does not – and cannot – adequately capture the richness and complexity of human experience, yet it vigorously asserts itself in many fields (Bullough, 2006; Leavy, 2009). There are many ways in which our world can and should be known. Ways of comprehending the human experience occur along a continuum between scientific and artistic knowledge, and so research cannot belong to science alone (Eisner, 1998; Rolling Jr, 2010). For those working in social and educational disciplines, understanding human experience is critical. Arts-based research is a knowledge-building paradigm offering spaces to explore alternatives (Rolling Jr, 2010). It offers extensive approaches and possibilities for addressing research questions and problems, for investigating issues that matter, and for opening research to diverse and larger audiences. Arts-based research offers a place to explore ways of *being* and ways of knowing. It is grounded in the idea that the materials and encounters of our lives are essential to our meaning-making and to our understanding of relationships, their interconnectedness and interrelatedness (Eisner & Powell, 2002). Arts-based

research values processes that have the capacity to promote connections to ways of knowing, to embodied knowledge, to affect, to aesthetics, and to internal and external experiences. Importantly, the process and products of creative approaches can offer catalysts for deep thinking, reflection, and problem-solving/posing (Black & O'Dea, 2015).

For all these reasons, arts-based methods were valued exploration tools for engaging pre-service teachers in meaning-making about significant life experiences and for supporting their "attending" and *being.* Arts-based and creative methodologies supported pre-service teachers' reflective inquiry and the telling and sharing of stories.

This Chapter focuses on one of the assessment pieces in the early childhood course which involves the creation of a sustainability-focused narrative or creative work. The goal of this task is for pre-service teachers to consider their own experiences with nature and how these have influenced them and will influence their educator roles. Pre-service teachers are encouraged to use images and visual components to support their storytelling and remembering. The course outline offers the following advice:

> Create a narrative or creative work to capture the connections, interconnections, and disconnections of your personal experiences with nature and the natural world, as well as your holistic thinking in relation to values, commitments, learning, living and wellbeing. You might consider how your experiences and relationships with nature and the natural world have supported your experiences of belonging, wellbeing and connectedness. You could consider the effects, positive or negative, your experiences of the natural environment have had on your sense of self, your connectedness to other people and the world around you; or on your physical, mental and spiritual health. In your reflection, you will consider how these experiences might influence and enhance your role as a professional working with young children. You will identify how you will support children's relationships with nature and articulate some guiding principles for your work as an educator who advocates for relationships with nature, early education for sustainability, and early environments as places of belonging for children and families.

Pre-service teachers chose a range of formats and methods to share their stories and histories, including written narrative accounts, paintings with artist statements, films and digital storytelling, visual collages, photography, poetry, story/photo books, installations of various kinds, and narrated PowerPoints incorporating image, effects, and music.

By encouraging pre-service teachers to engage in arts-based methods that value narrative and autoethnographic components, I am seeking to create spaces for authentic conversations and opportunities for ongoing conversations. Sharing educational meanings and stories is a way of reaching and exploring real places that we each have been (Clandinin & Huber, 2002). This type of experience offers reflection that enhances personal and professional meanings and deepens and advances open-ended conversations about research, about experiences, about learning, and about *being*. Engaging in this kind of "assessable" meaning-making can feel uncomfortable and a bit risky, especially when our experiences and memories are characterized by layers and traces, partial reflections and forgetting, complexity and ambiguity, or

deep feelings. But, as Hart (2003, p. 9) suggests "at its best, narrative inquiry has the power to bring together stories and in so doing transform the story and the participants in the process" with our narratives inviting us "to rethink what we thought we knew."

Bringing the personal realm and inner lives into educational and university settings challenges conventional understandings about what education, research, and academic work are, and are not, about (Golden & Elbaz-Luwisch, 2007). However, there are a growing number of us who recognize the importance of valuing our experiences and the value of caring about what it means to be human and part of something bigger. There is a growing recognition of the need to attend to our lived and relational lives and the significance of experiences and encounters if life and learning is to be meaningful. When we share our experiences, there is a greater chance we will recognize deeper understandings of what is shared and remember our belonging to a universe that articulates through us and extends beyond us (Bennett, 1994).

Telling Stories and Histories

The next section illuminates the ways in which the pre-service teachers described how their childhood experiences have influenced them and their visions for their work with children. My interest and focus here is not the *analysis* of pre-service teacher's childhood experiences and assessment work. Rather it is to encourage contemplation of pre-service teachers' stories about the experiences which have led them into their environmental commitments and to employ "a listening approach" where attention is paid to what *they* are saying about their formative experiences and what *they* are describing as significant.

When they commence this assessment task, many pre-service teachers begin their reflections by gathering photographs from their childhood and by talking with family about their childhoods, local place connections, and significant connections and relationships with the more than human world. Many say they cannot remember the child version of themselves pictured in the photograph, the child splashing in the waves during a family holiday at the beach or laughing under the hose in the backyard. But somehow connections are made and (re)activated by this going back in time, by this being in the moment, and by this engaging again in an embodied remembering of feelings and relationships with human and more than human worlds. Looking back and looking forward, pre-service teachers describe appreciating their childhood experiences more; they describe recognizing the significance of these early experiences, and they connect with new insights and awareness. As they share their stories and memories with other pre-service teachers, they also recognize the uniqueness of their own meaning-making and their own experiences. Story snippets and vignettes follow to illustrate these various aspects.

Invariably pre-service teachers focus their storytelling on the natural features of their favorite places and holiday experiences and the feelings these places and

experiences cultivated. There is an emphasis on relationships with friends, family, and animals and many descriptions of play and activity and adventure.

> **Laura** – *As a child, my memories are not centred on the places I visited, but rather to my connection to the animals and people I shared the experiences of the natural world with. As an adult, venturing to natural environments provides me with a sense of tranquility enabling me to relax. This gives me a sense of responsibility to look after my own health and wellbeing as well as to look after the natural spaces I am engaging with.*

Relationships with animals, both wild and pets, are described in many accounts, with sometimes an exclusive focus. And, when describing relationships with the local environment, the influence of grandparents and early gardening experiences feature in multiple stories. The role of the significant adult is clearly important. Many pre-service teachers describe understandings and imaginings about their connections to the universe, sharing encounters that have stayed with them with regard to the mysteries of the universe and their lifelong sense of wonder.

> **Aimee**—*One great childhood memory that I will never forget is star gazing with my dad and sister. On a bright starry night after dinner we would go outside, lie on the grass and stare at the stars—and occasionally we would see a shooting star! Dad would always say "quick make a wish!" This is a magical moment and a calming moment for me still to this day. It makes me feel small, in a wonderful way. It makes me appreciate how small we all are as humans in the vastness of the universe.*
>
> *I've realized that my best experiences with nature have come when looking at her from a distance but ever so closely. That makes me feel a sensation of awe for the world that surrounds me. But what does this mean for me as a teacher? And how has this influenced me as a person? During writing this assignment I have been thinking deeply about my own experiences with nature. Even though I can't remember all the moments I've had as a young child, I know I was definitely involved with and enriched by nature. I know this by looking back at photos, having conversations with my parents, reading, swimming and acknowledging the love I have for animals which all have roots in my relationship with nature.*

> **Matilda—***My art piece (*Fig. 1*) symbolises my connection with nature. It visually expresses the way I see people and earth—as one. It captures my own connection with nature as well as the deeper connection existing within us all. My experiences and connections have been shaped by my early experiences, in particular with the Mary Valley. This artwork says 'the land is terra mother'. And 'we are nature'.*

In constructing "significance," a spectrum of thoughts, feelings, and beliefs about nature are revealed in pre-service teacher's accounts. As Chawla (1998, p. 19) reminds, "the ultimate target of research about significant life experiences is not merely to know the experiences that people have had, but how their significance becomes constructed." In many stories, there is an innate recognition that "we are nature," such as is seen explicitly in Matilda's reflections and creative work (Fig. 1).

Also apparent in pre-service teacher's stories is their relating to the widely held belief that it is possible to feel disconnected from nature (Louv, 2005), especially when there is limited interaction with natural environments. Many pre-service

Fig. 1 Matilda's creative work illustrating "we are nature"

teachers communicate that contact with natural areas and spending time outdoors is what connection "looks like" or "feels like" – that "being in nature" supports their sense of connection. Their accounts communicate that people interact with, connect with, conceive, and think about nature in many different ways. Just because we *are* nature doesn't necessarily mean that we all believe or understand that reality.

Pre-service teachers describe that "contact with natural areas" is a significant influence. When Tom introduces his story (below), he describes that before moving to life on a farm, his only "real" connections with nature were "exploring the backyard" or "the trips to the park to feed the ducks." Similarly, Savannah's exposure to the ocean over her life-span is at the heart of her relationship experience.

"Direct experience *with*," rather than just "learning *about*," is a key theme permeating pre-service teachers' stories and revelations (and this is clear in Terry's story). Pre-service teachers describe their sensory and emotional responses and their "inner experience" during their connections with natural surroundings and elements. Stories highlight that *being* matters – engaging with senses, bodies, perceptions, feelings, and lived and embodied experiences. Having knowledge, or some kind of external awareness, is *not* what pre-service teachers are describing as influential. In terms of what *is* influential, the role of "the significant adult" (often a family member) as an "accompanier *with*," rather than solely as an imparter *of* knowledge, is emphasized. As educators, we can typically assume that if we "impart knowledge" to students, responsible action will follow (Hungerford and Volk, 1990), yet pre-service teachers recognize that this is not enough. This takes us back to Bai et al.'s (2010) ideas about *attending,* listening, and dwelling *with* children and ensuring that children have sensory, embodied, and evocative (rather than just explicative) experiences with more than human worlds.

Stories of Relationship

Larger excerpts from the storying of three pre-service teachers are provided below to animate some of these ideas and to demonstrate the depth, quality, and impact of pre-service teachers' recollections and meaning-making. Given that narrated PowerPoints and films are not easily transferable in a printed book, the examples presented here come from artifacts that students submitted as part of written narratives and photographable creative works.

Rather than engage in further commentary of or between the stories, the following passages are offered with little analysis. You are invited to make sense of them in your own ways using whatever perspective or lens or philosophical thoughts you bring – perhaps even letting those perspectives and lenses and thoughts fall away so that you can just sit and *be* with another's experience and storytelling.

Tom: Living and learning with the land

Tom—*As a young kid I lived in central Toowoomba. My only real connections with nature at that time was exploring our back yard, or the trips to the park to feed the ducks. The year I turned seven my family sold everything, bought a grain and cattle farm, and moved over an hour away, out into the country. Our farm was a long way out of town, and was so different to my previous suburban environment. I now had an entire farm to explore as my back yard. The stark change of environment meant that I didn't recognise the various dangers that came with that change. Rather than worrying about traffic or getting lost on an unfamiliar street while riding my BMX, I now had to learn about living in the country.*

My parents and grandparents purchased the farm together, so now my grandma was around a lot more and she was a significant part of my life and my younger sisters' lives. Grandma grew up in outback Quilpie during World War Two. The intense war rationing and outback lifestyle during her childhood had given my Grandmother her perspectives on nature and survival (Fig. 2).

Some of her first lessons to my sisters and I was to stomp your feet in tall grass; always be on the lookout for brown and black snakes; don't startle a horse while standing behind it; and check if a fence is electrified with a piece of grass 'before' trying to climb over it. Just a few little tips for a new country kid connecting with his new landscape. As I reflect, I can see

Fig. 2 Tom's photo of his grandma

how these experiences might be applied in my own work as a teacher. I can envision myself as a teacher asking children to think about the different aspects of living in different places, like the city or the country.

I gained a new perspective on the importance of the weather too. Like most suburban kids, it is a bad day at school if it is raining and you can't play outside. However out west, rain makes everyone very happy. I came to understand the importance of rain for a drought stricken community that relies on the climate so heavily for its industry. Rain equals money out there. The other new environmental experience was living through 'too much' rain. Flooding happened many times through my childhood, and our family farm has a section of the Myall Creek running through it, so it never missed us. I saw our farm get carved and changed by flood waters, and I learned very early about land and soil erosion, land and soil salinity, and about subsoil moisture tables. The creek on our farm is bone dry most of the time, save for a few deep waterholes dotted along it (Fig. 3).

Rain has to happen on the Bunya Mountains (upstream) for our part of the creek to run, but when it does, all of the water holes get refreshed with new clean water. This means that the water holes are now clean enough to swim in for a while. Swimming in a dirty creek is great for getting familiar with different types of soil. I would feel the slimy-smooth-silky silt, or dig down and pull up thick clay which was great for building mud slides with. These connections are what I draw on to realise the value of mud, sand, water, and rocks for young children, and the importance of childhood opportunities to handle, explore, and create with natural materials.

Being a 'farm kid' meant I had many connections and experiences with animals. While we kept animals such as horses, cows, dogs, and chickens, we also had a large property, which made it possible for many encounters with wild and native animals as well. Exploring nature and animals from horseback was a great way for me to enjoy connections with animals and to learn respect for, and bond with another animal. Riding a horse and mustering cattle involved working as a team and having trust in the horse I was riding. I would have to walk out into the field and find the horses first, then bribe them with carrots so that I could catch them for a ride. I had to learn how to keep the horse comfortable with a saddle on, and how to not lose control of a beast that weighed seven times my weight.

*My experiences helped me gain understandings and respect for natural places and the animals that lived amongst those places. I was getting fresh milk by milking our own dairy cow by hand (*Fig. 4*), and collecting eggs from the chickens we kept. They didn't just come packaged from the store. The milk was still warm from the cow some mornings. I believe in*

Fig. 3 Tom's photo of the drought-affected land

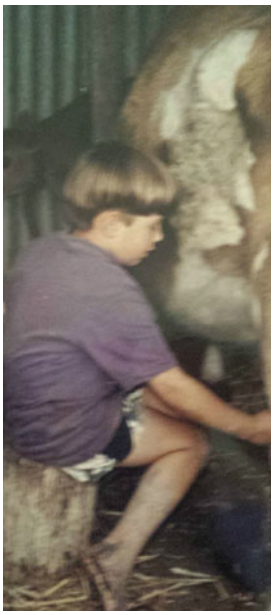

Fig. 4 Tom's photo of him milking the cows

showing children real examples of where their food comes from and how it is produced. Milk and eggs don't just come from the shop.

I think it's important to give children real connections with the common things that they all use and consume from nature, and to know where those things come from originally.

The unfortunate side to having constant close engagement with nature and animals is that I also encountered death and dying. Our dogs got bitten by snakes, we had to euthanize old or sick livestock and occasionally even horses, and shooting wild pigs and culling kangaroos were experiences I had to grapple with as a kid. This was perhaps balanced by helping birth calves in a paddock, raising baby chickens, and growing food. Therefore, life and death were concepts I had an understanding of as young child. The interactions with nature in rural areas are often quite harsh. It isn't very nice to jam a young steer in a calf crush, hold it down while it snorts and kicks, grab the red-hot irons out of the fire, and brand the calf on the rump while it bellows in pain. But a quick splash of tick treatment, maybe a quick castration, and then it seems they're all happily back out to pasture. That brutal type of experience is something that was accepted as part of the work that had to be done. But, as a young kid, witnessing the process showed me the harshness that non-household animals endure. If I find myself teaching in a rural area, I may have children in my classroom who live around livestock and who will have similar encounters.

I was lucky to have such a rich natural environment to explore as a child.

I have many memories of experiences, places, and connections that were formed while I was empowered to be, become, and belong through engagement with my natural surroundings. These experiences have helped form my own reflections and perspectives on nature and how I fit into it. As a teacher, I can draw on these experiences, and other resources, to inform my role as an educator. I hope to empower my learners to explore their own connections and experiences with nature.

The significance of "direct experience *with*" nature, and the influential role of the "responsive and accompanying adult," is captured in both Tom's story (above) and

Terry's story (below). For Tom, his experiences connected him to feelings of respect, care, and reverence for the more than human world. Far from being simplistic recounts of time in nature, Tom's stories also highlight moments of conflict, hardship, and deep feeling. And, he engages in reflection about how he will integrate his experiences and his stories with those of his learners.

Like Tom, Terry's grandmother played a key role in teaching her to appreciate the more than human world. Terry's account shows how her childhood experiences inform her love of nature and her educator commitments. She describes how she shares her *own* love and appreciation of nature with the children in her care and the particular approaches she takes to foster *their* love and appreciation of nature.

Terry: Being accompanied and loving the earth

Terry—*Since I was young my Nanna has been a massive influence. Her place always invoked a sense of excitement, of exploring the unknown and engaging in new adventures. Looking back at my experiences, I can see she was the perfect example of an ideal educator. Rather than 'filling a child with knowledge' I see the value of 'having children experience it themselves'. I see the relevance of this statement in the Early Years Learning Framework: "Children's understandings are constructed as they interact with and make meaning of their experiences in their complex natural and constructed (physical and social) worlds". Children learn better by experiencing than by being told.*

I remember when we would visit Nanna's and Poppa's place we would drive down their driveway and I would spot Nanna in her 'vege patch'. It became a game between me and my brother of 'who would find her first'.

*Once we arrived we would bolt for the garden (*Fig. 5*) and be given a snack—fresh from the garden. It would change with the season: sometimes strawberries, carrots, bananas, apples, mangos, or our favourite: 'the liquorice plant'.*

After our snack, we would be given simple jobs like watering the plants, mulching, feeding and watering the animals, putting the weeds in the compost heap.

Then the fun time of harvesting our lunch began. It was always a pizza which Poppa made—but the vegetables were always picked fresh from the garden by us, which seemed to always make the pizza taste extra amazing (and I can't seem to recreate that flavour again).

Fig. 5 Terry's Nanna's vegetable garden

With these experiences in my early years I naturally came to respect nature and wanted to look after my own 'patch'. This respect emerged not only in my home life, but my workplace as well. It took the form of me creating and looking after gardens in both my home yard and the childcare centres that I worked. In many centres, there was not enough room for me to create an elaborate garden so I have had to improvise and create 'mini-gardens'.

By experiencing living off the land from Nanna & Poppa I have found that wherever I live I seem to naturally have a vegetable garden and grow my own food to eat. I also conserve water, and have a 'scrap bucket' that I use for either animals or composting, depending on what I have at that point in time. These eco-friendly resource-management teaching strategies have naturally become a part of my everyday routine, and of course I impart my knowledge to the children through our daily routines.

Nanna's compost heap was a huge tank that had been cut to a quarter of its height. My brother and I used hunt for things to throw into it while Nanna pitched out forks of compost for her gardens. I remember watching the worms wiggling around in the compost heap each time she took out some compost.

Remembering my own childhood gardening with Nanna, and the knowledge I gained, influences how I interact with the children around me. While at work, I impart my own knowledge to the children while we garden, talking about nature, seasons, life cycles, companion planting, harvesting and so many other topics. And sometimes we just rest and watch the environment around us in the garden.

Children connecting with nature: the feel of the dirt, the smell of the natural environment, the taste of the fresh produce, the colours that beam in front of them, wildlife, and chattering companions—each of the senses processing information about their surroundings and optimising engagement in the natural environment.

I remember how as a child Nanna's garden had so many little nooks and crannies that I could hide in and just relax. I would listen to the wind and animals and just 'be a part of nature'. As an educator, I understand how important it is for children's and adults' wellbeing, to have that time to just let the wide world pass you by and to relax, and communicate with the natural environment around you. It could be as simple as looking at a flower beside you, sitting under the shade of a tree, feeding the fish and watching them fight over the food, or watching the sunrise or sunset. Beautiful moments to relax and let go of stress that has piled up.

Another way to instil a sense of wonder in the children is as simple as having them experience a storm or rain. Whenever it rains at the centre I work, the children rush to grab the cushions and sit on the veranda to listen to the rain and watch it make puddles. I like to use this beautiful teachable moment to my advantage and together the children and I move our plants out into the rain.

Terry's formative experiences have provided a basis for her interest in the environment, her feelings of concern for it, and her receptivity and responding. She is now passing this on to children and providing opportunities for children to respond receptively to the more than human world. Terry's practice of gathering children to sit and watch the rain, and moving the plants out in the rain, engages children in environmental sensitivity and environmental concern. Chawla and Hart (1995) consider that this fusion of feelings and sensations of the world can form the basis for children's awareness of the world as a living being to which they are attached. Similarly, Savannah's art-making (below) represents her fusion of feelings and her diverse emotional responses and communion with the ocean over her life-span. Savannah connects with her early feelings as a young child and to her current feelings, understandings, and appreciation of this interdependent relationship.

Through their storying, like many of the pre-service teachers, Terry and Savannah identify the sense of belonging, wellbeing, and centeredness they have experienced during "here and now" moments of "communicating with the environment" and "immersing" themselves in experiences with the more than human world.

Savannah: Sensing and feeling relationship

Savannah—*Innocence: This art piece* (Fig. 6) *represents the first stage of my personal connection to the ocean, being one of innocence, enjoyment, and fond family memories. Growing up in the coastal town of Busselton, in the South West of Western Australia, I spent many hours at the beach as a child. Looking back on these early years of my life, I feel my connection to the ocean was one of naive innocence and pure enjoyment, unclouded by the reality of any threat the ocean could cause me or by any current environmental issues. I associated the ocean with sand castles, fish and chips, ice-cream, sun-cream, and family time. I attempt to communicate this innocent childhood perception through an almost stereotypical depiction of the ocean, using light colours and 3D art mediums.*

*Antipathy: This second piece (*Fig. 7*) represents the second stage of my relationship with the ocean, when as an older child and young teenager, I developed a level of fear, due to some traumatic events I experienced. I attempt to depict a dark and formidable wave in the second frame, communicating the sheer power and uncontrollable force of the surf. It was at this point in my life when I experienced what it was to be dumped by one of these waves and my reaction at the time was to retreat from the ocean, due to the loss of control I experienced in that moment. For a long period of time I would walk a tightrope of emotions: on one side holding a true fear connected with the strength of the waves, on the other side still craving that innocent childhood enjoyment.*

*Harmony: The final art piece (*Fig. 8*) is a 3D layered effect I have created using multiple prints of a photograph. The original image is one that is very dear to me. It was taken of myself and my husband, by a close family friend, in the lead up to our wedding day. The location is one of my husband's favourite coast lines in the South West of Western Australia and coincidentally, not far from where my previously mentioned trauma occurred. I feel this image is an appropriate representation of my adult relationship with the ocean, which has*

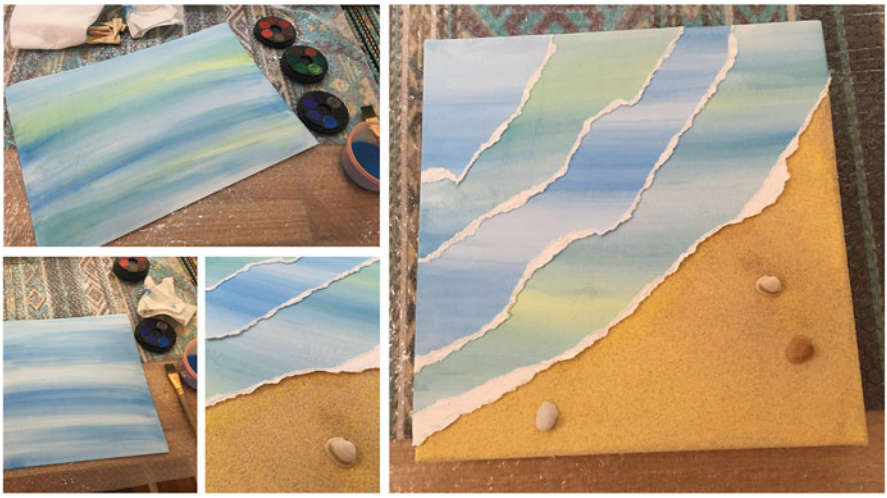

Fig. 6 Savannah's collage illustrating early innocence and connection with the ocean

Fig. 7 Savannah's collage illustrating her changing relationship with the ocean and her sense of antipathy and fear

Fig. 8 Savannah's collage representing her adult relationship with the ocean, characterized by respect, connection, and harmony

become one of deep respect, connection, and harmony. During my later teen years and adult life up until this point, I have grown to love the ocean at a deeper level. My once limiting fear has now become healthy caution, respect, and understanding of the strength the ocean holds. As an adult, I have also learnt of the vulnerability of the worlds' oceans and sea creatures. I realise how fragile this aspect of our environment currently is and that it is my responsibility to contribute to sustainability efforts. On a spiritual level, I now experience a cleansing and grounding effect when I visit the coastline of Australia. Stress will melt away from my body and I feel much more centred after immersing myself in the healing salty

waters. This photograph communicates a stunning coastline, powerful currents, the connection between two people, and most importantly, their deep respect of the amazing environment they have the privilege to have grown up in. The strong connection I have developed with the environment will enable me to adopt a holistic approach to my future vocation. "We are all visitors in this time, this place. We are just passing through. Our purpose here is to observe, to learn, to grow, to love... and then we return home"—Australian Aboriginal Proverb

These story excerpts and creative and historical artifacts are visual and "textual representations of different experiences" (Denzin, 2003, p. 5). They highlight how the materials and experiences of one's life influence understandings and educational commitments (Golden & Elbaz-Luwisch, 2007).

Creating narrative accounts and creative artifacts supported pre-service teachers to remember, revisit, and renew their appreciation of early experiences in the natural world. Through writing and creating, pre-service teachers became sensitive to embodied emotions and those significant times in their histories that moved them and which move and resonate with them still.

This kind of approach was meaningful to these university students. Pre-service teachers' evaluation (63% response rate) of this sustainability-focused early childhood course both statistically (4.9 out of 5) and qualitatively reflects their appreciation of opportunities to make personal/professional connections:

I loved this course. It helped me articulate ways that I can implement sustainable practices into an early childhood setting as well as how I can pass on this passion to the next generation of children.

I loved our creative piece for assessment, and the hands-on learning experiences we were provided with. I was able to show my own personal view and understanding.I have loved this course and I will take it with me forever.

I have reconnected with my appreciation for our environment and the need to live a sustainable life.

For these pre-service teachers, engaging in reflection about their own childhoodnature experiences, their *being*, and their sensory, embodied, cognitive knowing has supported articulation of commitments and desires to contribute to social change. Reflection has supported deeper understandings and appreciation of their relationships and encounters with nature, which have now become integrated into identified educator commitments.

Educator Commitments

Our perspectives and priorities shift over the course of our lives. But, remembering and revisiting experiences can (re)connect us with what we value and support the transformation of priorities. Remembering the wonder cultivates the wonder, supporting our receptivity and priorities for the world around us.

The teacher education course has provided pre-service teachers with a place to tend to their relationships and understandings. They have had an opportunity, as Rautio (2013a, pp. 452, 453) describes, to tend to their "self-environment

relationships" and engage in "the articulating – finding, inventing, and rearranging – of connections" and "conceptualizations" with and about human and more than human worlds. And through this articulating, they are recognizing their commitments and hopes for children and the important role they play in facilitating significant life experiences for the children they will teach.

Adam—*After writing my narrative, I feel grateful for the opportunities I was afforded as a child. My experiences have had a huge influence on my personal connection to nature and my wellbeing. In my adult life, I use the natural world and the connections I have made to it, to assist my health and wellbeing, both physically and mentally. Whether it is going for a run or walk outside or going and lying in the park or the beach and reading a book, being in the natural world, has a calming effect on me. The physical feeling of the wind, sunshine and the noises of leaves rustling in the breeze or birds singing is to me a soothing feeling.*

These personal experiences are something I intend on using in my approach as an early childhood teacher—and with mental health issues in young people on the rise, the natural world and its benefits have never been more important. As an educator, I understand that not all children in my care will have had a rich and nurturing experience to the natural world. Children come from diverse backgrounds and situations.

Deb—*The environment has always been a valuable part of my life. I hold a great respect and appreciation for the outside world. I would like to do everything that I can to support children in learning and valuing the same principles that I have. I realise that many children do not have many opportunities at home to engage and explore nature. Everywhere I have ever lived I have always developed a deep sense of belonging and sense of place. This is because of my strong connection with that natural world. I feel safe, secure and supported in nature and I wish to ensure that I support children in doing the same. Growing up in an aboriginal community has also supported and developed my understanding of the importance of developing a sense of place and cultural appreciation. I want to envision a better future for myself and for children; to think critically and reflect; to question current beliefs; and acknowledge links and synergies; to build effective partnerships with families, children and the wider community; and participate with children in decision making about issues that affect us.*

Louise—*Reflecting on my own experiences with nature and the natural world, as a future educator I want to create learning environments that are authentic, engaging, supportive and safe for the children, families and the community. I believe that wellbeing, along with wonder, curiosity, respect, belonging and connectedness are crucial for a young child's healthy development. Making time to be in natural environments, and providing opportunities for children to freely and independently explore, discover, imagine and investigate, will contribute to children's sense of place, connectedness, belonging and wellbeing. Children need to engage in unstructured time to play within nature and follow the wisdom within their own bodies and hearts—as this is when we learn our most expressive and important lessons.*

Conclusion

This Chapter offers a space for reflective exploration. Recognizing that early childhood educators are uniquely placed to support children's childhoodnature encounters and relationships, it focuses on pre-service teachers and provides an assemblage of significant life experiences from their childhoods. It provides points for

philosophical rumination, on topics such as *attending, being,* and *remembering the wonder.*

Knowing that the early years are an important and foundational time, and recognizing how critical it is that pre-service teachers understand their professional roles and responsibilities, we can feel concerned about how we can support teachers in establishing personal direction and guiding principles for early education for sustainability. Although we might worry about how they will learn the information they will need, this chapter redirects us away from information transmission and toward *being*, toward *embodied ways of knowing*, and toward *story.* Pre-service teachers' *own* experiences and stories are important resources for connecting and contextualizing what matters. Using the resources of their own significant life experiences invokes a desire to attend to such experiences and relationships *with children*.

The methodologies used in this project, including storytelling and arts-based approaches, have supported "consciousness transformation" and provoked "pre-sencing" (Bai et al., 2010, p. 361). They provided ways for pre-service teachers (and others) to bring their attention to their experiencing and being in relationship. The power of narratives as invitations to rethink and reflect and to support our navigation of the changing landscapes of environmental education and sustainable worlds is immense (Hart, 2003).

Opening spaces for embodied remembering and consciousness transformation – rather than information transmission – is important. We need to offer spaces (in teacher education and in early childhood education) for *being* – for remembering senses and feelings and perceptions and dwelling (again) in significant experiences and relationships. Stories support these ecological homecomings; they return our attention to meaningful and resonant experiences. As Bai et al. assert (2010, p. 362) "Yet we may forget who we are, and have lost our way—not in the forest but in discursive languages that take us away from our senses and presence.. . [s]torytelling can return us to our bodies and senses, and to our indwelling presence.. . storytelling is really the heart of environmental education."

Cross-References

- ▶ Moving Beyond Innocence: Educating Children in a Post-nature World
- ▶ Children's Imaginative Play Environments and Ecological Narrative Inquiry
- ▶ The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment
- ▶ Fostering an Ecological Worldview in Children: Rethinking Children and Nature in Early Childhood Education from a Japanese Perspective
- ▶ Children's Imaginative Play Environments and Ecological Narrative Inquiry
- ▶ Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development
- ▶ Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective

- The Nature of Childhood in Childhoodnature
- Troubling Intersections of Childhood/Animals/Education: Narratives of Love, Life, and Death
- Wild Hope: The Transformative Power of Children Engaging with Nature

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Significant Life Experiences that Connect Children with Nature: A Research Review and Applications to a Family Nature Club

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Abstract

In past research on significant life experiences (SLE) that influence environmental values and behaviors, a triad of experiences frequently emerge: free play and exploration in nature in childhood or youth, influential role models who communicate nature's value, and opportunities to learn how to take action on nature's behalf. This Chapter opens with a review of past SLE research and theories of child development that predict these repeated findings. It also reports on an

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evaluation of family nature clubs (FNCs) – community-based organizations that regularly bring families together to enjoy nature together, creating conditions for families to share all three of these experiences that have been associated with care for the natural world. This study of more than 330 FNC leaders and participants found both quantitative and qualitative support for the effects of these formative experiences. Statistically significant survey results are complemented by ethnographic observations and interviews that offer insight into what happens during these experiences that makes them important and lasting in memory. The consistency between this study's results, previous SLE research, and relevant concepts in the psychology of child development is discussed.

Keywords
Significant life experiences research · Childhood time in nature · Family nature clubs

Introduction

What childhood experiences lead some people to feel a bond of connection with the natural world and understand that they are part of the interdependent web of life? What early experiences encourage lifelong expressions of care for other parts of the natural world? Efforts to answer these questions have come to be called "significant life experience" (SLE) research: the study of experiences that promote the development of values and behaviors consistent with awareness of and appreciation for nature (Tanner, 1980). The first part of this Chapter reviews studies that have sought to answer these questions. The second part of this Chapter adds new content to this literature from a study of family nature club leaders and participants from six countries.

Family nature clubs (FNCs) bring families with growing children together at regularly scheduled times to explore natural areas in their local surroundings. The design of FNCs can vary widely, but they all offer events that occur outdoors, are geared toward full family participation, and are intended to develop positive connections with nature through direct experience. The majority of the FNCs included in this research were registered with the Children and Nature Network, an international organization that promotes FNCs (www.childrenandnature.org). This research was able to relate parents' perceptions of significant experiences, as captured through surveys and interviews, to researcher observations of what actually occurred during experiences in nature via the case study of a new family nature club created specifically for this purpose. This Chapter is the first to connect FNCs to research about SLEs.

This Chapter also seeks to connect SLE research to well-studied aspects of child development that may help explain recurring results. Significant experiences in nature appear to embody basic processes of development, including the development of agency and a sense of competence, social modeling when children look to role models to determine how they should act, joint attention when two or more people knowingly focus their attention on the same object or event, empathy, sympathy, and

an environmental identity when people's relationship with their environment becomes an important part of their sense of self. This Chapter considers how its findings about FNCs correspond to these developmental processes. The conclusion discusses parallels between past SLE research and the new study presented here.

Review of Significant Life Experiences Research

Defining a New Field of Research

Engagement with nature through direct experience has many immediate positive benefits for children (Chawla, 2007, 2015); and from a life span perspective, it is the most frequent experience associated with later action on nature's behalf. It is only one of a sequence of experiences, however, that motivate later interests in nature and caring environmental behaviors, whether they are expressed through environmental career choices or volunteer activities (James, Bixler, & Vadala, 2010). Efforts to identify key events in this process, or significant life experiences (SLE), began in 1980 with a seminal paper by an environmental studies professor, Tom Tanner, who noted the need to understand the kinds of learning experiences that produce "an active and informed citizenry" who will work to maintain "a varied, beautiful, and resource-rich planet" (Tanner, 1980, p. 20).

The investigation of formative childhood experiences that encourage people to feel connection and care for the natural world began with retrospective studies. Through interviews (Chawla, 1999; Peterson, 1982; Peterson & Hungerford, 1981) and written narratives (Palmer, 1993; Tanner, 1980), people were asked what motivated them to choose careers in conservation work or environmental education or why they became engaged in actions to preserve or protect the natural environment. Findings from Peterson's (1982) qualitative study were integrated into quantitative surveys that examined statistical associations between childhood experiences and environmental values and behaviors in adulthood (Marcinkowski, 1988; Sia, Hungerford, & Tomera, 1985/86; Sivek & Hungerford, 1989/1990).

The second SLE study, by Peterson (1982; Peterson & Hungerford, 1981), had the goal of identifying life experiences associated with "environmental sensitivity." According to the Tbilisi Declaration drafted by international leaders in environmental education in 1977, one of five major objectives of environmental education is "to help social groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems" (UNESCO, 1980). In an often cited paper, Hungerford and Volk (1990) listed environmental sensitivity as the major "entry-level" variable in their model of life pathways in the development of responsible environmental citizenship. Whether SLE research should focus on the outcome of action for the environment, or antecedents of action like environmental awareness and sensitivity, was an early controversy (Chawla, 2001; Payne, 1999; Tanner, 1998). In practice, studies have investigated diverse outcomes that include environmental sensitivity, awareness, attitudes, values, interest, concern, and career choices as well as committed activism. Environmentally active subjects have included

volunteers at marine centers, natural history enthusiasts, farmers who maintain wildlife habitat, teachers of environmental education and geography, members of environmental organizations, political activists, and people in the general population who take relatively simple steps like recycling and voting for green candidates (Chawla & Derr, 2012).

Previous Literature Reviews

A series of reviews of SLE research have traced the field's methods, measures, and findings over the years. In a review of early studies and a subsequent investigation of life paths into environmentalism, Chawla (1998a, 1999) noted that people mentioned multiple experiences that included both direct engagement with nature and learning how to interpret nature in positive ways. In seven qualitative studies based on interviews and open-ended narratives, she found that people referred most often to time outdoors in natural areas, often through childhood play and exploration, but other common responses were witnessing habitat destruction, teachers or education, youth groups, and books. She also made recommendations for strengthening future research, including working with more diverse social and ethnic groups and a broader range of environmental issues, and including less environmentally active comparison groups (Chawla, 1998b, 1999). Since she wrote, the field has moved in these directions. Beyond its origins in the United States, studies now include samples from Canada, El Salvador, the United Kingdom, Ireland, Norway, Germany, Switzerland, Lithuania, Slovenia, Greece, South Africa, Uganda, China, Sri Lanka, Taiwan, Hong Kong, Japan, and Australia (see studies reviewed in Chawla and Derr (2012) and, more recently, studies by Catling, Greenwood, Martin, and Owens (2010) and Li and Chen (2015)).

Marcinkowski (2001) reviewed applications of a survey created by Sia (1984) to distinguish the life experiences of more versus less environmentally active people. Sia's index of "environmental sensitivity," based on Peterson's (1982) study, asked people whether they were involved in hunting, fishing, and hiking as children or adults and whether they were influenced by parents, teachers, or books. (Hunting and fishing are often a way of life in rural areas, and many rural people learn outdoor skills and the ecology of natural habitats through these practices.) When Sia (1984) collected surveys from members of Sierra Club chapters and participants in an elder hostel, people who reported many responsible environmental behaviors versus few scored significantly higher for environmental sensitivity as well as knowledge of environmental action strategies and self-perceived action skills. When Sivek and Hungerford (1989/1990) used the same survey with members of fishing, hunting, and trapping associations in Wisconsin, these three variables, again, were most strongly associated with behavior scores. When Marcinkowski (1988) used an extended version of the survey with members of the US Sierra Club and Audubon Society, behavior scores were most strongly explained by knowledge of environmental action strategies. Together, these studies indicate that significant childhood experiences may increase the likelihood that people will take action for the

environment as adults, but action is also influenced by whether people know what they can do and believe they can act effectively.

Sward and Marcinkowski (2001) reviewed research on SLEs associated with measures of environmental sensitivity, concern, and action, with an emphasis on studies published from 1980 to 1998, but with attention to relevant studies prior to 1980. They covered many of the same studies as Chawla (1998a) and found similar results: people often identified direct experiences of nature, role models such as family members and teachers, and involvement in outdoor-oriented youth organizations or camping. When they examined studies of people who chose careers in natural science or environmental education, they found the consistent importance of outdoor experiences. Like Chawla (1998a), they noted the need for future studies to include comparison groups who are not environmentally sensitive or active.

Two more recent reviews have covered both the SLE literature and evaluations of environmental education programs. Wells and Lekies (2012) found that the results of Tanner's (1980) initial study have been repeatedly confirmed by subsequent descriptive studies, including the importance of time in nature, influential individuals, books, and seeing the loss of valued natural places. They noted that the greatest commonality across all studies is "the importance of time spent outdoors in natural habitats during youth" (p. 206). They observed that studies in this field typically focus on people in environmental careers or activism, so results may not be generalizable to other groups or the population at large. Relatedly, because descriptive studies like Tanner's rely on self-report, they are limited by the potential inaccuracy of memory. "Is it the case," Wells and Lekies (2012, p. 207) asked, "that certain childhood experiences lead people to be dedicated to the environment? Or, rather, do individuals construct coherent stories of their life experiences leading up to their ultimate environmental careers or activism?" An autobiographical approach may generate hypotheses, but it cannot establish causal connections.

Turning to quantitative surveys, Wells and Lekies (2012) observed that these studies support a connection between childhoodnature experiences and later pro-environmental attitudes and behaviors. Reviewing seven studies that involved large, general population samples from the United States, Germany, and Scotland, they found that people who reported spending time in nature in childhood were more likely to express favorable attitudes to trees and natural areas, perform actions like recycling and environmental cleanups, support nature protection, prefer natural areas for recreation, understand biodiversity, and express ecocentric beliefs. Although these studies lend validity to descriptive studies, they also rely on memory. To make causal claims possible, Wells and Lekies recommended longitudinal designs.

In a review that covered 39 publications related to significant life experiences, Chawla and Derr (2012) noted that whether studies involved interviews, questionnaires with open-ended narratives, or surveys of large samples, the most common antecedent of valuing and caring for nature was time in nature in childhood and youth. Other frequent results were participation in environmental or nature-based organizations, influential people or books, and the loss of valued natural areas. In two studies, one in Japan and one in the United States, that compared people who demonstrated interest and care for nature with others who did not, positive contact

with nature in childhood was the distinguishing factor (Furihata, Ishizaka, Hatakeyama, Hitsumoto, & Ito, 2007; James et al., 2010). A unique study observed elementary school children in upstate New York as they engaged in intense creative play and fort building in a natural area that adjoined their school and then, unexpectedly, as they witnessed it being bulldozed and coped with its loss (Blizard & Schuster, 2004). The children expressed strong emotions of attachment to their natural play area and sadness and anger over its loss. This longitudinal case study illuminated the importance of both nature play and the loss of valued habitat.

As another means of insight into experiences that shape children's environmental values, attitudes, and actions, Wells and Lekies (2012) and Chawla and Derr (2012) also reviewed studies that evaluated outcomes from environmental education programs. They drew similar conclusions. Programs are most likely to increase concern for nature and pro-environmental behaviors when students are actively engaged in hands-on activities that include direct experiences of nature, they address meaningful local issues, they do their own investigation and information gathering, and they have extended or repeated exposure to a program. These characteristics of impactful programs may help explain why nature-based programs often emerge as a significant life experience.

New Directions for Significant Life Experiences Research

SLE studies that have been published since 2010 and not included in previous reviews confirm preceding results but also explore this subject with new groups and new methods. A paper by Place (2016) brings the field full circle to its beginnings. Tanner (1980) was motivated to initiate the study of SLEs after reading biographies and autobiographies of prominent conservationists. When Place (2016) examined histories and personal writings of five prominent conservationists in the United States, the three strong strands that ran through their early lives were childhood exploration of nature, a parent or grandparent who taught them to notice and appreciate nature, and books about natural history and outdoor adventure.

Extending the study of formative experiences that motivate environmental career choices to a new career area, Catling et al. (2010) found that geography teachers identified time in nature, influential parents and teachers, an enjoyment of maps in childhood, and, later in life, fieldwork as the main experiences that excited them to pursue geography. Extending SLE research to China, Li and Chen (2015) found that environmentally active citizens were most likely to write about time in nature – primarily in childhood, organizations, environmental destruction, education, and role models. In a follow-up survey, a large sample of Chinese college students identified participation in environmental organizations, nature experiences, and their college education as most important.

A new subject of study is the background of people who are taking action against climate change. Pearse, Goodman, and Rosewarne (2010) investigated the lives of adult climate activists in Australia, Fisher (2015) interviewed international youth

climate activists, and Howell and Allen (2016) surveyed people involved in climate change writing, education, and mitigation. Although positive engagement with nature was an important influence for some respondents, other experiences were more common: direct contact with environmental problems and their social consequences, learning at work or in organizations, education, influential people, and media. Howell and Allen (2016) observed that for climate activists, social justice themes are more important than nature connection.

Fisher (2015) noted that the international growth of environmental youth groups has provided new opportunities for significant experiences, as several young activists talked about the sense of inclusion and empowerment that they gained from being part of the climate movement. In previous studies by Sivek (2002) and Arnold, Cohen, and Warner (2009), youth found the identity and relationship that they felt at environmental gatherings to be significantly motivating and sustaining. Empowerment from working with others was also important in Ceaser's (2015) study of environmental justice activists. When Colvin Williams and Chawla (2015) interviewed adults who had participated in nature center or wilderness programs as children or teens, salient memories included direct encounters with nature, inspiring guides, and their sense of pride in belonging to their group. Colvin Williams and Chawla related free exploration and guided learning in nature to the development of an ecological identity formed through a personal history of connection with nature (Clayton, 2003; Thomashow, 1995), and the sense of group belonging to an emerging social environmental identity, as people came to identify themselves with others who actively work on the environment's behalf (Kempton & Holland, 2003). The work by Ceaser (2015) and Fisher (2015) suggests that the second type of identity may be primary for climate justice and environmental justice activists.

Two recent studies open promising new paths for longitudinal designs. In a small qualitative study, a preschool class was observed as the children visited a river in a state park in the United States each week over the course of a year (McClain & Vandermaas-Peeler, 2016). The children's understanding of the natural world developed through a combination of their own direct exploration and inquiry along with teachers' questioning, and teachers promoted children's appreciation for nature and stewardship behaviors. A larger longitudinal study measured the environmental attitudes and behaviors of 118 young people at ages 6 and 18 and surveyed their mothers when their children were 6 about their children's outdoor play habits in their upstate New York towns and their own environmental attitudes and behaviors, political values, and level of education (Evans, Otto, & Kaiser, 2018). They found that 18-year-olds reported more pro-environmental behaviors and attitudes when they spent more time outdoors at 6, and their mothers expressed more pro-environmental attitudes and behaviors and more liberal political values. Future longitudinal studies can build on the strengths of these two approaches by combining children's and parents' responses to standardized survey measures with observations of children's interactions with the natural world at repeated points in time.

Pivotal Processes in Child Development

Although SLE research identifies experiences associated with appreciation and care for nature in later life, it sheds limited light on why these experiences have lasting influence. It has not yet predicted outcomes based on well-established processes of child development and child-environment relationships and then observed whether the predicted results occur. This Chapter seeks to build a foundation for research of this kind by proposing that key experiences identified in past studies are not surprising: they represent basic processes of learning agency in the world, learning what to notice and value, and developing a self-identity related to the environment. This section proposes processes of child development that may underlie existing findings.

Agency and a Sense of Competence

Theories of agency suggest why people frequently remember childhood play in nature as a meaningful experience, as the natural world is rich in opportunities for children to develop agency and a sense of competence. In a classic paper, White (1959) identified a strong intrinsic motivation in humans and other animals to exercise autonomous agency and experience competence in engaging with the environment. Intrinsic motivation and agency are also core parts of the self-determination theory of Ryan and Deci (2000). Defining intrinsic motivation as "the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn," they noted that relating to the environment in this way fosters feelings of vitality, competence, and self-esteem, which contribute to a general sense of well-being (Ryan & Deci, 2000, p. 70). They observed that intrinsic motivation and agency are facilitated by environments that offer optimal challenges: not only repetition of what a child can already do but opportunities to take the next attainable step. Other important elements of supportive environments are feedback that offers clear evidence of achievement and people who give positive evaluations and encouragement.

Synthesizing a large body of research regarding the development of a sense of self-efficacy, or people's belief in their ability to achieve personally valued goals, Bandura (1997) came to similar conclusions. Above all, people experience this healthy sense of efficacy or competence when they enjoy mastery experiences and demonstrate to themselves and others that they can be successful. When they achieve significant goals by working with others, then a sense of self-efficacy combines with a sense of collective efficacy, with feelings that we did this together and I contributed my part. Other supports for self-efficacy are coaching and encouragement from others, reassurance that feeling stressed or anxious in undertaking daunting challenges is normal rather than a sign of inadequacy, and seeing others with whom one identifies achieve desired aims (Bandura, 1997).

The ecological approach to perception and action of James Gibson (1979) also emphasizes the importance of agency, with close attention to relationships between

an organism and its environment. According to Gibson's theory of affordances, the opportunities for experience and action that an environment offers depend equally upon the physical features of a place and the capabilities of an organism. A tree affords climbing for a child, for example, only if its lowest branches are within her reach and she has the strength to pull herself up. Therefore, as children explore the environment, they simultaneously learn about the characteristics of the world and their own capabilities.

Viewed through the lens of these perspectives, the natural world is filled with opportunities for engrossing and exhilarating experiences of agency that sustain intrinsic motivation (Chawla, 2007). In Ryan and Deci's (2000, p. 70) words, it is full of "novelty and challenges, to extend one's capacities, to explore, and to learn." As children play in nature, they can select optimal challenges for themselves – and each success is a mastery experience. As they dam a stream or build a fort, the environment provides clear feedback about their abilities, and when they accomplish goals together, they experience a sense of collective as well as personal efficacy. Given the centrality of intrinsic motivation and autonomous agency for healthy functioning, vitality, and wellbeing, it is not surprising that childhood play in nature emerges as a significant experience.

Social Modeling and Apprenticeship

When people in SLE studies identify influential adults in their childhood, they commonly describe them as role models of appreciation and care for nature, who notice and talk about plants, animals, and places and introduce the child to stewardship practices. These stories suggest processes of social modeling, joint attention, perspective taking, direct instruction, and practice in helping skills that have been associated with the development of prosocial and, by extension, pro-environmental behaviors. By watching what others do, engaging with others in joint attention to things and events in the world, and acquiring skills through apprenticeships, children learn what others around them consider important in the natural world, how to respond, and how to engage with nature with competence and care.

According to the social learning theory of Bandura (1986), people learn by observing others as much as through their own exploration, and this extends to learning emotional responses and socially approved ways of interacting with people, animals, and objects. A child is more likely to pay close attention and reproduce what another person does if this person has pleasing characteristics and she is doing something functionally important that gains benefits and if the child finds imitation rewarding. Rewards can be intrinsic, through the pleasure of the action itself and the sense of competence and achievement it engenders, or they can be material gain or social approval. The role models identified in SLE research have influential characteristics. As family members, teachers, or mentors, they spent extended time with the child or youth, who had many opportunities to observe them, and they commonly engaged in rewarding actions and expressed emotional warmth and approval.

In the body of SLE research, people often describe episodes of joint attention with role models. Joint attention happens when two or more people notice the same thing with a mutual understanding that they are sharing this experience, and it is central to

learning what other people consider worth noticing and how to respond (Carpenter & Liebal, 2011). It is not only one-directional, with a child learning from others. At its best, it happens when an adult or friend directs a child's attention to an object in nature as something worth stopping to watch and appreciate, *and* when others enjoy something that a child points out, affirming the value of the child's interests.

Joint attention and social modeling combine when children participate in apprenticeships and learn a set of skills through shared activities under the guidance of someone more experienced (Rogoff, 1990). Through this involvement, children gradually develop competence to take responsibility for this activity themselves, at the same time as they learn the activity's meaning and value in their culture. Many significant experiences that people remember involve apprenticeships in the environment under the guidance of family, teachers, or other adults, such as farming, gardening, camping, fishing, and bird watching (Bixler, James, & Vadala, 2011; Chawla, 1999). Through these activities, young people develop competence in the natural world.

Sympathy and Stewardship

Empathy is an innate tendency to apprehend the feelings of another creature by experiencing similar feelings, such as when a baby exhibits distress when someone nearby cries (Hoffman, 2000). As young children begin to distinguish the feelings of another from their own, adults need to help them extend their innate capacity for empathy to sympathy, which combines awareness of others' feelings with concern for their situation, and to encourage the disposition to help (Eisenberg, 1992). Adults do this by demonstrating caring behaviors themselves, showing that they value expressions of kindness, giving their child instruction and practice in helping skills, and encouraging social perspective taking when they ask their child to imagine standing in another's place (Eisenberg, 1992). Without this guidance, children may act detached or seek to escape the scene when they witness another's suffering or need (Eisenberg & Eggum, 2008).

Similar processes appear to foster the development of empathy, sympathy, and care for non-human animals and elements of the natural world (Chawla, 2009). When young children imitate animals' gestures, facial expressions, and vocalization with similar body movements and emotions of their own, Myers and Saunders (Myers Jr. & Saunders, 2002) hesitate to use the term "empathy" for children's responses – given the difficulty of interpreting animal behavior accurately – but they propose the related concept of "cofeeling." Gebhard, Nevers, and Billmann-Mahecha (2003) found that young children also tend to attribute emotions to trees. Several researchers have proposed that when adults encourage children's perceptions of similarity between themselves and other living things, they create a basis for active care for nature and a belief that the natural world has moral standing (Chawla, 2009; Gebhard et al., 2003; Kahn, 1999; Melson, 2001; Myers 2007; Myers & Saunders, 2002).

Environmental Identity

Whether a person develops an identity as someone who is part of nature, deeply connected to it, and committed to conserving and protecting it, is another important

environmental orientation. One facet of this orientation is what Thomashow (1995) and Clayton (2003) call an ecological or environmental identity. As they define it, an ecological identity involves people's feelings, values, and understanding regarding their relationship to the Earth and all living things, and it reflects their personal history of engagement with nature and often their emotional attachment to a particular place. They note that people who report feeling connected to nature typically have an extensive history of nature experiences.

Although people who express an ecological identity tend to report taking personal actions for the environment (Clayton, 2003), Kempton and Holland (2003) claim that sustained and organized action for the environment requires a social environmental identity, when people integrate membership in an environmental group into their self-identity. This may be a general self-definition, such as "environmentalist," "naturalist," or "animal lover," or identification with a specific group such as Friends of the Earth or the Sierra Club. Through group activities, the cultural world of environmental action becomes more salient, people identify themselves as actors in this world, and they gain practical knowledge about how to act effectively. Kempton and Holland's (2003) emphasis on a social environmental identity for sustained environmental action is consistent with the importance of environmental and nature-based organizations in many SLE studies (Chawla, 1999; Ceaser, 2015; Colvin Williams & Chawla, 2015; Fisher, 2015; James et al., 2010), including studies with adolescents and youth (Arnold et al., 2009; Sivek, 2002). These studies indicate that a social environmental identity, as well as an ecological identity associated with direct engagement and connection with nature, can begin to develop in childhood.

Significant Life Experience Research in the Context of Family Nature Clubs

The second part of this Chapter shares an evaluation of FNCs that apply SLE results by making three formative experiences available to children and their parents: time in nature, role models of nature appreciation, and membership in a nature-based organization (referred to as the youth nature triad for ease of reference moving forward). Taking many forms depending on their context, FNCs are community-based organizations that regularly bring families together to enjoy the benefits of time spent in nature (D'Amore, 2016). Some FNCs are small, while others are quite large; some meet at the same place each week, while others make a point of going to a new place for each gathering; some are focused on education, while others are focused on free play; some are run by a parent volunteer, while others are part of a larger organization's mission (D'Amore, 2015). FNCs can be adapted to diverse community interests and conditions.

FNCs are part of a growing movement to reconnect people with the natural world (D'Amore, 2015). The Children & Nature Network (C&NN) is a leader in this international movement and promotes FNCs as a form of self-replicating social change that can help to scale up family and community engagement with the natural

environment. At this time, there are over 275 FNCs registered with C&NN, the majority of which are in the United States.

A long-term longitudinal study would be required to assess how participation in an FNC as a child impacts environmental behavior as an adult. However, FNC participation has the potential for a number of near-term effects, including changes in time spent in nature and household environmental behavior as well as a sense of connection to nature, individual and family wellbeing, sense of community, and social engagement. From 2014 to 2015, one of this chapter's authors conducted a study to understand FNCs and the near-term effects of participation in these organizations (D'Amore, 2015). Her sample drew from FNC leaders and adult participants in six countries, primarily in the United States and Canada. Other countries included New Zealand, Peru, Germany, and England. All study participants were asked to complete an in-depth survey, and the FNC leaders were invited to also complete an interview based on the most significant change (MSC) technique (Dart & Davies, 2003). In her community of Columbia, Maryland, she created the FNC named Columbia Families in Nature (CFIN) as a case study for this research. After each family's first CFIN event, they were invited to take an initial survey. The researcher also recorded direct observations of family participation in each event. After attending six events, CFIN parents were sent a post-survey that included questions about their club experiences. The parents that complete the post-survey were invited to participate in an in-depth interview based on the MSC technique. As a comparison group, parents who expressed interest in CFIN but never attended were sent a shorter version of the pre-survey given to other parents after attending their first event. This combination of quantitative and qualitative methods, shown in Table 1, facilitated the exploration of FNCs from multiple triangulated perspectives. For the surveys and full descriptions of the samples and methods, see D'Amore (2015).

Quantitative survey analysis was done using Excel for descriptive statistics and t-tests and Python for regression analysis. The significance threshold was set at .05. Qualitative data from interviews and open-ended survey questions were analyzed using an open coding process to identify common themes (Patton, 2002). This Chapter reports on portions of this study relevant to SLE research. The data and analyses that this section presents cover participants' experiences in nature in childhood and youth, family time spent in nature, sense of connection with nature, and pro-environmental behavior.

Youth Nature Experience Triad

The surveys administered to FNC leaders and adult participants included three statements drawn from the "youth nature experience triad" found in past SLE research: (1) playing outside in nature was an important part of my childhood; (2) as a child, there was at least one adult (parent, grandparent, etc.) that spent time with me outside and helped teach me an appreciation for nature; and (3) during my youth, I participated in an organization that had a nature and/or environmental

Table 1 Study methods and samples

	Participants	Methods
Overview of FNCs	FNC adult participants $N = 170$	28-item survey
	FNC leaders $N = 52$	28-item survey
	FNC leaders $N = 20/52$	Most significant change interview
	FNC leaders and adult participants $N = 190$	Effects validation survey
Case study of CFIN	Club parents $N = 81$	24-item pre-survey
	Club parents $N = 29/81$	18-item post-survey
	Club parents $N = 28/29$	Most significant change interview
	Parents in comparison group $N = 45$	20-item comparison group survey
	Participant observer of 133 club families at 31 outings	Informal conversations, field notes, reflexive journal, photographs, archive of club history

focus. Participants were asked to score each statement along a five-point scale from strongly agree to strongly disagree. A total of 337 study participants completed this section of their surveys (Table 2).

FNC leaders were most likely to state that playing outside was an important part of their childhood (95%) and that they had a role model for nature appreciation (68%). FNC participants also indicated that playing outside was an important part of their childhood (83% for the FNC sample, 80% for CFIN pre-survey respondents); and slightly more than half stated that they had a role model for nature appreciation (56% for the FNC sample and 59% for CFIN pre-survey respondents.) The response rate for involvement in a nature-focused organization was similar for FNC leaders (46%), FNC participants overall (46%), and CFIN pre-survey respondents (41%).

Group responses were compared using a two-tailed, type-three t-test (Maxim, 1999). FNC leaders ($n = 52$) were significantly more likely to agree with the statement that "playing outside in nature was an important part of my childhood" than FNC participants including CFIN pre-survey respondents ($n = 242$, $p = 0.001$) or the control group of parents ($n = 43$) who expressed an interest in CFIN but never attended ($p = 0.0035$). There was no significant difference between the participant and control groups ($p = 0.307$). There were no statistically significant differences between these groups' responses with regard to having an adult who spent time outdoors and taught appreciation for nature when they were young. For the prompt "during my youth, I participated in an organization that had a nature and/or environmental focus," FNC leaders were significantly more likely to agree than FNC participants (the FNC overview sample as well as those in CFIN ($p = 0.0226$).

Table 2 Youth nature experience triad response comparisons ($n = 337$)

	FNC leaders	FNC participants	CFIN post-participants	CFIN pre-participants	CFIN comparison
Respondents	52	162	28	80	43
Playing outside	[a]**95%** [b]**3.73**	[a]83% [b]3.36	[a]68% [b]2.96	[a]80% [b]3.26	[a]82% [b]3.14
Adult role model	[a]68% [b]2.83	[a]56% [b]2.48	[a]50% [b]2.25	[a]59% [b]2.55	[a]58% [b]2.49
Nature organization	[a]46% [b]2.27	[a]46% [b]2.19	[a]64% [b]2.46	[a]41% [b]2.24	[a]56% [b]2.40

[a]Percentage is derived from adding "generally agree" and "strongly agree" responses
[b]The average weight is a zero-to-four scale with four indicating a stronger agreement response

The youth nature experiences of the entire study population were analyzed as an independent variable that may influence other response variables. Linear regression was used to test the relationship between the responding parent's youth nature experience triad and current family time spent in nature, sense of connection to nature, and environmental behaviors. For this analysis, all survey respondents (FNC leaders, FNC participants, CFIN pre-survey respondents, and CFIN nonparticipants) were aggregated. For current family time spent in nature, there was a positive, but not statistically significant, relationship with youth nature experiences ($n = 318$; $p = 0.077$). There were statistically significant relationships between youth nature experiences and an individual's sense of connection to nature ($n = 306$; $p < 0.001$) and level of environmental action ($n = 314$; $p = 0.03$). Mayer and Frantz's (2004) five-item connectedness to nature scale was used to measure sense of connection, and Canada's household and environmental green index (Statistics Canada, 2009) was used, in part, to measure household actions, such as recycling, turning off lights, and buying organic or local foods. Although current family time in nature did not have a statistically significant positive relationship with club leaders' and parents' nature experiences in youth, it trended this way ($n = 318$; $p = 0.077$).

Family Time in Nature

A total of 353 people completed survey questions about how frequently, and for how long, their families spent time in nature together (FNC leaders and participants, respondents to the CFIN pre- and post-surveys, and the CFIN comparison group). FNC leaders went out in nature with their families most frequently, with 33% saying they went out daily and 31% saying they went out two to three times per week. For the other groups, their most common frequency was two to three times per week (32–38%). CFIN nonparticipants reported the lowest frequency of family time in nature, with 47% saying they went out once a week or less. The study group that spent the greatest quantity of time in nature was also FNC leaders, with 28% spending more than 8 h of family time in nature per week and another 46% spending between 3 and 7 h. Other participants were most likely to say they spent 3–7 h in

nature in a week (38% of FNC participants, 53% of CFIN pre-survey respondents, and 50% of post-survey respondents). CFIN nonparticipants had the lowest quantity of family time in nature of all the groups, with 63% indicating that they spent 2 h or less in nature each week. The quantity of time spent in nature by club leaders and participants is remarkable when it is compared to estimates that the average child in the United States engages in 7 min or less of unstructured outdoor play each day, which equates to less than an hour a week (Juster & Thomas, 2004; Rideout, 2010).

Ordinary linear regression was used to determine relationships between current family time spent in nature, connection to nature, and environmental action. For this purpose, respondents consisted of FNC leaders and participants, CFIN post-survey respondents in order to reflect the effects of club participation, and the comparison group. There was a statistically significant positive relationship between family time in nature and sense of connection to nature ($n = 249$; $p = 0.007$) as well as environmental action ($n = 256$; $p = 0.021$).

Taken together, the quantitative survey data show that people who lead, join, or even express an interest in joining an FNC frequently report that playing outside in nature was important to them as a child – and this is especially true of club leaders. More than half of the survey respondents also stated that they had adult role models in nature – with this, again, most characteristic of club leaders; and 41% to 56% reported that they participated in an environmental or nature-based organization in youth. People who were more likely to report these experiences in childhood and youth were also more likely to report a sense of connection to nature and pro-environmental household behaviors in adulthood. Although the relationship between these experiences and current family time in nature was not statistically significant, it was positive and approached significance. Club leaders spent the most weekly time in nature with their families and parents in the comparison group the least amount of time. The more family time in nature that respondents reported, the more they were also likely to report feeling a sense of connection to nature and performing pro-environmental behaviors.

Qualitative Survey and Interview Data

In addition to quantitative questions, all the surveys included narrative prompts designed to solicit descriptions of club experiences and their personal meaning and effects. 145 people responded to the question, "What has been particularly meaningful for you and your family with regards to your participation in a family nature club?" Each response was reviewed and coded for emerging categories of effects, with most responses indicating multiple effects. Table 3 presents the 13 most common effects in their order of frequency. Although the question allowed people to share negative as well as positive effects, all reported effects were positive.

It is striking that many of the effects that parents identified related to the experience that SLE research most commonly associates with environmental interest and action in adulthood: free play and exploration in nature. The value of time in

Table 3 Analysis of narrative responses regarding effects of FNC participation. ($n = 145$, with some people giving multiple responses)

Description of effect	Responses per effect
1. Sense of community (shared values, like-minded people, friendships)	31
2. Spending time outdoors and learning about new places	28
3. Fun/interest/friendships (variety, novelty, adventure, other kids/ parents)	27
4. The opportunity to learn something new	27
5. The opportunity to get to know new people	22
6. An enhanced sense of connection with/comfort in nature	20
7. Opportunities for free play (independence, creativity, exploration)	16
8. A greater sense of connection with family	15
9. The passion, knowledge, guidance of the leaders	12
10. Norming/increased confidence/improved child behavior	10
11. Sense of accomplishment/wonder/break from the norm	9
12. Taking care of environment/nature	5
13. Sense of safety/presence of other adults	4

nature is suggested by themes shared by study participants such as "spending time outdoors and learning about new places"; "fun, interest, and friendships"; "the opportunity to learn something new"; "an enhanced sense of connection with/ comfort in nature"; "opportunities for free play"; and "sense of accomplishment/ wonder/break from the norm." Together, these responses account for 127 out of the 226 responses listed in Table 3 or 56%. Parents did not specify whether they were referring to effects that they observed in their children or themselves. Based on direct observations of the researcher, most likely, their responses reflect both.

Parents did not specifically write about opportunities to serve as role models of appreciation for their children – another part of the youth nature experience triad, but by registering their family in the club and enjoying experiences in nature along with their children, they stepped into this role. When Chawla (2007) analyzed what environmentalists remembered influential family members in their childhood doing, parents and other family members were most commonly remembered as giving attention to elements of nature, with evident fascination and appreciation, or simply sharing pleasure at getting out into nature. These are the types of behaviors that the FNCs encourage in parents. For many parents, being in nature together also brought "a greater sense of connection with family."

It is also striking that what parents wrote about most often was the "sense of community" that they developed in their club. This benefit is also implicit in "the opportunity to get to know new people," the friendships in "fun/interest/friendships," and the "sense of safety/presence of other adults." Whereas time in nature on club outings was intended to provide the history of personal engagement with nature and relationship to the earth that are associated with the development of an environmental identity, for many parents, their club also provided the group identity that is important to an emerging social environmental identity (Kempton & Holland,

2003). This came as part of joining a nature-based organization with their children, the third part of the "triad." Comments about "the passion, knowledge, and guidance of the leaders" and "taking care of nature" showed appreciation for the clubs' leadership and structured stewardship activities.

In the narratives that Table 3 summarizes, many parents described processes of development that have been implicit in past SLE research: experiences of agency and competence, social modeling and apprenticeships, stewardship, and a sense of environmental identity. For example, parents shared that significant effects of their FNC participation included:

- "My children and I are gaining so much by being so involved in our natural world. We have grown emotionally, socially, spiritually, intellectually and I have watched my children's self-confidence and focus increase and anxiety and stress decrease." (P#130)
- "My daughter has an innate interest for the flora and fauna present in nature. Participating in nature club activities reinforces her strong bond with nature." (P#22)
- "Not being a particularly 'outdoorsy' person myself, doing activities with the nature club really helped me to observe other parents interactions and setting limits in nature and it helped me 'loosen up' a bit! Also, it helped me gain confidence to do more with my kids on my own outside of the club." (P#41)
- "We have all learned incredible amounts of information about our local ecology and have made many connections within the community who share our same conservation goals. It is empowering and inspiring for everyone in our family but especially for our children. It gives them hope and incentives to change the world instead of the hopelessness that comes with watching news and nature shows reporting only doomsday predictions." (P#156)
- "Having the opportunities to go out as a family (vs being split up as would happen in scouts, say) and enjoy the company of other like-minded families and to learn about nature. The boys learn so much from other children and engage in activities that they wouldn't if it was just our family." (P#158)

CFIN parents also described these processes in their interviews about the most significant changes that they and their children experienced during club outings, and D'Amore was able to observe these processes as the CFIN leader and participant observer and record them in her field notes. The following section shares some of this material from the CFIN case study. It illustrates each developmental process through quotations from the survey narratives written by CFIN parents, their comments during outings, and their significant change interviews.

Columbia Families in Nature Case Study

For the purposes of her research, in March of 2014, D'Amore began offering Columbia Families in Nature (CFIN) outings to her community in central Maryland, along with her husband and two young children. On at least two Sunday afternoons, a month of CFIN outings were offered at nearby natural areas. By connecting

families with nature, the primary goals of CFIN were to foster greater connection with nature and the community, increase environmental awareness and action, support the wellbeing of participants, and help strengthen family relationships.

31 CFIN outings were held in 2014 at a variety of natural areas, including public parks, farms, gardens, wildlife sanctuaries, and community open space trails, with few repeat visits. The foci of each 2-h outing were also diverse, ranging from free exploration and play to active hikes to structured, conservation-focused events, such as tree planting and garden creation. A total of 133 distinct families participated in these 31 CFIN outings, with an average of 15 families attending at one time. (Another 52 families registered to participate in CFIN, but never attended an event, forming this study's control group.) As the leader for CFIN, co-author D'Amore was able to make close observations of participants' experiences during these events and compare these observations, as well as participants' feedback via narrative surveys and interviews, with the pivotal processes in child development suggested by existing SLE findings.

Agency and a Sense of Competence

For many families, CFIN offered their first experience walking through a meadow, wading in a stream or river, foraging for wild edible plants, exerting themselves on a hike, planting native species, or camping. On the other end of the spectrum, some families were seasoned explorers, with parents who had taught in Outward Bound and had already brought their young children backpacking. Observations during outings as well as parents' written and verbal feedback indicated that club participation provided children, parents, and families as a whole many opportunities to feel agency and competence. General feedback such as "our family has developed new confidence in exploring nature," "we have learned that we can do more outside than I thought we were capable of," and "we have gone to great places that we would not have ventured to on our own" were common themes.

According to the self-determination theory of Ryan and Deci (2000, p. 70), a person experiences feelings of vitality, competence, and self-esteem when he or she has autonomy "to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn." According to Bandura (1997), the most potent way to develop a sense of efficacy is to undertake a meaningful challenge and experience success. Parents observed that children enthusiastically enjoyed the novelty and challenges that nature play afforded. For example, one CFIN mother shared:

> I have never let my son play in a creek or river or anything like that before. I wouldn't have known if it was allowed, or safe, or what to do. So, for us this outing was a big deal, and he LOVED it! He seemed so happy and content and excited and interested and didn't want to leave. We've been talking about where else we can go to play in natural water this summer, it is his new favorite thing, so much more interesting than a pool, with all the rocks and sticks and critters to look for.

Another mother observed about her daughter: "I can see the things she enjoys doing, not just walking but stopping and looking, throwing sticks and climbing on rocks. She likes to do it with other kids and now she gets that going out in nature can be fun."

As parents witnessed their children's achievements, they felt more comfortable with allowing the autonomy that self-determination and mastery experiences require: "It is kind of awesome to see what he can do when he is outside. I think that it has done a lot for his confidence in new situations and to a certain extent mine as well. Certainly, he has shown me he can do stuff that I didn't know guys his age could do." A mother said about her daughter, "She definitely wants to be outside more, and I feel more comfortable with letting her be outside more by herself because now I know she knows how to handle herself outside." Some CFIN parents had significant nature-based experiences prior to having children, whereas others had few. Based on the researcher's observations, the opportunity for intergenerational outdoor exploration and learning helped parents across this spectrum witness and encourage their children's independent relationship with nature.

Nature outings engaged parents as well as their children in new experiences of agency and competence:

> You can see on some of the more ambitious hikes people feel like they have never quite done something like this before. I think that is an amazing thing because you find out that the journey isn't just going out there, it is also the internal journey. You are moving the map of your own self at the same time as you are moving on the map. And I have seen folks definitely finding that. When you can see them get to the top of that thing and they are kind of glowing a bit. They have dug a little deeper, both in terms of their comfort zone of where they are willing to go outside and what they are willing to subject themselves to. Those are great lessons.

As another parent said, "The way back was tough, but we worked together as a family and are proud that we were able to do it!" As parents observed their children's abilities and had mastery experiences of their own, they began to take their children into nature more often outside of the club: "Getting out to CFIN outings helps me be able to go out to more places with [my son] more often and for longer because now I have more knowledge of where to go and what to do."

Social Modeling and Apprenticeships

Opportunities for shared attention, social modeling, and learning were built into all the CFIN events (D'Amore & Chawla, 2017). Parents were encouraged to slow down and explore with their children. The leaders and occasional guest guides modeled desired behaviors, such as being respectful of plants and animals, being curious, having fun, helping one another, and picking up trash. Most events included educational opportunities such as a scavenger hunt of things to look for during exploration, taking out a field guide to identify a plant or animal, or a guest speaker who shared wisdom about a topic like animals or edible plants.

Parents expressed appreciation for both the attention to details of nature that the club leader and guest guides encouraged as well as the sense of safety that they provided:

> I spend a lot of time out in nature with my kids, getting exercise and letting them play. But there is something about going out on these CFIN outings where we see nature with deeper eyes than we do when we are just out by ourselves. Maybe it is because I am not alone with my kids and solely responsible for them, maybe it is because the leader makes a point of drawing our attention to neat things, like the praying mantis egg cases today. Either way, we all come away feeling more grounded and connected to nature than we do during a lot of other outdoor time.

Many parents made similar remarks. One parent noted that instead of just going outside for exercise and fresh air, her family learned about "really engaging with the environment and learning about different things and different seasons of the year." She explained, "Because you can kind of just bypass everything in nature when you are just going for a walk and you're like, 'Oh, it's pretty out,' but you don't really see the details. Now we do more." Another parent noted: "We used to walk down to the river, look at it and walk back up. Now we actually take the time to look at the different plants and pick up these little shells. Now we are actually involved."

As families learned to notice and understand elements of nature from the club leader or guide, they began to share what they learned with each other and from child to child. This was some of the richest organic learning that took place during CFIN events. "It was great to learn a bit more about some of the native plants today. We learned about wineberry, raspberry, and blackberry and can tell the stems apart now. My daughter watched the trout lily for ages and can point out May apple now." Children also began to teach each other. A mother said about her daughter, I "enjoyed watching her explain to a friend the difference between a thorny plant and another plant that could be touched without getting pricked."

In addition to directing participants to notice details of nature, the club leader served as a role model for more confident and permissive parenting in nature:

> Going out on different outings with you has helped us to get out and explore things differently than we necessarily would have and we have also explored different areas that we haven't ever been to before. She also likes being outside and dirty more than she used to before. I have to catch myself sometimes because I will start to say, "Oh, be careful you're going to get dirty," but then I remind myself it is okay for her to get dirty.

Parents also learned new parenting norms by observing other families: "It is just nice to be out with other families and see people interact with their kids and how they encourage them in different activities. Now I give her more leeway."

On some outings, the club leader and invited guides involved families in apprenticeship activities that combined joint attention, social modeling, and instruction to demonstrate how to care for places they visited. Activities included learning to distinguish native and nonnative plants, pulling invasive weeds, planting trees, and

planting butterfly habitat. Because these activities were deliberately intended to cultivate stewardship skills, they are covered in the following section.

Sympathy and Stewardship

One of the primary goals of CFIN was to increase the environmental awareness and action of participants. This included fostering a sense of sympathy and stewardship toward nature. All CFIN events sought to impart sympathy for other living things. Participants were taught to consider when it was appropriate to leave the trail and explore and when fragile plants would be damaged by such wanderings. The appropriateness of picking plants was discussed: "If you can count more than 100 of something it is ok to pick one, but do not pick things that are not as plentiful," and when participants did pick something, "do not rip plants out by the roots, it hurts them like it would hurt to pull your hair out." Any animals found during exploration were noticed with care and protected from harm. When environmental damage was evident, the potential cause and remedy were discussed.

Many CFIN outings involved families in stewardship actions that were designed to teach skills such as tree planting, planting native plants, and removing invasive weeds. These activities had the elements of apprenticeships, as they involved the club leader or an invited expert who explained the importance of the project and how to perform it effectively and then guided families in their work. In most families, parents as well as children were learning new skills, and this work appeared to increase their connection to the places where they labored: "Planting trees was a totally new experience for the kids as well as us and it was hard work. We enjoyed working together on this positive project. I took a few before and after pictures and think we will come back each year and follow the tree's growth."

These activities were intended to help families feel empowered rather than helpless when they learned about environmental problems. For example, after a visit to a nature center where a guide explained the life cycle of monarch butterflies and monarch caterpillars' dependence on milkweed plants, families engaged in planting milkweed and other native plants. A parent explained that this changed what she and her child noticed in their surroundings at the same time as it showed them the positive role that they could play:

> To have an awareness now of native versus invasive plants and animals is also amazing, because before we started doing the hikes with you I had no idea about that stuff. Now I am so aware of it. When I walk around and I see the plants that we have and the ones the neighbours have, so many are not native and we are going to set up a garden that is good for butterflies soon. The kids are really excited about the milkweed and the monarch butterfly and helping them.

Another parent noted her family's growing sense of confidence it their action capabilities: "The being outside part is important and good, but we are also really appreciating the knowledge that we are gaining. But at the same time we are appreciating a bit more that we don't have to be experts to get our hands dirty and

do something – we are feeling braver." On one outing, families shared what they had learned by gathering at a member's house to prepare a butterfly garden together.

Several families talked about integrating what they learned into their household life: "Participating in CFIN has stimulated us to do more around our own home, to take care of our yard and the piece of land that we can care for. Especially since we went to the native planting event at the lake we are really aware of this. Instead of just picking plants that are pretty we want to think about what is local, and what is beneficial for animals and the planet." Another parent noted: "In the spring we were talking about trying to get some weeds up and our daughter is so aware of stuff now she said, 'We can't use pesticides because of the earth worms in the ground.'" A mother shared that she and her husband deliberately tried to make connections between the beautiful woods and water bodies that they visited and daily actions: "Then we can tell them this is why we turn our faucets off when we are brushing our teeth, this is why we recycle our mail once they can start to make that connection."

Environmental Identity

CFIN strove to cultivate families' environmental identity by offering opportunities for them to develop a personal history of engagement with nature and an emotional attachment to natural areas in their region. Parents' remarks suggested that emotional attachments were forming through stewardship activities: "It was interesting to see how excited our daughter was to get involved in planting the native species. Then when we went to throw the seed bursts into the fields, she was going on and on about how people don't notice how beautiful nature is and how much of a gift it is!" At the same time, emerging social environmental identities as members of the club appeared to be meaningful for many. Just as FNC parents overall identified a sense of community as a major effect of club participation, many CFIN parents believed that doing stewardship activities together contributed to their sense of community. A parent noted, "My son likes being a volunteer with the group, being outside and enjoying nature while helping the community." Parents expressed this sense of belonging for themselves as well: "I appreciate belonging to a solid group of people with like interests regarding nature, people who are definitely interested in preserving and caring for nature."

One parent connected an environmental identity as a sense of connection with nature to this social environmental identity with particular eloquence:

> I feel like I am starting to notice how much we benefit from feeling part of something bigger. That this is our planet, this is our community, we coexist with all of these species. It teaches you a lot about life, about yourself, and about the life cycle. There are so many lessons you can teach the kids with nature. The more we are outside the more we realize this importance of taking care of the environment. You can learn so much from just being outside and seeing that we are coexisting and we all need to take care of each other. One thing I have really found is that I need that community connection and that environment connection. I need to feel like we are a part of something bigger.

Her statement showed that she understood CFIN's linked goals of fostering greater connection with nature and with the Columbia community.

Conclusion

Since Tanner (1980) initiated the field of SLE research, generally consistent findings have emerged. People who express connection with and concern for nature and who act to protect it, across a broad range of actions, commonly have childhood experiences of play and exploration in nature, influential role models and books, and participation in nature-based or environmental organizations, and they often witness the destruction of a valued natural area. The salience of different experiences varies study to study, with the exception that time in nature in childhood is a consistent thread across almost all studies. These findings reflect what basic research in child development would predict.

Connecting with the natural world affords children opportunities to fulfill their intrinsic motivation to explore and master challenges, with abundant attractions for all senses. Given the centrality of experiences of autonomous agency for human vitality and well-being and a sense of competence and self-esteem (Bandura, 1997; Ryan & Deci, 2000), it is not surprising that play in nature leaves vivid memories and lasting effects. Research on joint attention, social modeling, and apprenticeships suggests how adults may influence children in lasting ways as they demonstrate appreciation and care for nature, encourage sympathy for other living things, and teach conservation skills. Together, personal engagement with nature and identification with other people who take action to care for nature, often through membership in organizations, contribute to the formation of an environmental identity. The results of SLE research are generally consistent across studies and consistent with child development theory.

FNCs are designed to embody results of SLE research in the form of a "triad" of childhoodnature experiences: regular time in natural areas, role models, and participation in a nature-based organization. The research on FNCs summarized in this Chapter demonstrates yet another way in which this "triad" of early experiences influences environmental action. Nature club leaders almost universally reported that play in nature was important to them in childhood, and this experience was shared by most parents who participated in clubs or even expressed an interest in enrolling. The majority of leaders and parent members also had an adult who taught them appreciation for nature in childhood, and about half or more belonged to an organization with an environmental focus in their youth. This evaluation of FNCs also shows that people with these experiences in childhood and youth were more likely to feel a sense of connection with nature and engage in pro-environmental behaviors as adults. This chapter extends SLE research into a new area of environmental action: in this case, leading and joining FNCs.

Many environmental organizations bring children out in nature under the guidance of adult role models and engage in conservation activities, but few involve whole families. Park interpreters see families, but they typically see any individual family only once. FNCs are unique in encouraging parents to join with their children in nature, serve as role models of appreciation for what they find together, and feel comfortable in their skills to explore nature and demonstrate stewardship. This study suggests that nature clubs often attract people who have already had positive

experiences in nature in their own childhood; but once they are together, club leaders and parents build a foundation for the next generation to form its own connection with nature and know how to act to protect the natural world.

In the past, SLE studies identified childhood play in nature as a solitary activity or something enjoyed with a few playmates. In FNCs, it becomes a collective social experience: potentially a foundation for a social environmental identity (Kempton & Holland, 2003) as well as an ecological identity (Thomashow, 1995). A new direction for SLE research in the future can be longitudinal studies to track the influence of FNC participation on children's developing environmental identities and behaviors. This Chapter also suggests that SLE research will be strengthened if it draws on basic theory and findings in the psychology of child development to understand why recurring experiences that it documents have a formative influence.

Cross-References

► Conceptualizing Parent(ing) Childhoodnature Through Significant Life Experience

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Impact of Significant Childhoodnature Experiences on Environmental Identity Formation for Globally Mobile Children Attending International Schools

37

Rianne Carolina van Zalinge

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Abstract

How do globally mobile children, especially *Third Culture Kids* (TCKs), with their mobile lifestyles, form their environmental identities? Through their many relocations, they are constantly in a state of flux in their ever-changing lives. Therefore, as these expatriate children move in and out of various countries,

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cultures and schools, they may experience significant life experiences (SLEs) and learn who they are within their prevailing/temporary culture.

The nature of challenges faced by TCKs, the role international schools play in environmental identity formation and the creation of childhoodnature experiences in TCKs will be explored through my own lived experiences as a TCK. By framing an autoethnographical exploration of SLEs as a globally mobile child through photographs and poems, I will illustrate my own lived childhoodnature experiences growing up as a TCK in international schools in eight different countries before the age of 18.

Myers (1997) and Chawla (1998) identified the importance of both the *outer environment* of the physical and social world, and the *inner environment* of people's own interests and feelings. Consequently, they recommended that additional research was needed exploring the influence of the *inner environment* in shaping an individual's SLEs.

For TCKs, this *inner* environment is critically important in shaping their SLEs but sadly, within international schools, this is often overlooked. To support TCKs in achieving much needed harmony, support, stability, understanding, and attain a sense of belonging, strategies will be identified to assist staff and students of international schools.

Keywords

TCKs · Identity formation · Environmental identity · Expatriate children · Sense of belonging · Mobility · International schools

Introduction

> When we are no longer able to change a situation, we are challenged to change ourselves.
> – Viktor Frankl (2006, p. 112)

As Frankl (2006) so eloquently stated, if you cannot change your situation, then try to change yourself. In an ever-increasingly globalized world, this represents an important theme in this Chapter as creating an identity and a sense of belonging, are major challenges for Third Culture Kids (TCKs). TCKs are globally mobile children who neither grow up in their passport country nor are citizens of their host country and are therefore part of a *third culture*.

In 2015, the number of people living outside their country of origin had reached 224 million (United Nations Sustainable Development Goals, 2016), highlighting that international mobility is becoming a distinctive feature of today's society with people/families moving voluntarily or involuntarily across the globe. Due to their mobility (refer to ▶ Chap. 70, "Third Culture Kids and Experiences of Places" by Picton and Urquhart elsewhere in this Handbook), globally mobile children such as TCKs find that some of the greatest challenges they face is in creating a sense of

identity and a feeling of belonging (Bennett, 1993; Hoersting & Jenkins, 2011; Picton & Urquhart, 2018; Pollock & Van Reken, 2009).

The focus in this Chapter is on the frequent mobility of globally mobile children (TCKs) from expatriate families. For instance, this includes children of international organizations and companies, foreign embassies, NGOs, the armed forces, and charities or missionary programs. In many cases, the children of expatriate families that move frequently for work or careers are often forced to move and it is their voice that needs to be heard. It is through my own experiences growing up as a TCK in an expatriate family, attending international schools and describing my own childhoodnature experiences that I will reflect upon.

International schools represent an ideal option for expatriate families in that they cater to students who are not nationals of the host country (Wechsler, 2017). These schools provide a comprehensive cross-cultural education that immerses students in multiple languages and gives them access to a global, mobile community that is defined by its internationalism and provides a unique cultural identity. Furthermore, international schools are generally more focused upon cultural identity than on a student's birthplace (Buchanan, 2014). Globally, there are 8,600 international schools, serving 4.5 million students and employing more than 420,000 teachers. According to the International School Consultancy (ISC), demand for international schooling is rising rapidly. Thus, in the next 10 years, the number of international schools will double to more than 16,000 schools to cater for 8.75 million students worldwide (Wechsler, 2017).

For those TCKs, who relocate often with their parents, mobility is simply a part of life. These children encounter multiple cultural settings due to their frequent mobility and thus experience a cross-cultural lifestyle (Downie, Koestner, El Geledi, & Cree, 2004). By cross-cultural, I mean that they experience their host country's culture, their parents' culture, and their own *third culture*.

Most studies dealing with environmental identity has centered on traditional schools and schooling. Consequently, there is a relative dearth in research dealing with the role of international schools in the creation of a sense of belonging in TCKs (Ota, 2014), and even less about their role in promoting a TCKs' childhoodnature and significant life experiences (SLE). Thus, for TCKs, creating a sense of belonging is more complicated than for children who have lived in one place all their lives because TCKs move between cultures and countries often and therefore identity formation is a complex issue for them. Yet, both their families and the international schools that these TCKs attend can play a key role in whether a child successfully creates a sense of belonging within their new community (Ota, 2014).

Consequently, questions arise about the opportunities for expatriate children to develop an environmental identity in a foreign context, especially when frequent moves occur? In the following sections, I will discuss the context of international schools and the nature of TCKs and then apply an autoethnographical lens to reveal my life as a TCK and reflect upon how my own SLE were shaped to create the person I am today.

International Schooling and Environmental Initiatives

An international school can be loosely categorized as one that promotes international education in an international environment (Nagrath, 2011; Wechsler, 2017). This is usually achieved by following an international curriculum, such as the International Baccalaureate (IB) or Cambridge International Examinations.

One of the many great advantages of an international school is that students are more open to people from all walks of life. In the very fabric of their education, students are exposed to a multitude of cultures, languages, religions, and values. They learn how to adapt quickly to change and how to form and nourish fast friendships. This promotes a broad-minded spirit and a multicultural attitude of acceptance. Indeed, with multiculturalism and International Baccalaureate (IB) qualifications, international schools might not be traditional, but they certainly reflect the future of education in a truly globalized world (Wechsler, 2017).

The rapid growth has corresponded with the proliferation of the title *international* placed on many schools that may possibly have the veneer of being international in name only. For instance, Nagrath (2011) reports that of the 345 new schools opened in 2010, 80 (or 23%) are offering one or more of the IB programs. Yet, what about the more than 75% of international schools those are not offering that program? What international program or curriculum are these new schools offering? Do they truly represent international schools? In 2009, the International Association of School Librarianship (IASL) developed a list of criteria to describe an international school. Although not all international schools would meet all of the criteria, most would meet the majority of the following eight specified criteria:

1. Transferability of students' education across international schools
2. A moving population (higher than in national public schools)
3. Multinational and multilingual student body
4. An international curriculum
5. International accreditation
6. A transient and multinational teacher population
7. Nonselective student enrolment
8. Usually English or bilingual as the language of instruction (Nagrath, 2011)

In 2015, the International School Consultancy (ISC) estimated that four million students attend international schools in more than 8000 English-medium international schools in 127 countries worldwide, including children of all nationalities aged 6–18 years (Relocate Global, 2015). International schools and teachers follow a largely western educational curriculum, with the dominant cultural identity being American or British. In fact, many TCKs grow up speaking English with an American or British accent (Ota, 2014). In any given year, international schools can have 40+ nationalities attending their school, with yearly student turnover rates of 25% (Ota, 2014). Due to the high turnover of students, the sense of belonging and community is much more transient than in a local school. Consequently, both teachers and students live in an ever-changing and dynamic environment. With these frequent (re)adjustments to new locations, differing cultural norms and values,

Table 1 My TCK journey from birth to 18 years (Father's career sponsored by the UN)

Town	Country	Duration	School
Mazatlan	Mexico	6 months	Not applicable
Jakarta	Indonesia	4 years	International nursery
Kuwait City	Kuwait	2 years	Kuwait American
Kuwait City	Kuwait	2 years	Kuwait British
Karachi	Pakistan	4 years	Karachi American
Haarlem	The Netherlands	6 months	Marnix Lyceum
Mussoorie	India	1½ years	Woodstock International
Blantryre	Malawi	1½ years	St. Andrews International
Calgary	Canada	1 year	Winston Churchill
Amsterdam	The Netherlands	1 year	Hogere Hotelschool

and various languages and schools, TCKs often struggle to create both a sense of identity and a sense of belonging (Moore & Barker, 2012).

Furthermore, the number of environmental initiatives evident in international school's pales by comparison to local state and national schools. Some examples of national approaches: whole-school initiatives include programs such as the UK's *Learning through Landscapes (LtL)*, Canada's *Evergreen*, USA's *Green Schools Initiative*, New Zealand's *Enviroschools*, Sweden's *Green School Awards*, and ENSI's *Learnscapes* focusing on greening school grounds and maximizing the potential of these spaces for quality educational and environmental experiences (Henderson & Tilbury, 2004). Environmental action and awareness initiatives do exist in the international school community; however, they are very sporadic. One example is the Eco-schools initiative (Eco-schools, 2014) which is one of a number of environmental education programs developed by the Foundation for Environmental Education. Eco-schools encourage and engage active young people to act for the environment in preserving and sustaining it. It starts from the ground up as it begins in a class and builds through the school and aims to ultimately foster change in the community. If achieved, schools can achieve certification and be awarded a Green Flag. Eco-Schools have been running for over two decades and now reach more than 15 million students in 59 countries worldwide. However, to date, only 31 international schools in 18 countries are registered.

Consequently, in all my experiences as a TCK and during my time in international schools (Table 1), the role of the international schools in developing any SLEs in me was negligible. In fact, the main source for the development of my environmental ethos was largely driven by my parents rather than my experiences in international schools. Despite there being times, such as at the 163 year old Woodstock School (an international school which was located at the base of the Himalayas) that the significance and its location, and the surrounding majesty of the natural environment was totally lost on me, despite being the perfect setting for the development of my SLE. Mind you, as a young female at the age of 14, I was not only grappling with adolescence but struggling to make sense of my own world and where I belonged especially as a TCK in an international school in India. Furthermore, my younger brother who was about 11 years old at the time also attended the same school and

loved being in nature and has since become a staunch environmental scientist. Thus, both our experiences differed at the same school, largely because, in my opinion, I felt that issues of adolescence and feeling very lonely clouded my judgment and my view of the world. I will reflect on these issues later in this Chapter through my autoethnographic journey.

Third Culture Kids . . . *Who Are They?*

> No generation before now has had so many of its members simultaneously living in, between, and among countless cultural worlds as is happening today.
> Lois Bushong (2013)

Who and what are these TCKs? To fully appreciate the circumstances and issues faced by TCKs, it is important that the reader understands *who they are*. Based on the increasing scale of global movements of families and children, greater attention in the future will be needed to more fully appreciate and cater for the many issues faced by these globally mobile children and TCKs, to ensure a smoother transition for children into schools and also into the general community.

The concept of Third Culture Kids (TCKs) was first introduced in the 1960s by Ruth and John Useem. They:

> . . . defined the home culture from which the adults came as the first culture. They called the host culture where the family lived the second culture. The shared lifestyles of the expatriate community they defined as an interstitial culture or culture between cultures and named it the third culture. Children who have grown up in this culture are called third culture kids. (Pollock & Van Reken, 1999, p. 20)

Pollock and Van Reken (1999) defined a TCK as:

> A person who has spent a significant part of his or her developmental years living in one or more countries outside their passport country because of their parent's occupation. The TCK builds relationships to all of the cultures, while not having full ownership in any. Elements from each culture are incorporated into the life experience, but the sense of belonging is in relationship to others of similar experience. (p. 19)

However, the concept of culture is a contested concept and notoriously difficult to define. Apte (1994) (p. 2001) summarized the problem as follows: *"Despite a century of efforts to define culture adequately, there was in the early 1990s no agreement among anthropologists regarding its nature"* (Spencer-Oatey, 2012).

A typical notion of culture is that it is formed by the ideas, customs, and social behavior of a particular people or society. It is the shared patterns of behaviors and interactions, cognitive constructs, and understanding that are learned by socialization (Zimmerman, 2017). Thus, TCKs are formed by many cultural aspects: firstly, by their parents' culture; secondly, their host country's culture; and thirdly, by their peers, international school, and mobile lifestyle that all contribute and strengthen their TCK identity.

Despite the first (parents) and second (host country) cultures being tangible, social constructions, the third culture is temporary and intangible, and constantly changing as TCKs move and connect with other TCKs going through the same transcultural experiences. This third culture, more than the first or second cultures, gives TCKs both a sense of belonging and being understood (Lijadi & Van Schalkwijk, 2014). In the third culture, the sense of belonging comes from the shared expatriates' internationally mobile experiences despite the differences in nationality, cultural background, or ethnicity.

First a Sense of Belonging, *then* an Environmental Identity

SLE research, initiated by Tanner (1980) and continued by numerous others (e.g., Chawla, 1999; Myers, 1997; Palmer, 1993) suggests that several factors occurring during childhood strongly influence one's environmental interest and can lead to an active role being played in environmentalism during their life. These factors include: positive outdoor experiences as a child with respect to nature; positive (adult) role models that create these outdoor experiences; and reading nature books (Stevenson et al. 2014).

However, Chawla (1998) states that more attention should be paid to your inner (physiological, personal) environment rather than just the outer (physical) environment. Furthermore, my position is that only once your inner state is at peace and feels safe, can you start bonding with others, which is when learning and identifying with someone/something can occur. This is best illustrated using Maslow's "*hierarchy of needs*" (2006), a motivational theory within psychology, that provides a five-tier model of human needs. It contends that people are motivated to achieve certain basic safety and physiological needs which take priority over others (Fig. 1). For instance, our most basic need is for physical survival, which is the first thing that motivates our behavior. Once that level is fulfilled the next level above it motivates us, and so on (McLeod, 2017).

Jose, Ryan, and Pryor (2012) state that *"there is general theoretical consensus among the diverse array of researchers that a perceived sense of belonging or connectedness is a basic psychological need, and that when this need is satisfied it brings about positive outcomes."* (p. 236). If children's basic needs are met, both physiological and safety needs (Fig. 1), then they start creating friendships and a sense of belonging to their environment. A sense of belonging is needed *before* you can identify with an environmental ideology to be integrated into their identity.

It is therefore important to understand how an environmental identity is created. Clayton (2003) argues that environmental identity is part of your self-concept, namely, that it is a part of you; making you feel at one with nature, based on memories of past activities, or an emotional bond, that ultimately affects how you see and behave in the world. Furthermore, he highlights the importance of positive outdoor experiences in helping to form an emotional attachment with your environment. Stapleton (2015) identified, in relation to environmental education, that in early childhood, children start to learn what their society expects them to be and to do and to develop personal responses to this. Thus, merging one's

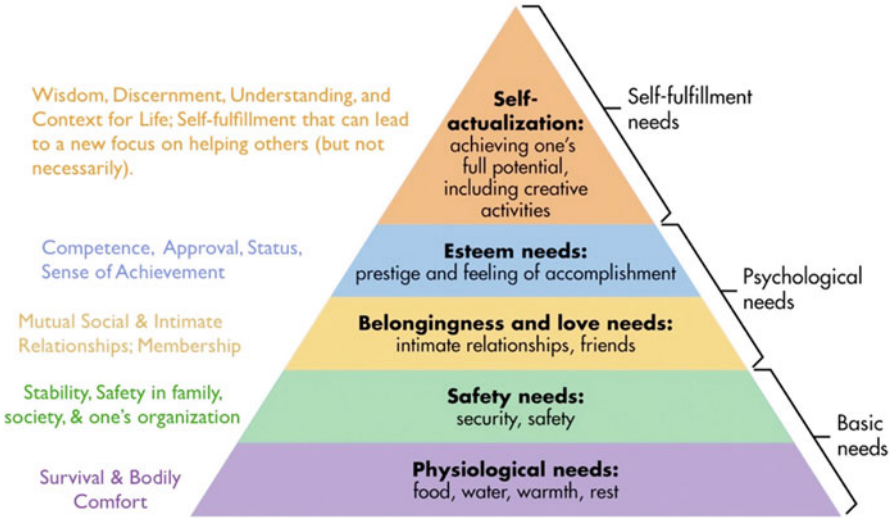

Fig. 1 Maslow's hierarchy of needs. (Source: Finkelstein (2006) https://commons.wikimedia.org/wiki/File%3AMaslow's_hierarchy_of_needs.svg [CC-BY-SA-3.0 (http://creativecommons.org/licenses/by-sa/3.0/)].)

personal identity (goals, values, and beliefs) with one's cultural identity (sense of belonging to a group).

The examination of environmental sensitivity, the openness to environmentally friendly behavior, and the development of environmental commitment through life events came into focus in the 1980s, with experiences in nature (or outdoors) being the most significant factor in the development of an environmental identity (Chawla, 1998, 1999; Palmer, 1993; Tanner, 1980). Furthermore, the role of childhoodnature experiences, which can be family holidays, summer camps, or outdoor activities were also significant. Palmer (1993) concluded that *"outdoor childhood experiences led to their concern for the environment"* (p. 29) and SLEs. They have less importance in domestic research (Hofmeister-Tóth, Kelemen, & Piskóti, 2012), but their role is important in the study of life events. Also, negative experiences as influencing factors appeared in research studies (Chawla, 1999; Palmer, 1993; Palmer & Suggate, 1996), which refer to perceived environmental issues. Chawla (1999) examined which life stage the given life experiences have the biggest influence. Outdoor experiences, family members, and education clearly have the biggest role in childhood. These results are confirmed by Hofmeister-Tóth et al. (2012), adding the possible positive effects of belief and religion. During the university years, friends and education have the most intensive influence. In adulthood, the influence of organizations and communities become an encouraging factor.

Stevenson et al. (2014) suggested that SLE research highlights that role models, time outdoors, and nature-related media can help to promote pro-environmental behavior; however, most of this research is qualitative. Furthermore, it is evident that among middle year students in the USA, life experiences appear less important

than promoting small class sizes and addressing challenges associated with lower incomes in schools (Stevenson et al. 2014).

In addition, there is support for the importance of childhoodnature experiences and experiences obtained in nature (Chawla, 1999; Palmer, 1993; Tanner, 1980), with 36% of positive experiences coming from one's childhood and another 24% being based on high school experiences. The importance of role models also appears to be significant, while activities learnt from parents and grandparents were the most salient among family memories (Piskóti, 2015).

Autoethnography

Chawla (1998) stated that *". . .research into SLEs is only as valid as the autobiographical memory on which it is based"* (p. 363). Therefore, autoethnography can thus be a risky means for researching SLE as the subject's memory can be faulty, especially if it describes details of vague memories produced a long time ago. (Simone Blom provides some additional ethnographic research elsewhere in this Handbook.) However, in my case, I feel my memories are a very relevant source of information because they encompass *significant* moments in my life. *"Events of high personal importance produce more vivid and accurate memories than events of low importance"* (ibid., p. 363).

The methodological approach that I took in this Chapter was rather straight forward. I chose an autoethnographical approach largely because it allowed me to use self-reflection to explore my personal experiences and the development of my environmental identity within the social context at the time and to also connect my autobiographical narrative to wider cultural and social meanings. I also wanted to explore and reflect upon my own lived childhoodnature experiences as an expatriate child in international schools.

I was inspired by the approach that Hopkins (2015) used of framing personal memories and critical points in my TCK journey through poetry. The focus of the poems was guided by Hanauer (2010) where I was directed to select provocative points to generate stimulus material upon which to shape my commentary for scrutiny.

Furthermore, poems and images were combined to generate richness in my ethnographic journey. Provocative prompts were used in combination with photographs that characterized the five critical stages of my cultural transition (Pollock & Van Reken, 2009), which include: involvement, leaving, transition, entering, and re-involvement.

The issue of identity formation interests me because of my own globally mobile upbringing as a TCK. As a dual Dutch/Mexican citizen, I struggled with my identity upon returning to my passport country, the Netherlands. This was supposed to be my home, and yet, it did not feel that way at all. By the age of 20, I had lived in 11 different countries and moved more than 18 times; plus, I attended five different schools in five different countries during my 6 years of high school, all of which classifies me as an Adult Third Culture Kid (ATCK) (Tarique & Weisbord, 2013).

The Early Years

Let's start at the beginning. My name is Rianne Carolina van Zalinge. Just looking at my name alone you would say that I am Dutch. My name sounds Dutch, I look typically Dutch (blond, blue eyed), however, I also have Mexican citizenship, and I only lived in The Netherlands a few months until I turned 18. Internally, I am as Dutch as most expatriates living in the Netherlands!

I was born during my parents' first posting abroad in Mexico. My father worked as a fisheries biologist for the United Nations, which meant that we travelled extensively around the globe. I was born in Mexico and at the age of 3 months, we moved to Indonesia (Fig. 2) where my brother Robert was born a few years later. I am told that I spoke Dutch, English, and Indonesian before the age of four. Many memories must have been unconsciously imprinted with lifelong effect, because in Indonesia our garden (and many others) were covered with bougainvillea's, frangipani's, bananas, and palm trees. To this day, I have a weakness for many of these. My everlasting love for the tropics and ginger-red cats stems from those first 4 years of my life in Indonesia.

When I was almost 5 years old, we moved to Kuwait (Fig. 3) where I started kindergarten at the American International School. How I loved my school! But after 2 years we were told there was a new posting for us, so we packed up and sold everything only to be told at the last minute that the project had been extended for another 2 years, so we were not leaving. Unfortunately, my brother and I could not go back to our beloved school and to our school friends and classmates (as our places had been filled), so we had to go to another school. I hated wearing school uniforms at this (new) British International School and having to make new friends when my old friends were at a school so close by! We also had to move to a new house, but that made less of an impression on me than having to change schools.

My other memories of Kuwait were of our family trips into the desert and sealing the windows and doors very tightly to stop sand from getting into our house during one of the many sandstorms we had. If you did not get to the windows in time, you would end up scooping sand out of the house for the rest of the day!

A vivid memory I have is of always being looked at and touched by the local people. They had often never seen a young blond-haired girl before. This feeling of being *different* typified much of my upbringing in Asia and Africa. As it turns out, many TCKs experience this, as it contributes to one identifying with what one is *not*, rather than what one *is* (Easthope, 2004, 2009). It was now that my sense of cultural marginality (Schaetti, 1996) was formed. I did not feel part of my host country, nor my home country, so I did not really belong anywhere except with other TCKs in our own third culture world.

During the first Gulf war, I remember going to school hearing the jet planes fly over-head and dropping bombs in Iraq just a few kilometres away. This was a very scary time for us all. Especially because my family and I had visited the lovely Marsh people in southern Iraq on several occasions (Fig. 4) and my heart ached to think about what they must be going through amid all this war. When we went back

Fig. 2 My life in Indonesia (Ages 0–4). From top left clockwise: My (visiting) grandfather and I, the only blond blue eyed girl, surrounded by locals; Tira the daughter of our housekeeper, who was my best friend; lots of outdoor activities like horse riding; preparing for a picnic with my friends; Tira and I playing with interesting things found in the garden

to that area after the Gulf war was over, we found the marshes had been drained and all the marsh people had been killed by Saddam Hussein's army. I felt terribly saddened to think of those lovely families all having been wiped out.

Fig. 3 Life in Kuwait (Ages 4–8). From top to bottom: Checking the safety checklist before setting off into the desert; visiting a local family; going for a camel ride

After Kuwait, our family moved to Pakistan (Fig. 5), where my brother and I had the most wonderful time at the Karachi American School (K.A.S.). I attended this school from age 8–12, when my identity was being shaped. It was all rose-colored unfortunately, because after my first year there (I was 8 years old), my best friend Monique moved away, and I felt very lost and lonely for many months after that. I remember thinking, *"OK, I need to find other friends, but I will never again become such good friends with someone, because I don't ever want to feel this bad again."* This was my first (conscious) step that I took to keep people at an (emotional) distance to protect myself from getting hurt. Many TCKs describe finding it hard to bond with people out of fear of losing them again.

At the age of 12, in the first year of high school, I also began to see things differently, as it was the first time that I sensed the importance of an international school, TCK identity, and my sense of belonging. All my friends attended the school and my after-school activities also took place there. Basically, everyone and everything I loved happened there – except my parents. The school gave me a sense of

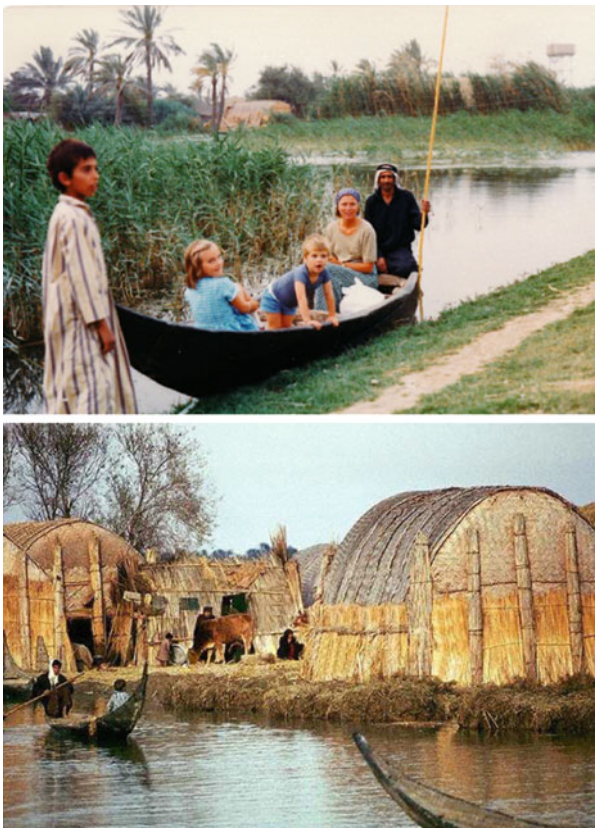

Fig. 4 Visiting the Marsh people in Iraq by gondola (top); The houses of the Marsh people built from dried grasses and reeds (bottom)

belonging as I belonged to the K.A.S. family. It was my community, my family when I was away from my parents.

The Dutch Stopover

At 13, I arrived in the Netherlands for a very temporary stay. My mother, brother, and I moved in with my grandparents while my dad worked at the UN headquarters in Rome, Italy, for a few months. I went to the Marnix Lyceum School in Haarlem but never really tried to fit in because I knew we would be leaving again soon. I did make friends, but I was very aware of the fact that they were transient relationships. In fact, I was very excited when we heard we would be moving abroad again.

Off to the Himalayas I Go

After leaving Pakistan, and spending 9 months in the Netherlands, my brother and I were sent to a boarding school in the Himalayas, India. I was 14 then and it broke

Fig. 5 Life in Pakistan (Ages 8–12). Walking in the hills of northern Pakistan (top); Activities at K.A.S. (Olympics and Nationality Day) (bottom)

my heart. This was the first time in my life that I felt utterly, truly alone. The reason was that for the first time ever, I was separated from my parents. For many TCKs, myself included, family provided the most important relationship, representing the only stable factor in an ever-changing life (Lijadi & Van Schalkwijk 2014; Gilbert, 2008). Being separated from them felt like I had lost my one rock, and I felt completely lost. This was all during my teenage years, which did not help.

Imagine the magnificent Himalayan mountain range. The snow capped mountains, winding rivers, lush forests, more stunning nature than you can imagine. Beautiful, isn't it? … But at 14 years of age it was anything but wonderful. I remember looking out over the Himalayas one morning on my way to boarding school thinking, *"This is beautiful, but I feel so alone. I don't belong here."*

I recently discovered the 2011 Academy Award nominated short film called *"The Road Home"* by film-maker Rahul Gandotra, which is based on the exact boarding school that I went to in the Himalayas in India, called Woodstock (Fig. 6). It tells the story of a boy who is Indian, looks Indian, but doesn't feel Indian (because he grew up in Britain), and tells how he gets bullied and misunderstood because his looks do not match his inner identity. He, like me when I returned to the Netherlands, was a hidden immigrant (McCaig, 1996). He wants to run away, to escape back home, only to find out he is not British either. This is a classic example of when one's inner and

Fig. 6 My years in India (Ages 14–15). From left to right: Woodstock school in Mussoorie, India; The foothills of the Himalayas, where the school was located

outer environment (Chawla, 1998) are not synchronized, one is not at peace. I did not have a sense of belonging at all, therefore I felt very lost and lonely, resulting in a feeling of alienation with my community, surroundings, and my environment. Any outdoor activities (hikes and camping trips) my teachers organized were lost on me because I did not want to be there. I did not feel safe, secure, loved, or a sense of community. Feeling so much negativity toward my surroundings made any attempts to develop an environmental identity fall on deaf ears. Here, again, is an example of how well Maslow's hierarchy of needs' triangle (Fig. 1) portrays reality: because my basic needs had not been met (i.e., feeling safe, secure, and loved), and thus I could not enjoy the environment I was in.

I was also strongly influenced by both my father, grandfather, and the schools and places where we lived. My father is a keen bird watcher and, like his father, an avid environmentalist. Many of my childhood memories were of us as a family being rounded up to have a weekly *bird-watching day.* Even when I was 12, I often battled with my parents because I felt I was being forced to do something I didn't want. The fact that it was a forced activity worked counter-productively as I resented these outings more and more. I was not a fan of bird watching, and consequently, I started building my identity by what I wasn't, rather than what I was (Easthope, 2009).

If my outdoor experiences (bird watching and my boarding school period in the Himalayas) had been under more positive circumstances, they could have been valuable and critical steps towards building a lifelong environmental identity (*c.f.,* Chawla, 1998; Palmer, 1993; Stevenson et al. 2014). However, because they were shrouded by my negative state of mind – symbolizing a period in my life when I felt lost and lonely – this valuable learning and identity building process was lost.

Having said that, I cannot negate the fact that my father and grandfather's ethos as biologists and environmentalists strongly formed my love and respect for nature. I agree with Erikson (1980) that role models (in my case my father and grandfather) strongly influenced my moral compass. Despite the experiences I went through

being lost on me, during my angry teenage years, the seeds planted as a child were not in vain, because a few years later, when we lived in Africa, my love for the environment came rushing back.

Interesting to note is that my brother (who is younger than me and is not as emotional as I am), quite enjoyed the solitude of the Himalayas with its rugged nature. He has gone on to work as an environmentalist for his whole career and engages in bird watching as his main hobby in his spare time.

The African Sojourn

At the age of 15, after a short intermezzo in the Netherlands, we moved to Malawi (Africa) (Fig. 7). This country opened my heart to environmentalism, as our house was on beautiful Lake Malawi and we had our own private stretch of beach. Every weekend, when my brother and I were home from boarding school, we would invite friends over and go surfing, canoeing, diving, or just chilling by the water. SLE were generated during these few positive years of living by the beach in Malawi which opened my heart again, and all the positive seeds about nature and the environment which were growing inside me.

Creating My Sense of Belonging

My identity was constantly (re)molded throughout my various moves, yet after a while, I always created a new home and sense of belonging wherever I went. Even if I knew I would not be staying very long, it was important that I feel attached to a place, school, or people to feel safe, and thus at home.

I get restless, if I live in a place too long and yearn for the feeling of adventure that a new move will provide. I love exploring this beautiful world we live in, but as a typical TCK, I feel a sense of belonging everywhere a bit, but nowhere totally. I always thought, *when will I truly be home?* However, I have found that home is where my family is. When I have my loved ones around me, this is when I am truly home.

The Stages in My Life through Poetry

These five poems that I have written each symbolize a stage in Pollock and Van Reken's (2009) five stages of transition that I experienced when moving: Involvement, Leaving, Transition, Entering, and Re-involvement.

Stage 1: Involvement
Sand crunching under my feet as I walk along the beach sipping my coconut
Having good friends to laugh and hang out with, in the thatched beach hut
Feeling relaxed while taking the canoe out, back home as the light is dimming
Having naughty monkeys steal my sunglasses while I had gone swimming

Fig. 7 My years in Malawi (Ages 15–16). Clockwise from top left: Our lovely private garden/beach in Monkey Bay, Malawi; Inviting friends over to spend the weekends in Monkey Bay with them; Swimming in Lake Malawi (together with crocs and hippos) with my beloved dog, Candy

Experiencing the paradox of seeing such poverty everywhere
Yet when listening to the people singing, I feel their happiness and joy in the air
Tagging fish for an important fisheries project in Monkey Bay
Banana and palm trees swaying in the wind during another warm, sunny day
Petrified when noticing a hippo coming up next to me while I stand motionless on a surfboard
Feeling the relief when my friends save me and my heart rate is restored
Swimming alongside beautiful fish as I learn to do deep sea diving
Feeling that I'm not just surviving, but I'm thriving!

Summary: Truly my happiest state of being. Feeling connected with my environment on all levels (social, personal and physical, inner and outer) is when I am most content.

Stage 2: Leaving
Saying goodbyes
Sadness hangs heavy in the air
Weighing heavy
Knotted stomachs
Farewell all that is known

Fig. 8 Saying Goodbye (. . .all too often)

All that is loved, all that is cherished
Grieving at what will soon be lost
But somewhere, deep inside
Feeling the fluttering of anticipation
Of what is to come (Fig. 8)

Summary: Grieving for the loss of friendships, home, school, climate, and all that is familiar. Stepping into the great unknown.

Stage 3: Transition
Airports are my second home
Watching people come and go
Symbolic of my life
I come and go too
Arriving, staying and leaving again
Always in transit
Mobile, fluid, global citizen
Always on the move
It's what I am used to, what I have always known, what I have become (Fig. 9)

Summary: Living in limbo. I have neither the home I just left, nor the one I am moving towards. I am in no-man's land.

Stage 4: Entering
Anticipation
Excitement
New life

Fig. 9 Endless waiting at airports during my many travels

New chances
Bit scared
Bit tired
Putting on a brave smile
Here we go again
But this time will be different because I am home

Summary: Mixed feelings. Exhilaration one moment and loneliness the next. Excited and sad. Happiness and loss. Starting to get to know the unknown.

Stage 5: Re-involvement

I am torn – if I am not Dutch, then what am I?
Where do I belong now?
Breaking down and rebuilding my identity
I become a chameleon, fitting in when and where I want to
Doing it so well I lose sight of who I truly am
Trying to create new friendships, a new home
Connecting with other expatriates

I am not Dutch, I am a global citizen
My home is everywhere yet nowhere (Fig. 10)

Summary: Trying to fit in. Where do I belong? Where is my home? Can I make this my new home?

Final Reflection

Hoersting and Jenkins (2011) observed that when TCKs returned to their home country, they may grieve and feel a sense of loss over the relationships and environments they left behind in their previous home. In addition, TCKs (myself included) often identify with their nationality more strongly when abroad than when they are in their home country. This is because when abroad, their nationality becomes a way of setting themselves apart from their peers, because their peers come from all over the world. Once they return home, they find out that the identity they had built up for themselves abroad, in my case the fact that I was Dutch, is false.

This leads to the complication of being a *hidden immigrant*. As McCaig (1996) so eloquently explains:

> The children's culture is basically an international one with an overlay of the passport culture. They therefore often feel like hidden immigrants when they reach "home." Because they look and talk as if they should belong, their outlook, actions and lack of knowledge of local and cultural trivia are often bewildering to those around them who do not know (or care) that they have lived abroad. (p. 111)

Being a hidden immigrant was an added and unexpected pressure, both from the locals and the pressure I put on myself. When I arrived back in the Netherlands, both the locals and I expected me to be Dutch. However, when my outer environment (my nationality and physical looks) did not match my inner environment (my lack of feeling at home, my English accent, and my distinct feeling that I was not Dutch), I felt more torn than ever before. Consequently, at the age of 18, I was in a full-blown identity crisis. The identity I had built up all my life abroad turned out to be false. I might be Dutch, but I did not feel Dutch. That is when I knew I had to rebuild my identity from scratch.

I fled the country to travel to Australia, New Zealand, and Cambodia, only to return 4 years later. I came back to study Cultural Anthropology and Sociology at the University of Amsterdam and I have lived in the Netherlands ever since. The reason the second return to the Netherlands was more successful than the first was because of my lowered expectations. I knew this time I was not coming home, I was simply moving to the Netherlands, similar to any other country, which was my way of coping.

Fig. 10 Reconnecting and rebuilding my Dutch identity playfully with my work colleagues (top and middle); and with my family near the tulip fields (bottom)

What Can International Schools Do to Promote a Sense of Belonging and SLE in Third Culture Kids?

Feeling accepted and comfortable somewhere is, of course, very important for all teenagers, but for TCKs even more so because in addition to the usual teenage identity crises and hormonal surges, they must cope with adjusting and readjusting to a new home every time their parents move. A new school which is familiar and welcoming helps them cope with the new living environment faster.

The children's expatriate world is mostly revolving around their school. International schools are a hub of TCK activity and take up a large part of a child's social life. There are large amounts of after-school activities organized, which sometimes even take place on weekends. Inter-school activities are frequent, with all kinds of sporting competitions taking place. This strongly enhances the school feeling like "*we are one big family*."

Since international schools form such an important part of a TCK's life, it is bound to be an integral part of their identity. Identification can sometimes take place in the form of idealizing the dominant culture of the school that the children are attending.

> If the majority of life is spent in activities connected with the school, the child will tend to become more American than their own nationality. Once again the school plays a key role in the cultural development of the young person. (Smith, 1996, p. 209)

Schooling and after-school programs are a major route to the development of an environmental identity (Colvin, 2013; Stevenson et al. 2014; Colvin Williams & Chawla, 2016). These programs can create a sense of belonging to a community and to the environment, which will lead to a respect for the environment and link it to a child's identity. Since international schools are such an integral part of a TCKs identity, this is a very important route to take when installing a sense of belonging and identity with nature in children. My environmental identity was shaped by the international schools that I attended, as discussed in my autoethnography earlier in this chapter.

Combined with living in a host country, international schools help to strengthen a child's perception of the world being a multicultural place. For many TCKs, living abroad is synonymous to attending international schools. The schools are often seen as a safe haven, a constant factor in a frequently changing world. What creates a bond between TCKs and their school, is their perception of being different from the locals (and thus creating a *we* vs. *them* identity) and sharing a transient lifestyle. All TCKs experience having to survive in a strange country and that creates mutual understanding. This TCK identification and affirmation seems to replace the importance of nationality for these children. Thus, as I experienced during my time abroad, TCK children appear to identify with expatriates firstly, and their nationality secondly (McCaig, 1996).

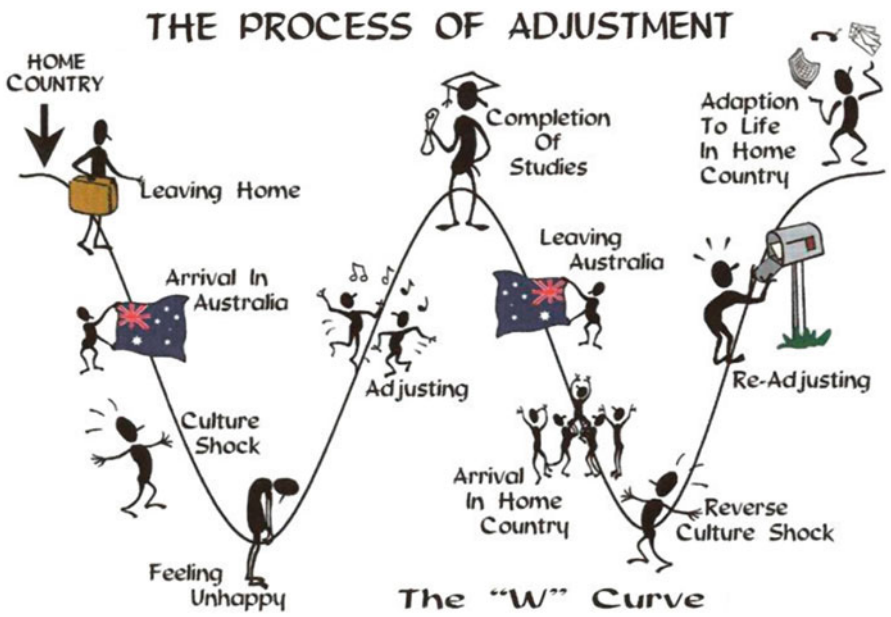

Fig. 11 The process of adjustment when moving to another country (Source: Oh My God, 2014: https://ohmygodd.com/side-effects-of-moving-to-a-new-country; Barker 1990)

Steps for International Schools in Managing Third Culture Kids in Transition

How can international schools and teachers optimally facilitate TCKs in their transitional process of arriving, staying, and leaving (see Fig. 11)? Transition programs need to be established to help these TCKs cope with the constant emotional flux of entering, staying, and leaving that encompasses and characterizes their lives: to help TCKs cope with the frequent moves and in handling the constant coming and going of friendships. The program should also help families to maintain and strengthen their family attachment bonds in all the five transitional stages of the move (Ota, 2014; Pollock & Van Reken, 2009).

International school staff needs to help TCKs actively manage their "grief" to help them settle into their new life at the school (Ota, 2014). When leaving, grieving can also take place, and goodbyes need to be handled effectively for there to be some closure for the child, so they can successfully move on to their next location. International schools need to collaborate with other international schools so that the transition from one international school to another goes as smoothly as possible.

School counselors should not underestimate the unique difficulties experienced by TCKs when adapting to a new culture, with their continuous personal struggles to build and maintain relationships in their ever-changing lives (Lijadi & Van Schalkwijk, 2014). Ota (2014) highlights the importance of creating a *safe harbour* (he was referring to an international school) for children. Once children feel safe,

they will start to absorb information and the learning, healing and sense of belonging process will start. Until they feel safe and secure, very little learning, healing, or feeling at home will take place. This is where Maslow's hierarchy of needs (refer to Fig. 12) becomes relevant, as it highlights that one's basic needs need to be fulfilled before progressing to the next level. If the lower, base levels (physiological, safety) are not met, the higher levels (feelings of belonging, community, school, education, etc.) cannot be addressed.

With respect to teaching environmental education and nurturing environmentalism to children in international schools, one needs to make sure TCKs are in the right frame of mind (feeling safe and happy) so that they can best absorb and assimilate the information and experiences made available for them. Furthermore, the action component in environmental education is important in doing something positive *for* the environment, but at the same time, it is also helping in molding/creating their identity: the more they do it, the more their identity thickens (Holland & Lave, 2001).

Having positive and environmentally conscious role models and outdoor experiences are indeed important to children, but for any of that to make a difference and have a lasting effect on TCKs, they first need to be in the right frame of mind. This was clearly not the case for me as my mind set was not ready to embrace environmentalism, especially to the same degree as my TCK younger brother, who largely went to the same international schools as me. Furthermore, supporting and embracing the environmentalism messages provided by environmental role models such as my father and grandfather did not have any impact on my mind set at this time.

According to social practice theory (Hargreaves, 2011), for people to become lifelong environmental activists, their love for nature and the environment needs to become a part of their identity, which can only be achieved if they feel a sense of belonging to the environmental cause and to the natural environment itself. Therefore, greater focus is needed upon identity and culture in the interpretation of SLE research (Dillon, Kelsey, & Duque-Aristizabal, 1999). This would be especially significant in my experiences and also for TCKs within international schools.

Coping Mechanisms

TCKs may use coping mechanisms to interact with the host culture and social groups, mostly when they find that behaviors considered socially appropriate in one context, are not accepted in a new country or culture. Pollock and Van Reken (1999) mention that one of the major areas that expatriate children need to cope with is their unresolved grief. They need to identify and mourn the losses they have felt during their lives. It remains as an unresolved part of my experiences. I also felt that I really did not get a chance to grieve.

Children might appear to adjust quickly in the sense that they get used to their new life, but when adjustment refers to feeling at home somewhere, the process could take a lot longer, and many never feel a sense of belonging to the places where they are living (Bennett, 1993; Fail, Thompson, & Walker, 2004). As Pollock and

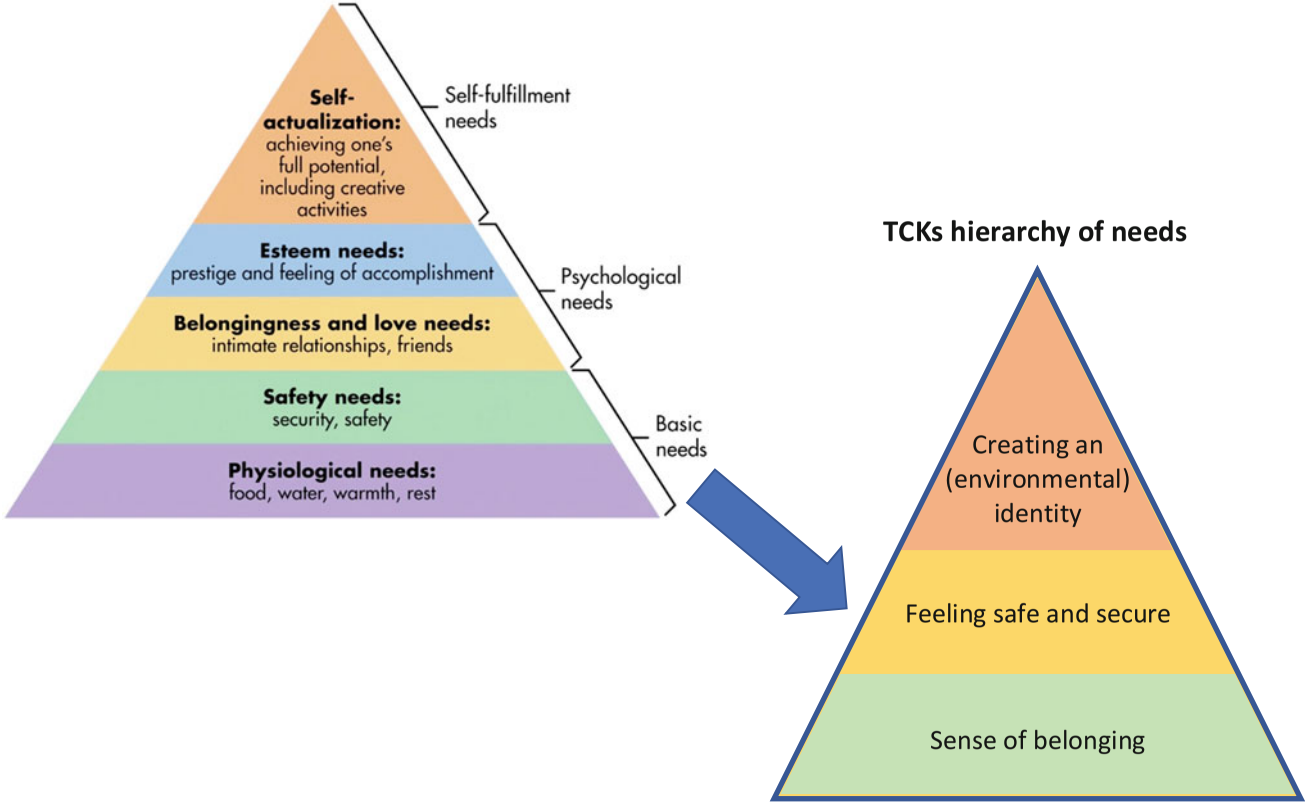

Fig. 12 Adapting Maslow's Hierarchy of Needs (Fig. 1) based upon my own experiences as a TCK. (Source of Maslow's top left diagram: Finkelstein (2006) https://commons.wikimedia.org/wiki/File%3AMaslow's_hierarchy_of_needs.svg [CC-BY-SA-3.0 (http://creativecommons.org/licenses/by-sa/3.0/)])

Van Reken (1999) point out, these children mourn the loss of *"status, lifestyle, … relationships, identity, role models and a past that wasn't and a past that was"* (Nette & Hayden, 2007, p. 436).

Conclusion

American-born Hopkins' (2015) experiences as a TCK growing up in West Africa as a child of missionary linguists were summed as follows:

> I never considered my African childhood Paradise, and when I returned after not quite a dozen years away, I felt comfortable, but not at home. I've moved on, or moved forward, or moved away, or something. (p. 819)

His account resonates in so many ways with my own autoethnographic journey. Of course, my journey represents just one voice and journey as a TCK; however, there are some key messages reported from the literature in the chapter that also arise. For instance, TCKs feel at home everywhere a bit, yet nowhere totally. Each move shapes them and changes them, therefore when revisiting their *last home,* they find out that they have changed and their previous home is not their home anymore. Thus, for many TCKs, the search for belonging/home is a life-long one. In my case, I feel that I still have unfinished business in my quest to find *my home*.

I have also explored some of the SLE research and its potential relevance to TCKs and addressed the many challenges arising from frequent relocation that many TCKs experience, including the impacts of/on international schools, through my own lived childhoodnature experiences growing up as a globally mobile child. It is clear from my dialogue that children need to feel safe and have a secure and nurturing learning and social environment where they feel a sense of belonging, before schools can try to develop an environmental ethos and SLE through environmental studies and environmental/outdoor experiences, as all these opportunities may well be lost on the students. This is true for both local/national and international school students; however, international school students have the added issues to contend with associated with being TCKs. Thus, it is vitally important that TCKs feel a sense of belonging to their international school/community, and that they feel safe and secure so that the next level of learning and identity forming in Maslow's hierarchy of needs (Fig. 1) can take place to help integrate childhoodnature experiences into their identity and thus be able to have SLEs as part of their lifelong calling and engagement with and for the environment.

After-school programs are a major route in the development of an environmental identity (Stevenson et al. 2014). These programs can create a sense of belonging to a community by linking environmentalism to a child's identity. International schools need to utilize this chance at cultivating a child's environmental identity when given the chance. By introducing TCKs to positive outdoor and SLE, they are paving the way for them to create personal attachments and identify with the environment and

thus learn to respect and take care of it. Not because they are told to, but out of love for the environment. Ultimately, what is instilled in children, manifests when they are adults (Chawla, 1999).

Approaches have been identified to assist TCKs in providing much needed harmony, support, stability, and understanding for both staff and students of international schools. This can be achieved by looking at how one's inner and outer world influences the construction and significance of one's SLE as articulated through my own TCK journey. However, there is clearly a need for additional childhoodnature research in many aspects of environmental educational research in international schools, especially further exploring the role of identity formation and its impact on SLE for TCKs.

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Phenomenology with Children: My Salamander Brother

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Adonia F. Porto and Janice Kroeger

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Abstract

The purpose of this research was to investigate young children's perspectives of nature while exploring a deciduous forest as an extension of their early childhood classroom in a University Lab School. This work was framed theoretically on the premise of ethical listening and doing curriculum and research *with* children in efforts to gain a phenomenological understanding of children's prereflective and reflective experiences of nature. Children's prereflective and reflective experiences were captured through methods adapted from the Mosaic Approach and video methodology as part of a dissertation research project. Children spent a minimum of 2 h per week in a natural environment with their teachers over the course of a school year. Key findings highlight how children's extended nature experiences led them to conceptualize how they can be (in) nature, that they can manipulate nature, resources in a natural space, and how they are nature themselves. Significant life experience (SLE) literature is drawn upon to show implications for early childhood practice and research with children.

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Phenomenology with Children: My Salamander Brother

Doing Phenomenology with Children

Phenomenology as defined by Max van Manen, "is the study of the lifeworld – the world as we immediately experience it rather than as we conceptualize, categorize, or theorize about it. Phenomenology aims to come to a deeper understanding of the nature or meaning of our everyday experiences" (van Manen, 1984, p. 37). Phenomenology as a research approach was adopted for this study to reach the goal of understanding children's everyday experiences with(in) nature with little to no interruption of adults. Video methodology, adapted from The Mosaic Approach method of magic carpet, became a primary method as children's immediate experiences were captured (pre-reflective) and could be reflected upon as often as desired (reflective experiences). van Manen (2014) emphasizes the study of reflective experiences but by also collecting pre-reflective experiences, a dual understanding is revealed. The authors use the terms "we" and "I" in this Chapter to share different viewpoints. "We/our" refers to our joint understanding of meaning derived from the study, while "I/my" refers to Adonia's primary position in gathering data and children's reflections of their time with(in) nature. We use the terms with(in) and (re)know as a rhetorical move to show the complexities of how children interact with and within nature while constructing knowledge with or without adults, simultaneously, and/or in different rhythms that are not easily discussed as linear experiences. Be(in)nature is a term I use to consider two possible conceptions of nature: that as humans we can be in nature and manipulate its resources and/or we can be nature. We are alive, breathing, and moving, because we are nature. We are a part of Earth.

SLE literature contributes to our understanding of how direct childhood experiences with(in) nature often influence our future attitudes and behaviors towards the environment (Chawla, 1998, 2007; Chawla & Cushing, 2007; Laird, McFarland-Piazza, & Allen, 2014). When I was a child, I remember using fallen fir tree limbs to sweep the dirt ground and pretend to be Mom. I can remember the smell of the sap and how dirty my hands would get as the dirt stuck to my palms. My connection with (in) nature throughout my life has led me to believe the more time we spend in nature, the more we begin to know and understand the Earth. We can be(in) nature. I assumed that children could also be(in)nature. After reflecting on my own childhood and reminiscing about my joys in nature, I knew I wanted this opportunity for children. This assumption, about children understanding themselves as nature, led me to develop a phenomenological study to investigate preschool children's pre-reflective and reflective experiences of nature because what I did not know is

what experiences would lead children to be(in)nature. Twelve preschoolers, ages 4 and 5 years, experienced nature in a forest environment near their school with myself and an outdoor educator over the course of nine months. Interpreted Phenomenological Analysis (IPA) (Smith, Flowers, & Larkin, 2009) was utilized to portray children's experiences in anecdotes of a greater phenomenological text. Three of the 14 final anecdotes featured in my research are shared in this Chapter to emphasize how children's construction of nature changes over time, along with what children consider significant about nature. Furthermore, I considered how these SLE in childhood may lay the foundation for pro-environmental behaviors if children carry a pro-environmental consciousness into adulthood, meaning their "knowledge, values, and attitudes are part of their emotional involvement" with(in) nature (Kollmus & Agyeman, 2002, p. 256).

Children's Perspectives of the Outdoors

The key to studying nature as a phenomenon with children is providing them with uninterrupted time and many opportunities to revisit direct experiences (Kellert, 2002). Children can move freely, explore nature's elements, and decide what nature is for themselves and as phenomenologists, "grasp of the very nature of the thing" (van Manen, 1990, p. 177). Then when needed, teachers are nearby for support. Moss and Petrie (2002) suggest that children's spaces such as outside environments "allow children to exercise agency, to participate in their own decisions, actions and meaning making, which may or may not involve them engaging with adults" (p. 93). Revisiting natural spaces over time allows children to (re)know, discovering something different than the visit prior (Tovey, 2007). The more time children spend in nature, the more they find meaning in places they consider significant. Kernan and Devine (2010) confirmed "the most prevalent value attributed to the outdoors by adults was freedom" and moving freely was considered natural and "a necessary part of being a child" (p. 377). There are limited studies capturing children's perspectives of the outdoor experiences while employing The Mosaic Approach (Clark, 2008) as ways to understand. However, one influential study (Waller, 2006) suggests that learning from children without a formalized research agenda gives us the opportunity to know children differently. While the focus of the study (Waller, 2006) was to examine children's participatory methods, children's perspectives of the outdoors were generated through drawings and camera use. Additionally, another study (Mawson, 2014) implied that children approach the wild woods similarly as other outdoor spaces, but in our study children approached the woods with a completely different demeanor and concentration. Without interruption, children addressed their own inquiries and questions about nature.

Ethical Listening in Curriculum and Research with Children

The teacher-child hierarchy begins to dissolve when children are in conditions of (be)coming curriculum with their teachers (Sellers, 2013). Sellers (2013) describes (be)coming as both being and becoming curriculum with children in ways that are not traditionally straightforward and product oriented. Being in the moment and

empowering children as agents of their own learning and (be)coming curriculum while children and teachers are in a constant state of learning from one another However, moving beyond traditional curriculum and doing research with children sets the pace for additional tensions, involving decisions about, for example, how research is enacted, when and for how long, how roles in the study are decided. (Farrell, 2005). The Convention on the Rights of the Child (United Nations, 1989, 2005) has set a guide for recognizing children's rights to participate in decisions about their own lives and circumstances. However, Pramling Sammelsson and Johansson (2009) argue that supporting children's right to decision-making depends on how adults receive children and their knowledge, learning, and experience (p. 79). If we consider (be)coming curriculum with children, perhaps we can know children differently.

Furthermore, Dockett, Einardottir, and Perry (2009) suggest that "efforts to engage children not only in the generation of data, but also in the interpretation of data can ensure that the voice of the researcher is not the only one considered" (p. 290). Adults should try to recognize when they are listening to some children more than others (Einarsdóttir, 2007). The phrase *ethical listening* describes the practices that I used, derived from others (Dockett et al., 2009; Farrell, 2005; Samuelsson & Johansson, 2009) in efforts to try and support each child as a co-researcher throughout this study. I acknowledge that the teacher-child power dynamic cannot be denied, but the following practices assisted in discovering a true representation of children's meaning-making:

1. Build strong relationships with children.
2. Children decide when and how to participate.
3. Support children's initiation of reflection invitations.
4. Read children's reflections aloud for editing and confirmation.
5. Share adult interpretation and seek child feedback or edits/additions.

Upholding these values and practices meant that sometimes the children would share what I valued as a great implication for research but then would ask me not to show anybody else. I respected their request because I valued ethically listening and their right to decide how our work was portrayed for others. All of the work was vetted through the appropriate channels of human subjects review boards at our institution, but working with children is far more complex than these institutional procedural steps. The practices described above supported my intentions to carry out a research project while involving children as active researchers (Barratt Hacking, Cutter-McKenzie, & Barratt, 2013).

Doing Curriculum and Research with Children

Doing curriculum and research with children is paired in this section to extend on the notion of children as active agents and researchers in our study. Inspired by Reggio Emilia approaches, curriculum at the research site is developed based on inquiry led by children and teachers both indoors and outdoors. The data generated in this study acted as both curriculum and research as the children were not asked to participate in

ways any different from their regular expected school day. Sellers (2013) suggested a lived understanding curriculum where children and teachers inquire together about what and how learning will take place. In this study, research questions were broad enough to ensure that children could lead how data were generated without an adult agenda. The questions leading to children's understanding of be(in) nature were: (1) How do young children, ages 3–5, experience, interact, and respond to the direct physical elements, an outdoor forest environment near their school? (2) How do young children create meanings about nature in a group setting? and (3) How do young children's meanings of nature emerge and change over a school year?

The Mosaic Approach Adapted

Methods adapted from The Mosaic Approach (Clark, 2008) were employed to capture children's pre-reflective and reflective experiences while considering their right to choose when and how to participate as well as how much to "say" about their experiences in a natural environment. The Mosaic Approach is a meaningful way of conducting research with young children (Clark, 2008; MacNaughton, 2003; Rinaldi, 2006) and asks the question "What does it mean to be in this place?" which may be interpreted as, "What does it mean *to be you* in this place now in this present moment, in the past and in the future? (Clark, 2008, p. 17). A goal of using The Mosaic Approach is to provide research methods that promote children's confidence in answering a question with no "wrong" answer (Clark, 2008). Each element of The Mosaic Approach encourages a different level of engagement, from talking or watching videos to creating books or drawings about their experience. The Mosaic Approach "combines the traditional adult-directed research tools of observation and interviews of family members, practitioners, and children, with participatory tools for children, including the use of cameras, bookmaking, tours, and mapmaking" (Clark, 2007, p. 2).

The methods that were adapted from The Mosaic Approach were Magic Carpet and Child-interviewing. Magic Carpet (Clark, 2008), a method where children typically view a slideshow of photographs from the experience, was revised to offer videos captured by the children or myself. This adaptation of the magic carpet offered a less product-oriented level of engagement that was welcomed by children who did not feel as comfortable drawing or writing or had less experience taking photographs. Child-interviewing, a method of short semi-structured interviews, was also revised to be an open invitation for reflection that could occur at any moment initiated by the children or myself. The methods (Table 1) provided an avenue for participants to choose how and when to share their meanings of experience.

Role of a Phenomenologist and Teacher

My role in this phenomenological study involved my participation as both a teacher and a researcher. During the data generation phase of the study, I invited another teacher, Tess, to help facilitate children's everyday needs in the forest so that I could take on a stronger researcher role to collect participant observations and children's pre-reflective and reflective experiences with video and photographic documentation. Everyday needs involved assisting children who needed a Band-Aid, a shoe

Table 1 Ways of reflecting: The Mosaic Approach

Ways of reflecting	Data generated
Observations	Qualitative accounts of how children respond and experience nature
Child-interviewing	Reflection invitation conducted one-on-one or in a group (adapted)
Photography/ bookmaking	Children's photographs of "important things" and books created with photos, words, and drawings
Tours	Tours of spaces led and documented by children
Map making	Children create 2D representations (drawings/photos) of space
Magic carpet	Children view videos of experience (adapted)

Note: Adapted from Clark and Moss (2008)

tied, a bathroom break or other specific care from an adult. Even with assistance, I acknowledged that my roles of teacher and researcher could not be fully separated especially when some of the participants were members of my own classroom during the study. My intention was that by inviting participants from another classroom, less biased accounts could also be incorporated. Continuous video recording allowed me to capture most experiences while being open to child-initiated reflections or use of the video camera. Then children could request to see a video of their experiences to support their reflections. Phenomenology, not often done with children, allows adults to *listen* and capture children's in-the-moment experiences so that they can be invited to reflect later. While in the act of experiencing, we do not always notice the possibility for reflection and meaning-making.

Phenomenological Writing and Interpretive Phenomenological Analysis

Three anecdotes of the dissertation study are shared in this chapter to portray how children came to recognize themselves as nature. The use of anecdotes in early childhood education is not a new method of observation (Carr, 2000; Clark, 2004, 2007; Clark & Moss, 2001, 2005). Partnered with methods of phenomenology, "anecdotes recreate experiences, but now already in a transcended (focused, condensed, intensified, oriented, and narrative) form" (van Manen, 2014, p. 250). Additionally, van Manen (2014) described meticulously the complexity of writing a phenomenological text and the challenges of writing about the living now while knowing philosophically, it is already too late (see pp. 43–44). Further he advised:

> The problem of writing is that one must bring into presence a phenomenon that cannot be represented in plain words—it would escape all representation. So, we may distinguish between the presentative (immediate) and the representative (mediated) modes. The presentative mode is immediate or direct— the representative mode is mediate or indirect. The writer who aims to bring the object of his or her gaze into presence is always involved in a tensional relation between presentation (immediate "seeing" and understanding) and representation (understanding mediated by words). (p. 370)

The challenges of writing the text, in my opinion, were attempting to write about the essence of the present in past tense to put the reader in the forest, experiencing nature with children. While avoiding the phrase "You had to be there," I was forced

to consider what anecdotes of children's conversations were pertinent to phenomenological understanding. Capturing the essence meant watching and re-watching videos to transcribe the conversations while bracketing my own ideas and reflections, just long enough to know the children's meanings before reflecting and incorporating my own. Additionally, punctum was used to leave a lasting impression in the reader (van Manen, 2014). For the purposes of punctum in this study, photographs were used to capture snapshots of pre-reflective experience and reflective drawings with children's one line statement about their experience.

Epoché-Reduction

The act of capturing the pre-reflective and reflective experiences of preschoolers calls for careful consideration when selecting methodology. The Epoché-Reduction method (van Manen, 2014), when writing a phenomenological text, begins with the understanding that the researcher cannot deny their own preunderstandings of the phenomenon itself and must practice radical openness to the phenomenon while bracketing interpretations and assumptions (van Manen, 2014, p. 224). The radical openness in phenomenology is being aware that our preassumptions, interests, and ideas cannot fully be separated. Bracketing refers to acknowledging one's own interpretations and assumptions separately from the generated data. However, when working in conditions of (be)coming (Sellers, 2013) with children in this study, my own preunderstandings and assumptions were revealed before, simultaneously and afterwards rather than separate. Bracketing all interpretation and assumptions was not possible in this study as my initiative was to instead research with children, listening and understanding together. Practicing with radical openness (van Manen, 2014) allowed me to video record children's direct experiences with (in) nature while journaling about my own thoughts or assumptions. In doing so, the data generation encompassed it all, children's meanings and my narrative interpretation.

Finlay (2008) suggests that an alternative to separating one's preassumptions is to practice with a phenomenological attitude. This means working in a back and forth process of acknowledging personal assumptions and returning to look at participants' experiences in a fresh way. As stated before, because everything we do can have a reflective phenomenological interpretation attached to it, critical decisions are made about what experiences to "bring to life" while maintaining a phenomenological attitude. Videos, photographs, and reflection invitations, as adaptations of The Mosaic Approach, were used as potential ways to understand children's reflections. We should remember that all children are unique and reflect in a variety of ways. These methods, and often those in phenomenological research, do not intend to expose the explicit meanings of one specific person but rather to suggest that these meanings are possible human experiences that are usually constructed as a group. Furthermore, the intent of writing the collection of anecdotes was to "make intelligible the kinds of meanings that we seem to recognize in life as we live it" (van Manen, 2014, p. 221).

A double hermeneutic interpretation was used to analyze preschooler's social constructions (meanings) of nature. Smith et al. (2009) in *Interpretive*

Phenomenological Analysis (IPA) suggest that double hermeneutic interpretation refers to "the researcher trying to make sense of the participant trying to make sense of what is happening to them" (p. 3). IPA seeks to understand the phenomena for what it is and not within the confines of predefined analysis. Smith et al. (2009) explicitly describe six steps to data analysis and uncovered how they might be helpful but are not meant to be prescriptive and can be used in any order. The six steps are as follows:

Steps of data analysis	Process
1. Reading and re-reading	Read and re-read to eliminate feeling overwhelmed connection possibilities
2. Initial noting	Write exploratory notes to comprehend data without rules and pinpoint a phenomenological focus
3. Develop emerging themes	From comprehension comments, participant guides understanding but researcher interpretation is interweaved
4. Find connections across themes	Charts or maps are used to consider how themes might fit together. Some emerging themes may be discarded
5. Moving to the next case	Researcher brackets the ideas from the first case to view the next with new openness. Steps one through four begin again.
6. Look for patterns across	These lend to theoretical understanding cases

Note: Adapted from Smith et al. (2009)

Each of the data analysis steps (above table) was considered for interpretation. Each way of reflecting using The Mosaic Approach (see Table 1) was transcribed employing these steps. Through these steps of interpretation and analysis, each data excerpt was interpreted to capture the essence of a preschooler's experience in nature.

Anecdotes, Photographs, and Drawings of our Significant Life Experiences

Three anecdotes, "The Earth is Right Here," "The Butterfly Visit," and "Salamander Brother," are shared in this Chapter to demonstrate phenomenology with children and carefully asking questions in the moment to effectively elicit meaning-making. Additionally, these anecdotes were selected to highlight how practicing in conditions of (be)coming with children, in both curriculum and research, led to child-initiated reflection and data generation. As children reflected on their experiences, they found deeper meanings and understood nature as needing compassion and understanding. The experiences that led to child-initiated reflections are the moments that I found mostly likely to attribute to pro-environmental behavior and attitudes.

Tanner (1980) described experiences in childhood, prior to age fourteen, to be the most influential to pro-environmental behavior later in life and most influential to their love for Earth. Additionally, Chawla (1998) found that the adults modeling care and environmental action also credited their direct childhood experiences as influence.

However, Sobel (2012) argued that the "don't touch" mentality of many environmental educators is limiting children's access to similar experiences of older generations and (Laird et al., 2014) confirm that many educators recall catching bugs as part of their own childhood but are limiting the same opportunities for children. The experiences in our anecdotes empowered children to make their own decisions about what experiences were valuable and how nature was treated. Beginning with "The Earth is Right Here," we invite you into our journey in discovering how children came to know nature.

The Earth Is Right Here

Lee, Midas, and Carmen began to walk down by the water so I followed. Lee climbed to lounge on a tree and Midas, Carmen stood nearby.

I asked, "Do you want to talk about what nature is while we wait to see another animal?"
Carmen asks, "Do you mean nature items?"
I nod with my camera recording.
She pauses before saying, "Hmm. Nature can be all on different planets."
Lee states quickly, "I don't want to talk about this."
Midas repeats Carmen's question, "Nature items?"
Lee interrupts, "Carmen, climb this log."
So I ask, "Are logs nature?"
Lee says, "Yep. And leaves."
Carmen bursts out, "Trees are nature! Leaves are nature! Poison Ivy's nature!"
Lee adds, "Branches are not."
"Houses are nature, trucks are nature." Midas suggests.
Lee says, "No they're not."
Carmen adds, "Children and people are nature because they live on nature."
I ask, "Lee, why do you say houses are not nature?"
"Because they don't walk or something?"
Midas says, "Well, they kind of walk but they don't."
Then I say, "So Lee, trees don't walk but Carmen said they are nature."
"Yep they are," nods Lee.
So I say to all of them, "How do you know then when things are nature or not nature?"
Lee confirms, "Because they're in the wild. Sometimes they move."
"I'm going to try to wiggle this tree" as he bear hugs the tree and tries to wiggle it. Agitated Carmen shouts, "I CANNOT get up here" referring to the log.
"Trees move when you cut them open" she adds.
"But that hurts the trees" remarked Lee.

Silence breaks our conversation about nature and Midas announces, "We don't really care about nature, right guys?" and I say, "Well I really do care about nature a lot" and Carmen immediately joins in, "Me too. Everybody in the world is nice to nature." I then ask, "Why do you think?" and Carmen says, "Because Earth likes the nature and it likes its beauty." Midas then changes his mind and reconsiders, "I do like nature and the Earth is right here." When Midas changed his mind, I knew that together we could help him understand care for nature.

When Carmen said, "Everyone in the world is nice to nature," I knew she had already formed a connection with nature because she moved carefully and quietly and described the forest as "the animal's home. I could tell her words were important to the

children as they listened to her intently. Midas was quick to show her that while her theory was ideal, it was not true. However, her influence led Midas to reconsider, if only for a moment, that there is importance in caring for the Earth. Right in front of us. Taking time to talk about nature, to study it as a phenomenon creates opportunities for understanding. Together, we participated in a conversation about nature that led me to understand the children's perspectives as I sparked their interest with one provocative question so the children could lead how the conversation was carried out. The open-endedness of our conversation taught me that talking about nature as a thing, a space and a part of us is essential for children's sustained connection.

Rosie's drawing as reflective response: Our hands are on the ground because we're looking for worms

The Butterfly Visit

Right next to our school, Carmen yelled, "Whoa! Our butterfly came back to visit us!" Lillian was being dropped off at school and she met us by the parking lot. Nikki, Midas, and Fitz yelled, "Li-ll-ian! Our butterfly came back to visit us! Come see!" She yelled, "Okay guys!" as she carried her lunchbox next to her mom. We had just started towards the Log Playground when we discovered the butterfly. Nikki carefully touched the monarch's wings and Nadia and Zeke both pushed into Nikki to see it too. She whined, "Ugh! Stop pushing me. It's fragile." Zeke asked, "Can I just see it, please?" Nikki backed up and I called to Tess who had kept walking with the rest of the group, "Tess! There's a butterfly!" She walked the group back to meet us and Midas told her, "It's our butterfly. It came back to visit us!" Tess said, "Oh the one you had in your classroom? That's great." The whole group crowded around the butterfly and Carmen said, "Remember it's wings are so fragile. It bled out of its rolled-up chrysalis. Please don't hurt it." Luis added, "We watched it so long. The poor little buddy. It missed us." I said, "It's great that we get to see it again. Its wings

seem larger." Lee said, "It might not be our butterfly, guys." Fitz added, "It probably grew up and came back to see us."

The Return of the Monarch

Carmen's drawing as reflective response: The butterfly came back to see us because we watered its leaves.

Zeke and Nadia were ready to move on and started to walk towards the path. When we entered the Log Playground it was as though everyone knew their plan. Zeke immediately climbed onto the Monkey Bar of the Log Playground Tree. He shouted in a teasing way as he swung, "You can't catch me up here! Oh, no you can't!" At the same time Nikki asked, "How do I get up there again?" I said, "Remember at the bottom and then you can climb up to where Zeke is." Nikki carefully climbed up the Slide of the Log Playground Tree and said, "I can totally do this now. My mom would be so happy." I agreed, "We can show her this part of the movie if you'd like." "I am the movie star, duh!" she spits out. I laughed and could hear Luis ask, "Remember when we were looking to see inside the tree?" Yoshi heard him, nodded, and said, "Milly and Nikki, do you want to play with me? Follow me if you want to play with me." Luis followed him and Yoshi began to pound on the stump of the tree and Luis found a stick to join in.

That butterfly missed us. In this journey, I have come to understand that each experience leads us to know something new or remember something old. This is especially true for children. For adults, we often fly through the busyness of life and skip moments to speed ahead to the next. That was the task at hand, to get to The Log Playground. Tess may have seen the butterfly, but we were on a mission to get to The Log Playground. When given a task, it is easy to forget your surroundings. To notice life around us in the moment. Seeing the Monarch butterfly reminded the children of the one we raised together. Our experiences lead us to make connections and process what is happening. Seeing the Monarch sparked a memory and led the children to think about the one we raised and the possibility of it coming back to see us because "it missed us." The lifespan of Monarchs is typically 2–6 weeks, except for the ones that migrate to Mexico. In that moment, I realized that my factual knowledge as an adult led me to immediately assume it was not the same butterfly. Reflecting on it more, I had hoped that it was a Monarch that would migrate to Mexico and I considered how it was more pleasing to perceive that the butterfly missed us. Furthermore, Carmen reminded us of the butterfly's journey, "it bled out of it's rolled-up chrysalis," as if reminding us of the complexity of its journey since birth.

Considering the feelings of a butterfly made us feel as though we had modeled a pro-environmental attitude by encouraging their conversation about the butterfly particularly following the hatching experience (Chawla & Cushing, 2007). Recognizing nature has feelings allows us to see immediately that our actions impact life. The butterfly "missed us." The children were careful not to hurt the butterfly and considered how fragile it was, especially the wings because "they had bled." They cared for a caterpillar in the classroom for weeks before it became a butterfly. It felt rewarding to all of us that it came back to visit us. The children's work and care paid off.

Salamander Brother

Tired of our conversation, Zeke ran and shimmied up The Monkey Bar and hopped down, "Tess, did you see that? I hopped right down from that monkey bar. I couldn't

do that before." "Let me see," she replied, before he did it again. Fitz, Carmen and Rosie were now at the highest point of the Log Playground Tree when Carmen hopped down and said,

"I'll let you know if I find any bugs, Rosie." And you dropped your mitten."
"Oh! I always do that," laughed Rosie.
Fitz asked, "Hey guys? Do you think all the worms are sleeping because it's cold?" "Well it's a little warmer actually," Carmen remarked.
"Yeah. No mittens," adds Rosie.
"Maybe they're in their cozy beds and we got to find them," considered Fitz.
"They probably are in a group hug so they can stay warm," smiled Carmen.
"Do you think they know to use their leaf beds we made them?" asks Rosie.
"Yeah," replied Fitz.
Rosie looked for a while and then shouts louder than normal,
"I found something! It's a bug! It's a beetle, it's hard!"
"Let me look!" said Carmen, "Oh yeah. It is a beetle."
"Let's make a bed for it," added Milly.

She picked up a large leaf near the Log Playground tree and laid it on the trunk. "This can be its trampoline," she announced. When Milly places the leaf, the beetle falls a few inches down the side of the tree and Carmen catches it. She whispers, "Got it!"

Rosie, irritated, says, "No! No trampoline! A bed! We're making a bed!"
I ask, "Hey. What's all this about? What's wrong?"
"I want to have it. I want to make it a bed, no one else."
"I want to be lucky and find a beetle too," sighed Carmen.
Rosie grumbled, "Ugh," and says, "Yeah. I am lucky."

Moments pass by before Carmen yelled, "P! We found something!" I walked over to see and the girls had just turned over a log. Two wet salamanders laid in the log's print. Carmen was holding a worm in one hand while touching the salamanders with the other. Rosie whispered,

"Aww. Look at it! Can I hold it?"
"Just pet it lightly first" whispered Carmen.
Nikki comes over, "Is it a worm?"
Carmen whispers, "No they are salamanders."
Rosie goes to pick it up and says, "Whoa. It's so wiggly. How can I pick it up?"
"Soooo carefully," remarks Carmen.
Carmen tries to pick one up with just one hand and whispers, "Yeah. Wow. Very wiggly." She placed her worm on a nearby log and says, "You rest here a minute." Carmen gets a salamander in both hands and shrieks as it falls to the ground." I ask, "What made you scream?" She says, "Because it wiggled way too fast." Rosie giggled at the wiggling as she loses it in the soil. She moves some of the ground around and instantly jumps up and takes two steps back. "Ahhh! A tiny spider," she yelled. Then she pauses and says, "Oh well. It's just tiny" and begins looking again. As she looks she says, "Ugh. I can't find my salamander." I say, "Just keep looking under those leaves." She moves some leaves and I say, "Oh! I see its head." She picks it up and closes her hands loosely. She opens them to look and moves it from one hand to another whispering, "Whoa. I got it."

She throws her head back laughing and says through giggles, “Ha! He’s tickling me.” She puts her mouth close to her closed hands and whispered, “That tickled me. . .you tickled me.”

Midas is nearby and Carmen says, “Show that salamander to Midas.”
Rosie nods, “Midas! I found a salamander over here.”
“Can I hold him?” He asks as he peeks in her hands.
“Yeah, sure” as she circles back around and checks back to see if she can quickly find him his own to hold.
He asks, “Can you help me find one?”
“Oh-kay,” Rosie says, “Thanks for not taking it from me. We found it by this log.” “They’re just so very cute!” she continues as she scanned the ground.

Carmen placed her salamander on the log for just a moment and Midas says, “Found it!” and went to pick up Carmen’s.

“No! I was just resting my hands for a minute,” she snapped.
Picking it back up she demanded, “Ahh-ah! Stop tickling me you little salamander!”
Sighing, she continued, “When they wiggle really fast, it tickles too much!”

Rosie peered closer at Carmen’s and Carmen said,

“Rosie when they wiggle, they tickle. Like tickle-wiggle, tickle-wiggle.”
“Pah-lease. . .help me find one. Please!” Midas pleads.
Carmen says, “Okay. They’re very squirmy.”

Milly joins them showing her hands. She is holding a well-formed ball of mud. Carmen says,

“Oh! I bet my salamander would love that mud ball, Milly.”
“Yep. He likes it!” as Carmen put the salamander’s face by the mud ball.
“Rosie, can we see if yours likes my mud ball?” asked Milly.

Rosie lets go of it in her hands and Fitz watches. She says, “This little guy is quite a handful. I can’t even take it.” Midas talks Carmen into holding her salamander and Milly passed the one she was holding to Fitz. Fitz giggles loudly and spins in a circle as the salamander moves in his hand.

“I can’t believe how cute he is. He’s crawling up my sleeve because he’s cold. I know it!” squeals Midas.

Midas holds it between his fingers and flips it over to see the belly. He remarks,

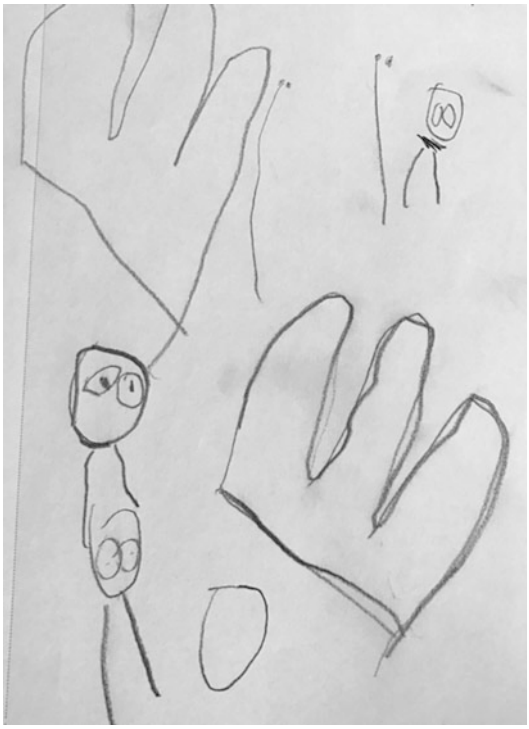
“Oh, my goodness! He’s so spotty. He’s like a Dalmatian.”
“Why are you tickling me so much, brother?” Fitz yells to the salamander in his hand.
“Yep. Mines my brother too,” confirms Midas.

Tess told us it was time to head back to school and so Midas puts the salamander on the log and says, “I’ll miss you Salamander Brother.” Right then, Carmen wrapped her arm around Midas and says, “Pssst. You’ll always be my brother.”

Midas carefully holding a salamander

Midas noticing the salamander’s spots

Midas' drawing as reflective response: Here's my little brother, Mikey!



Lillian's drawing as reflective response: We always hold the worms. They love us.

Nikki's drawing as reflective response: To find worms you must look really hard and then bam! You see them!

I assumed that the conversations about group hugs and cozy beds were the children's way of embracing the chill in the air that day. After we walked for a while, our bodies were warm and we could shed our mittens. The children also empathized with the worms or insects that could not escape into the warm school like they could. When thinking about a group hug, I thought about the warmth it brings. The physical warmth of being close but also the emotional warmth of being held and cared for by people you like. It makes you think of love and family. The salamanders became our brothers. As Rosie was searching for her salamander she was forced to address her fear of spiders again. She jumped and shrieked at first but remembered she had overcome it before and could again. When I think about what it means to have a brother, I envy people with older brothers who probably tickled them and picked on them when they were young just like the salamanders were tickling the children. I wondered if some of the children longed for an older brother too. When Midas said sadly, "I'll miss you my salamander brother," Carmen comforted him by wrapping him in her arms and telling him that he is her brother. In the end, we found that if we care for nature, nature will care for us.

The part of be(in)nature that I find most important is "be nature." That children can connect with nature to learn they are nature themselves. The children learned that anything once alive, particularly things that could breathe were nature. They learned later that plants and logs, dead or alive are nature too. This realization allowed their relationship and connection with nature to grow. For example, the butterfly "missed us." Although it could not express feelings, it missed us because it was alive. The children knew that living things had feelings like humans. Ending our experience with salamander tickles was powerful for us. Fitz accepted the salamander as his brother which told me he accepted that he is nature or that nature deserves the same respect. Midas joined in his compassion and his caring side shined through. Carmen accepted his need for care and embraced him allowing me to see the children bond over a special moment that felt like family.

Discussion and Implications

Uninterrupted Time in Nature

Studying how children interacted and came to know nature was simple and challenging at the same time. It was simple to support children's uninterrupted time and just be. To be with children with(in) nature while videoing their conversations and interactions with the ground, trees, insects, and life without an agenda. For 2 h, we escaped the real world back at school. We escaped the schedule, logistics, and structure. Doing phenomenology was challenging because children pulled me in every direction to experience nature with them. One child found a worm for the first time and touched it while another climbed higher on The Log Playground Tree than before and they both needed me to experience it with them at the same time. The excitement and passion was real. Without an agenda or adult leading their study, children moved freely and excitement filled the forest. The discovery of a monarch led to the reflection of our care in the classroom to the sadness of the blood it shed. Its return led us to believe it missed us. Discovering a salamander meant realizing nature is like us, and when it has arms and legs, it becomes clearer nature is family. Nature is our brother. Additionally, it was challenging because while doing phenomenology a phenomenologist knows that every second has the potential for a reflection and being open to any experience and any reflection meant the data was abundant but a project was to unfold in the end. Uninterrupted time in nature meant the children discovered nature for themselves and realized over time that you can be(in)nature and nature needs our care.

Children's Curriculum, Research, and Voice

Children guided this study of nature and we discovered how nature leads us to understand that we can be(in)nature. Listening to children and allowing them to guide the research is a priority for phenomenologically understanding children's

experiences. Each time the children approached me for a reflection invitation, where they would talk about their experience, request to watch a certain video, or draw about their experience; we knew they found meaning or significance in their interaction with(in) nature. Stepping back while being present meant that the children felt competent in their reflections with no right or wrong answer. More importantly, they did not look for approval or praise to know that their research and voice were valued. The role of a significant adult in children's experiences links directly to Chawla's (1998) point of adult modeling of pro-environmental behavior and attitude. By empowering the children to experience with(in) nature, consider themselves nature, and listen to one another while supporting their needs gave them agency over what they learned about nature and what led them understand that they are nature and nature needs our care.

Significant Life Experiences of Preschoolers

van Manen (2014) reminds us that every experience can be reflected upon and stays with us until the next experience takes precedent. While we know children's nature connections as important, how do we inspire children to sustain connections into adulthood? SLE literature suggests direct experiences in nature (Chawla, 1998, 2007; Chawla & Cushing, 2007; Laird et al., 2014). The most influential direct experiences from our research that may lead to pro-environmental behavior later in life include:

1. Defining Nature Aloud: The children could talk about nature often, uninterrupted by adults to discuss, negotiate, argue, and contemplate the elements of nature leading to the discovery of what it is and group meaning-making.
2. Discovering Nature's Needs: Over time children used their knowledge of their own needs to suggest that nature needs the same: group hugs, cozy beds, trampolines.
3. Realizing Nature is Family: Being in a group with the consensus that nature should be cared for, let's children realize that nature is family.

Based on these experiences, there is a potential for children to reflect on these experiences as memories later in life and recall what nature is, its needs and the discovery that as humans we are nature and/or we can be(in)nature. While SLE suggests strong connections to nature in childhood with adult models, encouraging children to conceptualize themselves as nature provides a new avenue for connection. Phenomenology as a research approach gave us the framework to understand nature as a phenomenon from children's perspectives. We encouraged their lead to help us understand their sense of wonder with(in) nature. Campbell and Jobling (2012) suggest that children need to find a sense of wonder and joy in the natural world. Being tickled by a salamander is just one example of joy we found together. The joy connected Midas to the joy his family brings him, thus leading him to see the salamander as his family and himself as nature. Reflecting as an adult on my own

childhood, my experiences in nature feel less significant than the implications in Salamander Brother. We intended for children to be provided with similar experiences like we had when we were children such as climbing trees, playing in the dirt and catching bugs. However, we discovered that when given the opportunity, children will teach us how they can conceptualize nature on much deeper levels as they make connections to their own lives and the ways their actions impact the environment.

Cross-References

- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Children's Imaginative Play Environments and Ecological Narrative Inquiry
- ▶ Unplanning Research with a Curious Practice Methodology: Emergence of Childrenforest in the Context of Finland
- ▶ Wild Hope: The Transformative Power of Children Engaging with Nature

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Embodied Childhoodnature Experiences Through Sensory Tours

39

Carie Green

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Abstract

This Chapter posits sensory tours as a method for discovering children's embodied "storied entanglements" in, with, and for the natural world (Ritchie, 2014, p. 50). Drawing from existential forms of phenomenology (Merleau-Ponty, Phenomenology of perception (C. Smith, Trans.). Routledge, New York.

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(Original work published in 1945), 1945/2002), and recognizing the significance of somesthetic experiences (Iared et al., 2016), sensory tours provide a novel approach for understanding children's experiences of being and becoming and relating with other natural beings. During a sensory tour, a child is invited to wear a small wearable video camera; the camera goes where a child goes, sees what a child sees, hears what a child hears, shows what a child touches, and reveals what a child tastes. Informed by the tradition of walking tours, which have been used for some time in place and environmental education research (Hart, 1979), the sensory tour method is uniquely positioned to unravel embodied temporal-spatial meanings during children's exploratory movements. This method opens up possibilities for bridging the "correspondence" gap between being and thought – by capturing children's pre-reflective movement – their imaginative song and dance, self-talk, and expressive utterances, as they interact with and relate to others in the more than human living world. The Chapter will draw from research findings involving young children in an Alaskan cultural and wilderness context (including trudging through tundra, transforming sticks into weapons, and scaling up tree castles). Through these examples, I will reveal how children's first imaginary and sensory encounters inform their sense of being with the natural world.

Keywords
Child embodiment · Phenomenology · Wearable cameras · Significant life experiences · Children's agency

Extending Significant Life Experience Research

This Chapter builds upon understanding of children's (SLE), an important line of inquiry that has persisted in environmental education and psychology for over 40 years (Cobb, 1977; Tanner, 1980; Chawla, 1998; Palmer, 1993; Williams & Chawla, 2016). This thread of research has sought to understand the "formative influences" of childhoodnature experiences and the way in which early experiences in nature shape an individual's feelings and attitudes as well as their interactions and actions toward their environment. Research on SLE has, however, primarily been based on autobiographical memories of adults. As Chawla (1998) explained, a "retrospective approach is a necessary preliminary that suggests the type of formative events that . . . research should monitor" (p. 361). While Chawla (1998) argued that memories of SLE offer a "lifespan perspective" on experiences that have influenced a person's feelings and behaviors toward their environment, memory-based research poses several limitations. First, memories are tainted by the past and the present and, thus, are unlikely to render complete and accurate details of specific encounters or events. As Chawla (1998) explained, oftentimes recurring encounters may be "blended together into one 'generic' representation" (p. 363). Furthermore, adult reflections on childhoodnature experiences are subject to adult biases and perspectives on what is meaningful and important. In this way, SLE research, collected by way of

adult memories, lacks the firsthand viewpoint of childhoodnature encounters as perceived through the lens of a child. In other words, retrospective SLE, while informative and useful, should not be relied upon as a representation of children's lived experiences. Thus, other naturalistic observations and methods, particularly those that honor the voices and perspectives of children, should also be pursued to build upon a retrospective line of inquiry (Chawla, 1998).

Embodied Essences of Childhoodnature

> The body is the vehicle of being in the world, and having a body is, for a living creature, to be intervolved in a definite environment. (Merleau-Ponty, 1945/2002, p. 94)

This chapter extends SLE research by considering the somaesthetics of childhoodnature experiences, that is, the "soma" or embodied and "aesthetics" or felt experience of being a part of nature (Iared et al., 2016). Children are nature living and breathing natural entities, intricately connected with everything that exists. While much of the children *and* nature literature has positioned children as nature deficient, disconnected, and somehow separated from what has been designated as nature (Louv, 2008), in this Chapter I maintain that children, and all humans, for that matter, are natural beings *always* immersed in an environment and place (Malone, 2016). Humans are indeed absorbed in the fundamental life-giving exchange of oxygen and carbon dioxide, between flora and fauna. Not only do humans play an integral part of basic biological interchange, interactions with other natural beings are also physically, culturally, and spiritually situated in time and place. This temporal-spatial dimension makes up the essence of *Dasein* or being in the world (Heidegger, 1962; Merleau-Ponty, 1945/2002). In other words, utterances of being are informed by the past, oriented toward the future, and enacted in present time. While SLE research has primarily been concerned with reflective essences of the past (Chawla, 1998; Williams & Chawla, 2016), this Chapter is framed around pre-reflective essences of the present, namely, through the lived bodily experiences of a child.

Phenomenology is concerned with "the nature of what is," in "turning from things to their meaning" (Schwandt, 2015). More specifically, Merleau-Ponty's (1945/2002) philosophy of existential phenomenology centers bodily existence at the core of conscious and subconscious understanding of the world and other living entities. Embodied essences of being, therefore, cannot be separated from a time and a place (Merleau-Ponty, 1945/2002), yet researchers have found it challenging to identify data collection and analysis methods that capture the pre-reflective essences of being (i.e., prior to language and thought) in a specific moment and in a particular time (Iared et al., 2016; Thrift, 2008). In this Chapter, the sensory tour method is presented as a strategy for bridging the correspondence gap between being and thought – by capturing children's pre-reflective movement – their self-talk and expressive utterances, their imaginative songs, and place activity, as they interact with and relate with others in the more than human living world.

But how can children's varied states of being in the more than human living world be authentically represented and described? Indeed, researchers pursuing studies within the new childhoodnature framework might be confronted with the nonrepresentational problem, that is, the challenge of "interpreting and explaining the primordial and, often, pre-conscious and pre-rational/linguistic experiences of selves and ecological others" (Iared et al., 2016, p. 191). Additionally, we must also acknowledge the correspondence problem: the gap between being and thought (Iared et al., 2016). In other words, the authentic state of being in nature may be quite distinguished from a reflection on the state of being. Both, therefore, should be considered in researching childhoodnature experiences. So how can childhoodnature scholars capture children's firsthand sensory encounters? Particularly, what methods can be used to explore children's utterances and nonverbal forms of communication expressed during their play and exploratory activities in nature? To answer these questions, and to extend understanding of children's lived SLE, researchers need to consider methods for promoting children's agency in research, specifically those approaches that highlight and honor children's views and perspectives.

Children's Agency

Honoring children's agency in research has been discussed extensively among scholars of the sociology of childhood (James, 2009; Corsaro, 2015) and those interested in environmental and nature-based research with young children (Barratt Hacking et al., 2013; Green, 2015). The United Nations Convention on the Rights of the Child (UNCRC) set precedence for children's citizenship and rights of participation (United Nations 1989, 2005). Specifically, Articles 12, 13, and 14 under the UNCRC established the rights of the child to form and express his or her own views, ideas, and thoughts and have been more broadly interpreted to include all areas of relevance to children's lives, including research (Barratt Hacking et al., 2013). This Chapter advocates for the importance of honoring children's agency in childhoodnature research by proposing a method for capturing the essence of children's being in the world. The method proposed naturally recognizes the unique contributions of children both in the present and in the future (James, 2009).

Additionally, research approaches involving young children must also consider the influence of adults on children's agency during all aspects of the research process. The power imbalance between an adult researcher and child participants can greatly impact *what* data are collected and *how* data are interpreted. To address this issue, some have suggested relational approaches and child-friendly data collection methods, such as book discussions, children's drawings, and interactive photography (Clark, 2005; Einarsdottir et al., 2009; Parkinson, 2001). However, relational approaches still rely on the direct involvement of adults during the research process, and depending on the relationships established, the researcher involvement will inevitably influence what is shared and how children act and behave. Others have suggested the use of video as a means to "pick up different

sorts of voices" along "with a range of images" (Haw, 2008). However, issues regarding adult influences on children's behavior have also been raised regarding the use of video with young children. Namely, Robson (2011) discussed the tension of remaining unobtrusive when filming preschool-aged children through the use of traditional video equipment (a handheld camcorder). Additionally, traditional video data are still framed through the researcher's point of view, that is to say images are never neutral and they are literally and socially constructed (Robson 2011, p. 186). Thus, Robson (2011) experimented with inviting children to hold the camera and film, finding that this strategy was "vitally important" in providing children a "sense of ownership in the process" (p. 183). However, having young children hold video cameras might be logistically problematic in that handheld camcorders can become heavy or difficult for young children to operate. Furthermore, because operating a camera requires the use of children's hands, the use of traditional handheld equipment might prevent children from participating in authentic play or other day-to-day activities. In other words, handheld cameras (held by adults or by children) can be intrusive in the research process. So how can children's authentic experiences of their world be collected in an unobtrusive manner? The sensory tour method was conceived as a novel research approach in using wearable cameras to capture the essence of being in nature through the lens of a child.

Wearable Cameras in Research with Children

Wearable cameras are extending the "ways and means" in which "we see and interpret the social world" (Chaflen, 2014, p. 299). A distinctive feature of the wearable camera is that it records what the user sees and experiences during novel events or situations that would be otherwise difficult to capture (Chaflen, 2014; Green, 2016a). While the use of wearable cameras in research with adults continues to expand (Chaflen, 2014; Dozza & Fernandez, 2014; Fung, 2015; Knight & van Nieuwerburgh, 2012; Leong et al., 2014; Sanchez-García et al., 2015), the incorporation of wearable cameras in research with children has thus far been limited (Kindt, 2011, Ghekiere et al., 2014; Green, 2016b, 2017). Kindt (2011) invited high school students to wear cameras using headstraps in the classroom. The cameras provided the teacher with a "never before" view of "what students see" and experience in the classroom (Kindt, 2011, p. 182–18). Ghekiere et al. (2014) implemented a "bike along" method, inviting 9 to 10 year-old children to wear cameras to record their encounters with environmental features while cycling. The "bike along" method included engaging children in discussions about the features they encountered, suggesting a child-directed approach that emphasized the perspectives of children. Over the last few years, I have investigated the use of wearable cameras in research with young children (3–9 years of age), referred to as the "sensory tour" method (Green 2016a, b, 2017). In this chapter, I will present several examples of children's sensory tours in Alaskan forest and tundra environments in order to consider the somaesthetics of childhoodnature interactions.

Conception of the Sensory Tour

The sensory tour method draws from the tradition of walking tours, which have been successfully used with children in geographical, place, and environmental research for a number of years (Green, 2012, 2014; Hart, 1979; Kjørholt, 2003; Kylin, 2003; Sobel, 2001). Given the tendency of children to "talk while they are doing" (Parkinson, 2001, p. 145), walking tours provide an alternative format to engage children in dialogue as they interact with other living and non-living entities in their environment. Tours provide children with an opportunity to show and tell what is important to them within a particularly setting, be it indoors or outdoors (Hart, 1979; Green, 2012). In other words, "tours allow opportunities for children to show something that cannot be explained" apart from the place (Green, 2012, p. 275). Understanding of children's experiences is thus gleaned through attending to both children's verbal and nonverbal forms of communication. That is, tours reveal children's "pre-linguistic experiences of selves and ecological others" by exploring children's expressions of meaning through their interactions (Iared et al., 2016, p. 191).

Traditionally, adult researchers accompanied children on a tour with a handheld video camera asking questions of children as they pointed out and described different features and experiences of their environment (Green, 2012; Hart, 1979; Sobel, 2001). In this way, child-led tours promote children's agency in the data collection process by providing opportunities for children to direct what they wanted to explore (Green, 2012). A noted limitation, however, is that the course of a tour is dependent on the relationship formed between a child participant and the researcher. Depending on the relationship established, children may or may not feel comfortable sharing certain aspects of their environmental experiences. Furthermore, in tours structured with adults, children may merely show and talk about what they perceive adults might like to hear rather than what they actually do in a particular setting. In other words, it can be difficult to determine if the things children show and talk about actually represent children's authentic day-to-day life encounters of their environment. This limitation relates back to the correspondence gap between being and thought previously discussed, whereas, the state of being in a time and place is distinct from one's thoughts about being in that place (Iared et al., 2016). Therefore, it is important to further explore a "tour" approach that would alleviate the involvement of an adult researcher as well as highlight children's authentic experiences of being in the world.

In two recent research projects, we implemented the sensory tour method, by inviting children to wear small video cameras around their forehead while they "toured" (freely explored and played) in their environment. When viewing footage captured during a sensory tour, one feels as if they are walking in the shoes of the child wearing the camera. The method literally captures a wide range of a child's sensory perceptions, including what he or she sees, hears, says, and touches in their environment (Green, 2016a). In this sense, sensory tours were conceived as a participatory research approach in that findings rendered from the video honor children's voices and perspectives. In addition, when paired with video-stimulated recall discussions and/or other interactive activities, sensory tours can be used as a means for engaging children in developing a research focus and interpreting their own experiences (see Green 2016b, 2017).

In our projects, we simply invited children to put on the wearable camera before going out to play and explore. The children volunteered to wear the cameras and most all appeared eager to do so. Thus, children took turns in wearing the cameras for as long as they were interested. If a child decided they no longer wanted to wear a camera, they simply found an adult (researcher or teacher) and asked to have it removed. In fact, once the cameras were strapped around their foreheads they seemed to forget that they were wearing them. Additionally, an open-ended structure is ideal when utilizing sensory tours. While it is important to provide children with some perimeters (for safety) as to where they can and should not play or explore, to the extent possible sensory tours should be open ended, child initiated, and child led.

The Somaesthetics of Childhoodnature

In this Chapter, we will consider the somaesthetics of childhoodnature, that is, the "felt" bodily experiences captured by way of sensory tours. The term "soma," according to Shusterman (2009), designates the "living, sensing, dynamic, perspective body" (p. 133). "Bodily consciousness. . .is not merely the consciousness that mind may have of the body as an object, but includes the embodied consciousness that a living sentient body directs at the world and also experiences in itself" (Shusterman, 2009, p. 133). Drawing from the phenomenological philosophy of Merleau-Ponty (1945/2002), the body is recognized as a medium in which one establishes a consciousness toward the world: "I am conscious of the world through the medium of my body" (p. 95). Phenomenological meanings are derived from "perception (hearing, seeing, etc.), believing, remembering, deciding, feeling, judging, evaluating and *all experiences of bodily action* [italics added]" (Schwandt, 2015, p. 234). Reality is thus subject to a time and a place, and through the body, which "anchors the subject to a certain 'environment'" (Merleau-Ponty, 1945/2002, p. 90).

In this chapter, the "soma" bodily experiences of childhoodnature will be explored through the presentation of descriptive transcripts of young children's sensory tours. Various aspects of childhoodnature embodiment will be presented to demonstrate the unique approach of using wearable cameras in research with young children. First, we will begin by exploring the physiology of childhood, particularly in considering how the physical body of a child is distinguished from that of an adult. This physical state of being and the assumptions associated with size directly inform the essences of children's experiences. In this way, we will consider the positionality of children within distinct social and cultural contexts. Second, we will consider the imagined essences of childhoodnature experiences. Through the viewpoint of a sensory tour, we will consider how children enact scripts through play and make-believe which shape their state of being. Along this line, we will consider children's sensory perceptions of the more than human living world, that is, those expressed by nonverbal utterances, experienced through movement, exploration, and imaginary play. Finally, we will consider interpretation of childhoodnature experiences; specifically, we will examine the benefit of pairing video-stimulated recall discussions

with sensory tours to consider both reflective and pre-reflective childhoodnature experiences.

The Embodied Child

The embodied experience of a child is distinguished from that of an adult. For one, the period of childhood is marked by progressive, yet at times sporadic, physiological growth and change. James (2000) explained:

> Children themselves have to live with their changing biology, a biology that both shapes what they are and what they can do and one that, at the same time, invites particular perceptions of what, as children, they should be and should do. (p. 26).

Not only does a child's changing physical body shape their self-consciousness, these changes are informed by the "situated agency," of being within a childhood culture in a particular place and time. It is, as James (2000) argued, the "everyday actions and interactions with each other that children develop a consciousness of self" (p. 27).

Size and Perspective

Wearable cameras provide deep insight into how physical stature influences the way in which children perceive and interact with other living beings in the natural world. Size not only influences perceptions but also accounts for what children do. Because of size, certain activities might be more challenging than others. As an adult, I scarcely considered the challenge of wild rosebushes prior to taking preschool children outside for open-ended play and exploration in an Alaskan forest. However, during 4-year-old Kenneth's sensory tour, the camera revealed Kenneth's encounter with the prevalent rosebushes when wandering down a new trail on his own:

> Halfway down the trail Kenneth stopped dead in his tracks when he confronted a large bush. "*A LOT OF BIG STICKER BUSH!*" he exclaimed.
>
> He continued pointing to all of the bushes around him, "*Big sticker bush, there is a sticker bush right there. AWH!*"
>
> Kenneth turned and ran back to his teacher. "*There's big sticker bushes everywhere!*" From the vantage point of a four-year-old, the large bushes were perceived as a threat. After encountering the large bushes on his own, Kenneth sought refuge with his teacher.

Sensory Tours provided a firsthand view of a child's encounter with the rosebushes, some of which towered over the children. Indeed, children exist in an adult world, both physically (James, 2000) and socially (Corsaro, 2015). Beyond mere physical size, children are subordinately positioned in a world primarily driven by

adults. In many instances, children have little, or no control, over the environments in which they are exposed to or the spaces or places in which they grow up (Corsaro, 2015). Access to certain environments is also constrained by adult permissions and restrictions. And depending upon the amount of freedom provided, children's experiences of nature are either largely influenced or scarcely shaped by adults. Natural settings, as opposed to human-built indoor settings, provide a setting for children to exercise a great deal of autonomy in constructing and creating their own sense of place (Green, 2013). Yet size and what is perceived as safe and what is perceived as scary shapes a child's perceptions and interactions with the more than human living world (as indicated in the rosebush example).

Becoming Bigger

Additionally, "children are deeply concerned with physical size," and as a result, they often climb to the top level of any available structure to make themselves bigger (Corsaro, 2015, p. 153). In the following example, Oliver's sensory tour revealed how Oliver and Ryan made themselves "bigger" through their physical actions:

> The two boys successfully cascaded up a fallen tree stump in the forest.
>
> "*Look at us! Look at us! Teacher! Teacher! Teacher! Teacher!*" Oliver called to his teacher who stood nearby in the distance. The video footage showed Oliver's vantage point of being high above his peers and teacher. His feet were positioned on a lower branch and his arms clasped the limbs of an upper branch. Oliver looked down at his and Ryan's feet positioned on a skinny limb above the ground.
>
> "*Whoa!*" Oliver exclaimed, revealing his feeling of unstableness.

Sensory tours allowed for the embodied vantage point of experiencing this heightened view through the lens of a child. While the feat of climbing to the top of a tree might appear simple from an adult's perspective on the ground, Oliver's muttered expressions, his physical movements, and adjustments revealed an inner conflict between apprehension and accomplishment.

Anticipating Growth

In considering a child's embodied physiology, Corsaro (2015) also explained that children "come to value growing up and getting bigger" (p. 153). For example, during a sensory tour, 4 year olds Keenan and Spruce conversed about their desire to "get older" so that they could reach up higher to peel the bark off a large birch tree:

> "*No, I'm gonna get it. I can-I ca-I'm gonna try,*" Keenan persisted.
>
> "*Um after you're done trying if you can't get it then I'll uh re-try it,*" David said.

Keenan stretched up to reach a piece of loose bark with difficulty. David also tried.

"*You can get it. You can get it!*" Keenan encouraged him.

"*See look! There is a little stand up here. Whoa!*" David stated uneasily standing on a small tree stump.

"*Let me try it. I'm super tall. I can reach it,*" Keenan explained.

"*Yeah you can.*" David encouraged.

"*I can climb everything.*" Keenan replied.

"*And I'm even four.*" David said, holding up four fingers.

"*I'm four too.*" Keenan replied

"*We're the same height,*" said David.

"*Can't reach it,*" Keenan said, taking a step back.

"*Well I can't reach it either,*" David agreed, "*So, you get a little older maybe we can reach it.*"

"*Yeah, I need to get a little older,*" Keenan said.

"*Me too!*" David added.

The sensory tour captured Keenan and David's peer-to-peer dialogue. The conversation revealed an inner tension posed by physical size. While the children put forth their best efforts to reach the upper bark of a birch tree, while even encouraging one another, they both acknowledged the limitation of their bodily stature and expressed a desire to "get a little older," anticipating a growth in physical size.

Imagined Essences of Being and Becoming

Proposing an ecophenomenological philosophy, Payne (2013) reminds us of our own "oneness of natures" (p. 425). Natures is referred to in a plural tense, signifying varied interpretations and meanings of nature, "past, present and imagined ecological affordances" (Payne, 2013, p. 426). Presumably, this also relates to what James (2000) described as child embodiment situated and enacted in a time and place. For children, *imagined* ecological affordances are frequently expressed through play and make-believe. Indeed, a child's imagination stretches beyond the boundaries of what might be considered adult-derived temporal and spatial constructs. That is, the sociodramatic and imaginary play of a child reaches beyond possibilities and quite conceivably beyond the realm of adult understanding. To a child, imaginary experiences in nature might be just as rich and meaningful (if not more meaningful) as those that are concrete and realistic. The imagined state of young children fluctuates

between the concrete and the abstract. Physical objects are used to represent the here and now; imagined ecologies represent the possibilities of what one can become. Research expanding the SLE literature would benefit from linking finding on what children *aspire* to become to what adults have come to be.

Play and Make-Believe

While research captured by way of adult observations has widely recognized the role of children's symbolic and make-believe play with inanimate objects in nature (Green, 2013), there is a scarcity of research that has looked at the embodied imaginations of being and becoming. Below, a portrait of an imagined ecology of childhood is presented by way of a sensory tour, keeping in mind that children's imaginary play is both culturally situated and "culture in the making" (Lindqvist, 1996, p. 15). Two 3 year old children played "Christmas" in the forest:

> "*It's Christmas time!*" Jenny shouted and began singing a song in the forest. She twirled around some green foliage.
>
> "*Do you like my Christmas decoration?*" Jenny asked before dropping the foliage on the ground.
>
> "*Christmas time. . ..*" Jenny continued singing.
>
> Jenny's friend Cindy stomped through the forest towards Jenny. She bent down and picked up some foliage, "*Ho, Ho, Ho – Merry Christmas!*"
>
> Cindy appeared to have taken on the role of Santa Claus; she took a few more steps and bent down again, "*Ho, Ho, Ho Merry Christmas!*"
>
> She ran to another strand of trees and bent down, "*Ho, Ho, Merry Christmas!*" Cindy ran and paused, catching her breath in between movements, exclaiming over and over again, "*Ho, Ho, Ho Merry Christmas!*"

The sensory tour method provided a firsthand view of Jenny and Cindy's imagined states of being, revealing the act of how the world is transformed through make-believe. The camera, worn across the brow of Cindy's forehead, revealed Cindy's embodiment of Santa Claus. She deepened her voice in expressing a holiday cheer, moving from place to place through the forest with a purpose. The camera also showed how Cindy's breath quickened with movement, indicating her excitement in bending down to deliver presents as she merrily announced her arrival.

The embodied child is not only influenced by social norms; he or she is also culturally constructed. Perceptions of what children should be and what children should become vary among cultures. As Christensen (2000) explained under Minority western cultural perceptions, "children are constituted as essentially vulnerable beings who can only survive and develop successfully if intensely nurtured and protected by adults" (p. 40). To some extent, the children's make-believe play of

Christmas was informed by Minority western cultural ideals. Santa Claus can be thought to represent a nurturing adult, providing treats and presents to good little boys and girls. Additionally, the children used natural objects to represent symbolically Minority western ideals of the holiday experiences –grass for ornaments and ferns for presents. The schema itself is not necessarily a unique example of children's make-believe play; certainly other children have enacted Christmas. What is unique, however, is the viewpoint revealed through the sensory tour. The tour provided insight into the embodied physiology of imaginary transformation and how the act of role-playing informed the ecology of childhoodnature experiences. In other words, in the role of Santa Claus, Cindy forged her own connection with the more than human world, which seemed to provide her with a sense of confidence and purpose.

Expressive Utterances

"Our initial experience of the world is always sensory, perceptual, and is affective 'emotional' in feeling. All precede language: affect is also and often pre-reflective" (Iared et al., 2016, p. 196). Expressive utterances represent pre-reflective consciousness, preceding language and verbal forms of communication. Expressive utterances, that is, children's nonverbal forms of communication, tell the story of bodily movement in nature and of transformations of an imagined ecology. Peter's sensory tour (illustrated below) revealed a child's transformation of a stick through movement and expressive utterances:

> The camera followed Peter's gaze as he turned upward towards the blue sky, revealing the leaves of the paper birch trees and the pointed tops of the tall evergreen spruce. A brown stick, held by Peter's hand, emerges directly in front of the camera.
>
> "*Do. . .do. . .do. . .do. . .do. . .*" Peter aimed his stick at two peers in front of him on the trail.
>
> "*WOOOW!*" Peter raised the stick high.
>
> *"GRRRRRRRRRRRRRRRRRRR,*" Peter made a rolling R sound, giving the impression that the stick was being energized. Swinging it up, and then to the left, and then to the right, the camera showed Peter hastily turn around in a circle.
>
> "*Bam. . .bam. . .bam..*" Peter moved fast through the forest, empowered and equipped with his magic stick.

Peter's engagement with the stick depicted through his sensory tour brought to life a pre-reflective consciousness of being and becoming (Payne, 2013). Indeed, his bodily movement and utterances of expression tell of an experience inseparable from a particular time and a particular place (Merleau-Ponty, 1945/2002). The wearable camera revealed an essence of being that would be next to impossible to capture through any other method. Perhaps, through a reflective descriptive method (i.e., drawing or an interview), Peter might be able to tell you that his stick was a sword or

another type of weapon. However, Peter would not be likely to put into words *how* the stick became a weapon; in other words, it would be difficult, if not impossible, for Peter to later vividly describe the process in which the transformation occurred. In other words, it would be challenging for a 4-year-old to recall his actions of raising a stick up toward the sky, making a sound and twisting it around to "charge" it. Extending study of children's SLE, sensory tours allow for a distinguished measure for capturing pre-reflective consciousness and the process of being and becoming, as well as the meaning derived behind such actions.

Movement and Exploration

"Our bodies are always interacting relationally via movement in the lifeworld" (Iared et al., 2016). Indeed, movement and exploration play an important role in a child's discovery of being in the world. Movement is intertangled and cannot be separated from knowing and describing, which also entails observation (Ingold, 2011). "Being observant," Ingold (2011) argued, "means being alive to the world" (p. xii). Similarly, Seamon (2014) articulated the synergistic dynamism between humans and their environment, whereas people and their worlds are integrally intertwined. In the following description of Elijah's sensory tour, movement accentuated his bodily relationship with his environment and other living beings:

> Tip toe, back and forth, forward and backward, 5 year old Elijah crept through the forest in pursuit of his teacher. Softly crunching the leaves under his feet, Elijah paused, turned, and looked behind him to ensure that his friend Sally and another adult were still following him. The camera showed when Elijah turned back towards his teacher and the landscape of the forest trees, bushes, and muddy path passed quickly under Elijah's feet. The sound of his breath quickened, and the video footage shook as Elijah moved quickly and quietly to close the gap between him and his teacher. His teacher moved at an even pace ahead of him, unaware of Elijah's sneaky game. Elijah snickered under his breath, and the camera came in close contact with bark of a tree; Elijah hid in the shadow of the tree out of view from his teacher who had turned and looked back. Elijah waited quietly looking at his friend who was also smiling. When his teacher continued forward, Elijah resumed on the trail, closing the distance between him and his teacher, "*AHHH!*" Elijah exclaimed.
>
> His teacher raised his hands in the air, *"AHHH!*"
>
> The children giggled.
>
> "*We've been following you!*" stated Elijah.
>
> "*You are real sneaky!*" his teacher said.

Elijah's propelled his body in attendance to the world around him. Aware of the crunching sound of the leaves, he tiptoed softly, and quietly, as he neared his teacher. Acknowledging the protective cover of the trees, he paused briefly looking away from his teacher, pretending that he was doing something else. His bodily

movement, however, revealed an observation that was keenly fixed and aware of both the teacher in which he followed and the adult and peer who followed him. Sensory tours, once again, revealed the process of being and becoming expressed by way of movement and interactions with other human beings and the more-than-human living world.

Sensational Perceptions

> Once consciousness has been defined as sensation, every mode of consciousness will have to derive its clarity from sensation. (Merleau-Ponty, 1945/2002, p. 17)

Sensational encounters, both those in the present and remembered (consciously or subconsciously), inform how we feel and act toward our environments and the more than human world. An advantage of the sensory tour method (as indicated in its name) is that it is a means for exploring children's sensory perceptions. However, notably the term "sensory" expands beyond the Minority western notion of five separate senses (e.g., vision, smell, taste, sound, and touch) (Pink, 2011). In other words, the body should not be viewed as "a collection of adjacent organs," rather it is recognized as a "synergetic system" (Merleau-Ponty, 1945/2002, p. 297). Sensory perceptions are inevitably linked with one another and overlap in function. "Movement forms the basis for the unity of the senses" and a stream of consciousness with and for the environment (Merleau-Ponty, 1945/2002, p. 272). The following example reveals how movement invokes a sensory experience: 3 year old Spencer discovered a stinkbug on a tree:

> Spencer and Samantha shuffled toward two tall trees positioned close together. Spencer bent down to closely examine one of the trees. As Spencer's head tilted downward, the camera zoomed in on the ruffled bark of the paper birch, "*I found a stinkbug!*" he exclaimed.
>
> "*Did you?*" his teacher asked, standing nearby and moving closer to take a look.
>
> Spencer stepped over a log and pointed to the tree on the left, "*Yes, right there.*"
>
> "*Is it a big one?*" his teacher asked.
>
> "*Where?*" Samantha asked, repositioning herself near Spencer.
>
> "*Right there,*" Spencer answered, pointing to the paper birch tree.
>
> "*Oh, yes,*" Samantha reached up and touched the stinkbug while balancing on a log, *"Ah got it."*
>
> "*I think I'm gonna stand right here,*" the teacher said, taking a step back.
>
> "*Why?*" Spencer asked.

"*Does he smell stinky, Spencer?*" the teacher asked.

"*Yeah,*" said Spencer.

"*Pew!*" said his teacher.

"*He's gonna stink?*" asked Samantha.

"*When you sit on it or you touch it, it'll stink you,*" answered Spencer.

"*Ohhh, well I will not touch it,*" his teacher reiterated.

According to Merleau-Ponty (1945/2002), it is not the external objects in the environment that stimulate our internal organs and activate our senses; on the contrary, it is the body that "rises toward the world," propelling movement and interweaving a system of sensations (p. 87). Sight cannot be separated from touch or smell; rather these are "just different facets of the same activity" (Ingold, 2000, p. 261). Spencer's bodily movement activated an array of interrelated sensory perceptions, which informed his experiences. He stepped nearer toward the tree and leaned in to get a closer view of the tiny creature. Likewise, Samantha stood on top of a log in order to see and touch the stinkbug. His teacher's bodily movement, on the other hand, was directed away from the creature determined to avoid an unpleasant smell from coming close to her body. Indeed bodily knowing and relating informed each person's sensory intake and experiences with others, human and nonhuman creatures in the environment.

Inviting Explanations

In the previous examples, we see how streams of bodily consciousness inform sensory perceptions of childhoodnature. While one's perception is certainly interrelated with the perceptions of others, past experiences provide a strong lens in which to interpret the present. As Merleau-Ponty (1945/2002) argued, "like a picture, a former experience, whereas this past which remains our true present does not leave us but remains constantly hidden behind our gaze" (p. 96). That is, the meaning hidden behind the gaze of one does not necessarily entail the same meaning hidden behind the gaze of another. For instance, in the above example, Spencer's perception was distinct from his teacher's perspective of the stinkbug. Spencer's movement toward the tiny creature revealed a desire for an interrelationship. Spencer's teacher, on the other hand, took a step away, drawing boundaries on such interconnectivity. Such a response was likely informed by her past experiences.

Thus far, we have discussed many of the advantages of the sensory tour method for tapping into the pre-reflective movement of children and addressing the correspondence gap between being and thought. While the sensory tour method is useful for "revealing" the "preconscious and pre-rational/linguistic experiences of selves and ecological others," the method still falls short on interpretation, making up part

of the "nonrepresentation problem" (Iared et al., 2016). Specifically, how can the knower interpret the experiences of the known or how can the interpreter explain the perception of the interpreted? In other words, while the sensory tour invites a child to actively engage in data collection, childhoodnature researchers must also consider a means for engaging children as active agents in reflective interpretation. Sensory tours paired with video-stimulated recall discussions amplify an approach for bridging preconscious states of being with post-conscious reflective thought. In other words, it provides children with opportunities to act without thinking and to think about acting.

In recent years, video-stimulated recall discussions have gained interest among scholars interested in participatory research involving young children (Thomson, 2008). The method "involves video-recording an activity and then replaying the recording back to the participants so that they can comment on matters of interest" (Rowe, 2009, p. 427). Forman (1999) suggests that replaying videos for children can serve as a "tool of the mind," inviting children to interpret the meaning of their actions (p. 1). Additionally, playing sensory tour videos back to children and engaging them in discussion can invoke intersubjectivity and collaborative reflection among children (Dahlberg et al., 2007). By the same means, videos might also invoke esthetic and emotional responses in the interpretation of actions (Thomson, 2008). Furthermore, Rowe (2009) suggests that engaging children in video-stimulated recall discussions can provide an "insider's perspective" on actions, behaviors, and experiences and provide participants with opportunities to raise ideas that have not been previously thought of by a researcher (p. 434).

While I found sensory tours to be an insightful tool for gaining insight on children's pre-reflective behaviors, analysis of such behaviors is subjective to theoretical interpretation and/or the researcher's own epistemological and ontological beliefs. Thus, whenever possible, inviting children to interpret and explain their own behavior is ideal. Particularly, when reviewing the video footage, a researcher might make note of certain movements and expressive utterances that are inexplicable and/or prompt further questions. Rather than guessing and possibly misinterpreting meaning, a researcher might use video-stimulated recall discussions to invoke children's reflective meaning on their own behavior. In doing so, a researcher should also be mindful of the developmental abilities of children, particularly among young children, in engaging in reflective thought. For instance when asking a young child why they like to do something, he or she might provide a simple response of "*because I like to"* (Green, 2012). Nevertheless, video-stimulated recall discussions, when used appropriately, can provide reflective insight on pre-reflective experiences. For example, video footage captured by 9 year old Daisy during her sensory tour revealed sounds of discomfort in traversing the Arctic tundra:

> Daisy, moved slowly while picking tundra berries, sinking with each step. The video picked up her faint whimper, "*Ow, ow, ugh, ow!*" Each step that she took became more pronounced; the camera wobbled: "*Ugh, ah, oh!*"

While reviewing the sensory tour video footage with the third grade children, I wondered what was going on? The challenge of traversing through the tundra was unperceived by myself and other adults whose legs are longer and stronger. I paused the video to engage children in a reflective discussion. Daisy and some of her classmates revealed that it was not only difficult, but it was also somewhat painful to walk on the tundra. Some shared that they got blisters, others spoke that they were not wearing the proper shoes, and still others expressed that it was not a problem. The children also revealed that the task became easier as they got older, with gained height and physical strength. Through a video-stimulated recall discussion of Daisy's sensory tour, the third grade children engaged in a reflective intersubjective classroom discussion on bodily movement on the tundra. Had it not been for the review of the video footage, the children's perspective of the challenge of traversing on the tundra might have remained unbeknown.

Concluding Discussion

This Chapter has explored how sensory tours can be used as a participatory method for discovering the "somaesthetics" or felt bodily experiences of childhoodnature. The examples of children's sensory tours provided in this Chapter extend the viewpoint of the SLE literature from one that has been primarily retrospective (based on reflective memories) (Chawla, 1998, Williams & Chawla, 2016) to one that embraces the agency of young children through the use of wearable cameras and video-stimulated recall discussions (Green, 2016a). While the examples in this Chapter were categorized under pervasive themes related to embodied phenomenology and the somaesthetic literature (Iared et al., 2016; Merleau-Ponty, 1945/2002; Shusterman, 2009), in order to illustrate certain aspects of children's embodied experiences in nature, there is recognizable overlap in all of the various themes in the examples provided. For instance, a child's developing physiology shapes all essences of being and becoming (Christensen, 2000; James, 2000), imaginary expressions, and what a child is able and unable to become. Furthermore, propelled by inquisitive imagination, a child's sense of being and becoming is invigorated in nature through movement, exploration, and make-believe. A child's pre-reflective consciousness is always sensory in interacting with other human beings more than human living world, interweaving taste, tactile, visual, and auditory mechanisms of the body in the discovery of self and the other (Merleau-Ponty, 1945/2002; Pink, 2011).

The sensory tour approach offers a method for addressing the correspondence gap between being and thought through capturing the essences of children's pre-reflective experiences in their environment. Set on the brow of a child, footage captured by way of a wearable camera gives the impression that one is walking in the shoes of a child. In this way, the sensory tour puts size into perspective, revealing aspects of the environment that might go unnoticed by an adult but pose a particular challenge or hold significant meaning to a child. The embodied physiology of a child signifies the challenges of physical size and stature (James, 2000; Corsaro, 2015).

However, with that said children compensate for their physical limitations by making themselves bigger – scaling up trees and other environmental features to obtain a heightened view above their peers and adults. Furthermore, cultural interpretations of what a child should or should not become also informs childhoodnature engagements. Cultural influences on one's embodied sense of being are acted out through children's imagined essences expressed through their imagination and make-believe play. Sensory tours not only tell *what* a child transforms (e.g., a stick into a weapon) but *how* it is transformed through expressive utterances and bodily movements. Bodily movement and exploration lead and guide children's sensory perceptions. Indeed, movement is a prominent feature in childhoodnature experiences; whether consciously or subconsciously, movement enables children to shape and acquire a sensorium of understanding, which informs their perceptions. Finally, while the video footage captured by way of sensory tours taps into children's pre-reflective consciousness, revealing features otherwise unaccounted for by reflective thought, sensory tours are, like any other qualitative method, subjective to the interpretation of the researcher. For this reason, the use of video-stimulated recall discussions, artwork, and other reflective measures are recommended to the extent possible. Pairing pre-reflective sensory tours with strategies for engaging children in metacognition (i.e., reflection on actions and behaviors) further addresses the correspondence gap and nonrepresentation problem of qualitative phenomenology and somaesthetic research.

Cross-References

- ▶ Childhoodnature in Motion: The Ground for Learning
- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Children Becoming Emotionally Attuned to "Nature" Through Diverse Place-Responsive Pedagogies
- ▶ The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment
- ▶ Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development
- ▶ Phenomenology with Children: My Salamander Brother
- ▶ Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective
- ▶ Sticky: Childhoodnature Touch Encounters
- ▶ The Nature of Childhood in Childhoodnature
- ▶ Unconscious Activisms and the Subject as Critic: A Slam Articlepoem

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The Child-Nature Relationship in Television for Children

40

Åsa Pettersson

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Abstract

This Chapter studies how the child-nature relationship is constructed in public service TV for children. TV has a strong position in society, as both a producer and reproducer of norms, notions, and identities for TV audiences. In a Swedish context, public service television is the television provider most used by the youngest audience and has been since the very start of television broadcasts. It is, therefore, a particularly influential institution for the child audience. When

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studying TV programmes for a child audience, nature content spans all genres, leaving few programmes untouched. By analyzing how children and nature are linked together in TV programmes, societal notions of this relationship can be studied. The vast presence of nature content in TV for children reproduces the discursive notion that children are linked to nature in specific ways. Children are supposed to engage in nature, be interested in nature, learn about nature, as well as want to watch TV programmes containing nature in ways adults are not. This portrays both nature and children as somewhat sweet and harmless, at the same time as the heavy responsibility of saving nature from environmental disaster is placed on the shoulders of children. The Chapter concludes that the child-nature relationship, as it is represented for a child audience, must be questioned, because it leaves children with the responsibility for nature and, moreover, portrays adults as unchangeable and unwilling to shoulder the environmental burden that they have created in the first place.

Keywords
Child-nature relationship · Swedish public service TV · Children · Outdoor life · Environmental issues

Introduction

The present Chapter focuses on the child-nature relationship in televised representations as a way of understanding the consequences of an anthropocentric and an even more "adult-centric" view on children as well as of nature. (The present chapter is a revised and shortened version of chapter 4 in my dissertation Pettersson, 2013.) Why the relationship between children and nature should be studied in TV programmes can naturally be questioned, but I will make a claim for my case: TV has a strong position in society, as both a producer and reproducer of norms, notions, and identities for TV audiences (Ellis, 2006). In a Swedish context, TV is still the medium that children use most, and public service television is the television provider most used by the youngest audience and has been since the very start of television broadcasts (Pettersson, 2013; *Småungar och medier,* 2017). Public service TV can therefore be argued to be a particularly influential institution for the Swedish child audience and hence in the lives of Swedish children. (When studying the Swedish broadcasting arena, one must bear in mind that some aspects are specific to the national context, such as the very long period of a public service broadcasting monopoly (1956–1992 for Swedish television) and the associated strong public service TV tradition for the child audience (cf. Pettersson, 2013; Rydin, 2000)) When studying TV programmes for a child audience, nature as television content turns up essentially everywhere. It spans all genres, leaving few programmes untouched – an aspect that will be presented in more depth below (see also Pettersson, 2013). In Minority western societies, children are understood as being closely linked to nature, and it has been argued that this notion is particularly strong in the Nordic countries (e.g., Halldén, 2009, 2011). This also ties in well with research stressing how important nature

experiences are for human beings (Kahn, 1999; Myers, 2007), as well as with research suggesting that we are replacing our outdoor experiences of nature with mediated indoor experiences of the natural world (Kahn et al., 2008; Kahn et al., 2005, Severson, & Ruckert, 2009). Moreover, the research on significant life experience (SLE) shows that adults who work to fight environmental threats often refer to experiences during childhood that put them on this path (Chawla, 1998). All these strands intersect issues concerning how we, as a society, can ensure that our citizens form valuable relationships with the natural world and understand how our lifestyle affects the planet we live on – and are willing to change this lifestyle. But they also have something more in common, and that is the role that children and childhoods are thought to play in relation to this.

Among these intersecting issues, norms, and notions are entangled. For example, when making claims about nature's importance for humans, research has often focused on children and young people, even when arguing for nature's significance for all of humankind (e.g., Kahn et al., 2008; Kahn, 1999; Myers, 2007). But why is research so focused on children's relationship with nature? And is nature an essential issue for children only? In this Chapter, the argument is that the often-represented and taken-for-granted relationship between children and nature must also be questioned and studied (see also, e.g., Halldén, 2009, 2011; Lindgren, 2013; Taylor, 2011), especially in relation to how the category adults can be understood against the backdrop of the child-nature relationship. By analyzing how children and nature are linked together in TV programmes, societal notions of this relationship can be investigated. It is a fact that the adult world often makes decisions for and controls children as a category (James, Jenks, & Prout, 1998); it also does so in issues regarding nature, and this is considered a normal part of everyday life. It may, therefore, be difficult to question the demands and wishes that the adult world places on people categorized as children and aspects categorized as nature. One way to investigate what children and nature are expected to be like in society is to study how childhoods are portrayed in relation to notions of nature in TV made for children. That is to study notions of the child-nature relationship and, thereby, linking this study to the concept of childhoodnature.

The present analysis draws on childhood sociology, which positions children as beings in society rather than as only developing, becoming adults, thus placing children at the center of research (e.g., James et al., 1998; Lee, 2001; Prout, 2005). It is inspired by visual studies, a research field which stresses that visual aspects must be taken into consideration when researching societal phenomena (e.g., Mitchell, 2005; Rose, 2001). Studies focusing on posthumanism are also a cornerstone of the study, as they highlight the interconnected relations that our everyday life experiences rest on. Such studies also stress that categories such as nature and children must be understood in relation to each other, particularly when mediated representations are under study (e.g., Baker, 2001; Cronon, 1995; Haraway, 1991, 1992; Macnaghten & Urry, 1998). These three research strands form the framework for exploring how the child-nature relationship is produced, represented, visualized, and negotiated in public service television.

In this vein, three questions have guided the analysis:

To start with, what does nature look like in TV for children?
In what ways are children and nature linked together in TV representations for a child audience?
What can the bond between nature TV content and the category children tell us about notions and norms regarding children and nature in society?

Methodology

The present Chapter is based on a study of TV material broadcast for children in Sweden during the years 1980, 1992, and 2007. (The analysis and examples in this chapter is based on chapter four in Pettersson (2013) and can be looked into in further depth there.) These years were chosen specifically as presenting key moments in the evolution of the national broadcasting context. In 1980, the public service monopoly was still strong in the Swedish context. In 1992, the monopoly was abolished, inviting commercial actors onto the terrestrial net. In 2007, the analogue broadcasts where shut down and digital broadcasting took over. All programmes targeting children and young people up to 18 years of age were studied in the main study (Pettersson, 2013). (This covers children's programmes, young people's programmes, family programmes, programmes in ethnic minority languages, and educational programmes that targeted children and/or young people.) Programmes from 14 days for each year were in focus. This amounted to almost 500 programmes and 180 h of TV material in the study. It is in this vast material that the present chapter has its background and from which it borrows its examples, adding some discussion points of public service TV for children in 2017.

This Chapter takes a discursive approach when it sets out to investigate how the child-nature relationship is constructed in the TV material. Discourse analysis is originally a linguistic method (e.g., Wetherell & Potter, 1992). Therefore, studying moving images using discourse analysis has been debated. Visual culture researcher Gillian Rose (2001) nonetheless argues that discourse analysis can be used successfully to analyze visual materials. She maintains that images are so tightly connected with texts and verbal statements that the same method can be used to study all these modes of communication, as long as their specificities are not neglected in the research (Rose, 2001. cf. Lindgren, 2006; Potter & Wetherell, 1994).

In the analysis, I have focused on the discursive practices used in the TV programmes (cf. Potter & Wetherell, 1992). In other words, I have studied the ways in which things are said, re/produced, and visualized in the TV programmes to discover what these practices can tell us about notions and norms in regard to the child-nature relationship. The analytical process was proceeded by "identifying themes" (Rose, 2001:158) that repeated watching and attention to details made visible. One of the themes of specific relevance was the nature content in many programmes.

Nature for and the Nature of Children

When I looked at the issue of televised nature content for a child audience in more depth, this content could be divided into three kinds of representations. The discursive formation of nature in *TV for children* contained children shown outdoors, animals of all sorts, and environmental issues. These three aspects should not be understood as essentially constituting nature. They are discursive representations that form the content of nature in TV for children. In line with prominent gender scholar Donna Haraway's (1991) questioning of binary dichotomies, the representations of children outdoors, animals, and environmental issues are used to discuss and question discourses of represented "nature" in TV programmes for children (see also Baker, 2001; Prout, 2005; Taylor, 2011). Such questioning opens the door to a multiplicity of possible natures and to seeing nature as relational and socially embedded (Macnaghten & Urry, 1998) in TV production for children (James et al., 1998).

As can be seen in the overview (Table 1), nature is a very common content in *TV for children* during all the studied years. It can also be noted that the proportion of this content remains quite stable over the research period. (The proportion of nature content in *TV for children* was about 80% during all the studied years (81% in 1980, 82% in 1992 and 88% in 2007) in the two main public service channels, SVT1 and SVT2.) All programmes containing nature have been counted, even if they do not have nature as their prime content. That means that all programmes showing children outdoors, as well as all animal representations, are present in the overview, regardless of whether the representations portray "real" footage, animated images, or whether animals appear as toys. Moreover, as soon as the environment was an issue in a programme, it was counted. This categorization was made based on the understanding that all these representations perform nature content for children, no matter what representational technique is used and whether or not nature constituted the primary content. Programmes containing these topics are broadcast by both the regular Public Service Television Company, SVT, and by the Educational Public Service Company, UR. They target children of all ages and can be found in almost all programme genres. However, programmes targeting older children and youth do not

Table 1 The number of programmes with nature content in *TV for children*

	1980	1992	2007	Total
Programmes in total	120	141	230	491
Nature in total[a]	97	115	202	414
Children outdoors	71	81	109	261
Animals	76	99	152	327
Environmental issues	12	15	24	51

[a]Many programmes contain more than one of the *nature* categories and therefore the number of programmes containing nature is not the sum of the programmes containing children outdoors, animals and environmental issues

include nature as their primary content as often as do programmes targeting younger children. The selection of programmes is presented in more detail under each heading below, where examples of programmes portraying children outdoors and with environmental issues as their primary content are analyzed. Programmes with animals as their main content is not analyzed here (for in-depth focus of animals in TV for children, see Pettersson, 2013, 2017); however, featuring animals is so omnipresent in TV for children that, as will be shown, the programmes selected for analysis of the other categories also reproduce animals in different ways.

Outdoor Life: Embedding the Child in Nature

Children are often shown outdoors in the TV programmes broadcasted for them. This does not mean that the whole programme takes place outside but that a considerable number of programmes (see Table 1) show children in an outdoor setting at some stage. Many of these programmes simply depict children outdoors in passing as a film narrative practice. This occurs in documentary programmes, as well as in those with a fictional or educational focus. There is outdoor footage of children showing them situated both in towns and in the countryside, in Sweden, as well as in other countries. This says something about where children are supposed to be located. No matter where they live or what their everyday life looks like, in *TV for children* being outdoors is strongly connected to the category children.

For all the studied years, when the outdoor experience is the main content in programmes, they seem to target children more than young people. In 1980, the main focus is often on the value of children being out in the open air. Such programmes are produced both by SVT and UR this year. In 1992, many educational programmes revolve around being outdoors, and the outdoor experiences often take place in institutionalized settings, such as schools and preschools. That is not the case in 2007. When the outdoor experience is the primary content, it is fictionalized in basically all instances. In 2007, instead of placing nature at the center of everyday life, nature is now a special event presented in televised competitions or fictional stories.

Of all the programmes showing children outdoors, three – one from 1980, one from 1992, and one from 2007 – have been chosen for a more thorough analysis. These programmes all have outdoor experiences as their main content. They also have characteristics specific to each year: in 1980 focusing on the valuable outdoor experience for children, in 1992 an educational programme picturing an institutionalized outdoor setting, and in 2007 focusing on an outdoor experience within a fictional frame. Among these are programmes broadcast by both UR and SVT and programmes targeting young children as well as slightly older ones. The issues at stake in this section are how children and outdoor life are re/produced and what kind of child-nature relationship the outdoor nature content constructs.

The Nostalgic Wilderness

The programme *Once upon a time there was a summer* (*Det var. en gång en sommar*) has the outdoor experience as its main topic. The programme was broadcast during the regular children's programmes in the autumn of 1980 (*Once upon a time there was a summer (Det var en gång en sommar)*, aired on SVT2, 3/10/1980, 17.30–17.50. Directed by Tomas and Yeng Löfdahl.). In the TV guide, it is stated that it is part of a series, this being the last of four episodes. The series was produced in 1972 and it was rerun seven times on TV between 1972 and 1987 (The Swedish Film Institute website). The episode is 20 min long and tells the story of three children, Mats, Kickan, and Pia, having a sleepover on an island.

The programme starts by showing traditional Swedish landscape scenery with a lake surrounded by a pine forest in the late summer light. A rowboat on the lake is shown with a small island in the distance. The tempo is rather slow and the viewer gets to see long sequences of the outdoor scenery accompanied by a classical melody and a child voiceover. It is the youngest girl, Pia, who is the voiceover, but occasionally the voices of the three children on screen can also be heard.

On the island, Pia, in her role as voiceover, reports that the children are building a shelter where they will sleep at night. The imagery shows how the children use leaves and branches to build it. When they are finished building, they have a snack. Placed on the table – which is made out of two rocks – are milk, raw carrots, tomatoes, a cucumber, raisins, bread, and cheese. The girls and the boy eat and talk in what sounds like a happy manner before using some of the bread as bait for fishing. It is the older girl, Kickan, who catches the fish, but the boy, Mats, who is the oldest, that kills them.

Altogether only a few of all the programmes included in the study show dead animals (in 1980, there are three other dead animals shown. In 1992, three dead animals are shown altogether. Four dead animals are shown in 2007.), and this programme is the only one that shows explicit images of a child killing fish. Neither the children nor the voiceover express any feelings of sadness when the fish are killed. Instead the constitution of the fish is talked about. Mats and Pia, in her position as voiceover, explain how a fish swims. As a clarification of these scientific facts, the swim bladder from one of the dead fish is shown floating in the water. The fish are cut up in pieces and used as bait in cages for trapping crayfish. That it is Mats who kills the fish could be seen as depicting a traditionally gendered activity (cf. Kalof & Fitzgerald, 2003). However, Kickan is the one doing the fishing and catching them in the first place, and hence this is a team activity. The practice of catching and killing animals is, in this way, naturalized and unquestioned in the programme (cf. Pedersen, 2007).

The three children are portrayed as well accustomed to survival in the wild. As a group, they know what to do when going on an excursion: build a shelter and bring along food and the appropriate equipment for fishing. Their packing is light, as they are wearing ordinary clothes and swimming naked. The only security devices they have are the life vests they wear in the boat. During the island visit, Pia expresses fear on two occasions, first for a bush cricket and the second time for a howling sound.

On both occasions, the two older children assure her that there is no reason to worry. Kickan explains that the howling sound is a dog, and together Kickan and Mats explain that wolves do not live in the area. Their expertise is used to calm Pia. In this way, Kickan and Mats present nature as a safe place to be. There is nothing to be afraid of and this natural environment can be safely enjoyed.

Mats is depicted as the one with the most knowhow, and he answers most of Pia's questions. Kickan also corrects and explains things to Pia, and it is Kickan who manages the boat, while Mats looks after Pia. Here, Pia's young age is a sign of having less competence than the older children. This hierarchy, however, is leveled out by the fact that Pia's voice is used as the voiceover. It is the voiceover that explains the most complicated matters in the programme, allowing Pia as well to hold an expert position. The children work together to perform all the tasks on this outing. Thus, it can be argued that the children are not acting out stereotypical gender roles or age hierarchies but instead cooperating and using their different competences together to manage the excursion on the island. Everyone is needed to tell this story.

When night comes and the children are shown sitting outside the hut looking at the stars, Pia says, from her position as voiceover: "We have been sitting outside the shelter for a long time – just looking." (All examples from the dialogues are originally in Swedish and have been translated by the author.) The outdoor experience is thus overwhelming for all three children. Pia then says directly from her position on the screen: "Never have I seen so many stars – only in fairy tales." Here Pia is experiencing the wonder of nature's beauty first hand. Her awe links well to the title of the programme, *Once upon a time there was a summer*, which draws on the fairy-tale genre. Thus, it is outdoors in the countryside that children can experience stillness and good, sacralized nature. This is the ideal place for children (cf. Jones, 2002).

Another clip shows the children wading around in the water checking the cages for crayfish. The morning light is so strong that it transforms them into glowing silhouettes. This sunlight and the very clear and dark midnight sky are typical for August in Sweden, as is catching crayfish. The August light gives the television programme a dimmed framing, which visually builds an idyllic setting linked to Swedish nature. The beautiful outdoor landscape has been used to create a romanticized view that has been crucial to binding the Swedish national state together during the nineteenth century and afterward (Halldén, 2009; Lindgren, 2009). This programme did not picture a historical event, at least not when it was produced in 1972, and the children fixed the programme in time with their 1970s clothes and haircuts. There is, however, a potential implicit critique in the programme title: *Once upon a time there was a summer*. The question is whether summers like these exist any longer. Is this a fairy-tale view of how it once was to be a child on summer holiday? Is the connection between children, their knowledge and independence, and an undisturbed outdoor life disappearing? The programme can also be interpreted as a nostalgic call to restore the bond between children and outdoor life in the wild, something every child, in Sweden and elsewhere, should experience (cf. Halldén, 2009, 2011).

In this programme, the children are shown on their own in nature. They manage their expedition and tasks without hesitations, and they do not seem to need help from anyone else. However, in the very last sequences, a break in the illusion of the self-sufficient child can be seen. When the children are leaving the island, the camera focuses on Pia and Mats sitting down in the boat. Pia points to something in the distance, presumably close to or behind the camera team's boat. For a second Pia's focus shifts, she smiles, and she looks straight into the camera; Mats smiles also before he hurriedly looks away, a bit embarrassed judging from the look on his face. The illusion of being alone on the island is hereby broken (cf. Allen, 1992; Edin, 2000). The children have after all been looked after on this excursion by the camera eye and the adults behind it. This provides a glimpse at the adults pulling the strings in the narration, the authors behind the storyboard and the speaker text. This glimpse reveals the narration to be an adult's nostalgic views on the connection between nature and children and the children to be acting out these views (cf. Lury, 2005; Outka, 2009; Ågren, 2008). The content of this programme urges the child audience to step out into the wilderness, to experience the outdoors, and to cherish it. However, this is more adult nostalgia talking than producing possible outings for children to try out, as the competence and location for the outing needed seem difficult for almost anyone to realize.

The Urban Everyday Outdoors

Day-care TV for children (*Dagis-TV för barn*) is a preschool programme series broadcast by the Educational Public Service Broadcaster, UR. An autumn morning in 1992, an episode called "We play with things others throw away" is broadcast (*Day-care TV for children (Dagis-TV för barn)*, aired on SVT1, 1/10/1992, 9.30–9.45. Produced by UR.). This programme also focuses on an outing but in a different way than in the previous example. Here outdoor life is located in a populated urban area, and the outings shown take place close to the day-care center. The programme shows preschool children taking care of things that have been thrown away, both to clean up and to refurbish their preschool yard.

The programme starts with a young girl voiceover saying: "Today you will come along on an expedition in *Day-care TV*." Several preschool children and two preschool teachers are seen walking in a line together in an urban area. The voiceover says that they are out looking for treasures. The children look well disciplined, and when they reach a park, the line is abandoned, and, before the teachers even suggest it, the children start picking up litter that has been dropped in the surroundings.

Agneta, one of the teachers, asks the children where litter should be disposed of and why it should not be thrown in nature, etc. The questions are pedagogical more than authentic (Dysthe, 1996), as there is no doubt that Agneta already knows the right answers. However, the children know the right answers too, and several of them answer in quite elaborate ways. For example, everyone knows that litter should be put in garbage cans and not on the ground. One boy knows that "animals can cut

themselves" on garbage lying about and another one declares that people who leave plastic bags on the ground should be called "nature tormenters." The nature referred to here is the park, and the outdoor expedition that these children are part of takes place between buildings. Studies of preschool practices have pointed out that what counts as nature has to be neither wild nor located far away from the preschool (Bergnéhr, 2009; Änggård, 2009). Being outdoors can in fact be synonymous with nature (Bergnéhr, 2009). This is only partly the case in *Day-Care TV*. Here nature is being outdoors, but it is also what is damaged when things are thrown away in the wrong way. Because these children are cleaning up nature, they become part of its cycle.

This expedition takes place on a gray day. There is no sun in sight and not much greenery either. The surroundings are quite muddy and the children as well as the teachers are dressed for these conditions, most of them in wellies and rainwear. The clothing is like a uniform that cuts across age, gender, and hierarchy.

The group walks on to a refuse dump. "You can find good things there," the child voiceover says. They start looking through the containers with help from the station staff. Among other things the teacher, Agneta, asks for an old wooden door and a hammock. The children ask for old vacuum cleaners, two pipes, and some other items. In the dialogue, there is no sign of the adults telling the children to hold back in their treasure hunt. Instead the group leaves the dump with their bits and pieces, and the children are shown carrying their own finds.

As soon as they are back on the yard outside the day-care center, all the children start working with their new things and are assisted by the adults. Agneta brings out tools, and together the children and the teachers start repairing the playground boat. Two young boys are using one of the pipes as a water groove and a few other boys are using the other pipe as a cannon on the roof of their hut. Yet another boy then transforms the water groove into a chimney pot on the boat. The fastening of the pipe on the boat is assisted by one of the teachers, but it is the boy who explains how it should be done and who attaches the pipe with planks and nails. It is mostly the boys who are seen and heard when it comes to the planning and restoration, but girls too are shown doing carpentry work. The fact that the voiceover is done by a young girl also levels out the focus on boys in the programme. Several long sequences are shown of children in deep concentration using tools on their respective tasks, and their conversation is heard without interruption, neither by the adults nor by the voiceover. Even though this programme started off by showing children walking in a line and answering questions, they are allowed to be very agentive both in their treasure decisions and in how the treasures should be used in their outdoor environment. This programme portrays the activities on the yard as being based on cooperation between children and adults. Several children are seen swinging in the hammock at the end of the programme. The last thing the voiceover says is: "A treasure is something that you can play with."

This programme draws on realism. The only encouraged make-believe present is when the children's imaginations are used to see things that others have thrown away in a new light. These children are cleaning up nature and searching the litter for things that they can play with, not standing in awe of nature's beauty.

The children are shown outdoors during the entire programme. The notion of children as benefitting from being outdoors is fully expressed here, even though the nature experienced is urban and institutionalized by the preschool setting (cf. Halldén, 2009; Jones, 2002; Säljö, 2000; Änggård, 2009). This is not exclusive to this programme. Several other educational programmes in 1992 show children leaving their indoor institutional settings, going out. In her study of a magazine for preschool teachers, child researcher Disa Bergnéhr (2009) recognizes that engaging in physical activity, improving one's motor skills, and being healthy are what preschool education should focus on and that these things should preferably take place outdoors (see also Änggård, 2009). Similar notions can be seen in this programme.

The children are not alone in this programme. They are looked after by their caretakers, but this hierarchy is not what the content is built on. Even if these children are portrayed as being in institutionalized care (cf. Säljö, 2000), they have a say in what they do and with what material. The children are performing everyday urban life in an outdoor setting together with adults. This constitutes a form of address built on respect for the children's own actions, for the adults caring for them and for nature. The surrounding city is thus not lacking in nature, but instead the children in the city are taking care of nature close by, living in it, and creating a meaningful everyday life in relation to it. The child audience, thereby, can be inspired and encouraged to play, be creative, and recycle by the way in which this programme portrays outdoor nature as being part of the ordinary. In this programme, there is no nostalgia like that seen in the previous example, just children and outdoor nature, cleaning and recycling in everyday life.

The Grand Wilderness

Yet another programme where the outdoor experience constitutes the primary content is *Expedition Wilderness* (Expedition Vildmark). It is a TV series in which two teams of children compete against each other, performing various tasks and living outdoor life in different parts of Sweden, together with an adult guide. One Sunday morning in October 2007 a 25-min-long episode shows one of the teams and the guide on a mission to transport a reindeer quite a long distance in the Northern alpine landscape (*Expedition Wilderness (Expedition Vildmark)*, aired on SVT1 21/10/2007, 10.35–11.00. Produced by SVT.). The guide and programme host, André, sets the agenda for the programme, while the female voiceover presents background and overview information. The child contestants are quite often interviewed on screen, and they are thereby also part of telling this story.

The episode starts by showing André in a white snowy landscape with mountains and a large cloudy sky in the background. It looks grand, beautiful, and quite inviting. However, André immediately starts to talk about how the bears are waking up after their winter sleep, how wolves and wolverines are close by, and how the approaching spring is causing the ices to melt, making it difficult to move in the area. After setting the scene like this, the friendly looking landscape might not seem so

friendly after all. André declares straight into the camera that: “This is Expedition Wilderness where the adventure is for real.” The scene for this episode’s adventure is also presented: “This is Lapponia, one of our world heritage areas and that means that this place must be protected.” The beautiful surroundings are in this way also put forward as a valuable and rare wilderness.

André and three children are then seen on screen. The children are asked whether they would like to help a friend of André’s with something. The children agree to take on the task before knowing what it is. It turns out that they are to help a reindeer named Bertil back to his heard. The reindeer is in this way humanized by being given a human first name and by his friendship with André. The fact that reindeers are domestic animals belonging to the Saami, a Swedish indigenous people, is not mentioned. Thereby, the fact that Bertil is portrayed as having lost his heard and his mum, and not that it is his owner who has lost him, also builds the anthropomorphic framing of the reindeer.

The team consists of two boys, 13 year old Nils and Brouk, and a 12 year old girl, Fanni, all introduced by the voiceover. The entire group is dressed in wind and waterproof hiking clothes marked with the SVT logo, warm hats, and gloves. They are all also wearing ice prods around their necks. The advanced clothing makes the expedition look professional and not like an everyday type of activity.

Even if the children are supposed to be the main characters of the programme, the fact that they are introduced after André explains the setting for the programme establishes the hierarchy in the group from the start. It is also upheld by the fact that André guides the expedition, asks the children questions, and has the right answers. In addition to this, André reminds the children of the predators living in the area and asks them to keep their eyes open for any signs of bears. Fanni then tells the others to look out for the remains of anthills, because when the hungry bears wake up they eat the ants and destroy the anthills. The children are thus shown to have competences, and they talk to the camera, quite often describing the course of events. Still, André is in charge, so Nils’, Brouk’s, and Fanni’s participation mainly consists of answering Andrés’ questions and reacting to what happens during the expedition.

The programme contains several challenging parts. The group is to cross-country ski to shepherd the reindeer. Bertil is not so easily handled and the group moves quite slowly in the terrain. The animal also manages to get off his leash and the group has to work quite hard to catch him again. To teach the children and point out the seriousness of the weather conditions, André jumps into a hole in the ice to demonstrate how to properly use the security gear designed to deal with weak ice. Shortly afterward, Fanni is shown getting her feet wet and needing assistance to get away from an area of very thin ice. André takes command in rescuing her. André is also seen helping Fanni put dry socks and plastic bags on her feet before putting the wet shoes on again. Here, the 12-year-old is getting assistance in dressing herself, which shows how exceptional and potentially dangerous the incident was. The adult guide is portrayed as responsible for the care of these children, and the hierarchy in the group is confirmed once again.

The group is shown continuing to ski on the frozen lake, and after a while the background music becomes rather dramatic. André has said that the group should

aim for a rock sticking up in the ice, but when the group comes nearer it becomes obvious that it is not a rock. It is a dead reindeer that has had its intestines eaten by some animal.

The group is displayed standing around the cadaver looking at it. They look quite alone in the massive landscape stretching out in the background. Both Brouk and Fanni are expressing disgust at the sight. Nils is heard saying: "I mean I've seen dead animals on TV but not as dead as this one, this guy, he was like stone-dead." He is here experiencing nature first hand, but it is not a beautiful sight, quite the contrary. André and Bertil, however, look unaffected. There is no sign of surprise on Andrés' part. It was he who directed the group toward what turned out to be a cadaver. In this passage, the adult seems to be a puppeteer pulling the strings to make the expedition into a "real" adventure.

André asks the children where they think they should camp that evening. The children express anxiety about sleeping in a tent with a bear possibly close by, and they decide to go back a bit away from the cadaver. A tent is put up and André makes dinner over an open fire before they tie Bertil to a tree and go to bed.

The programme then moves on to show the next morning when the children leave the tent. Fanni exits the tent first. She quickly moves away out of the frame, but before she does one can detect a smile on her face. Then Brouk exits and Fanni is heard saying: "But where is Bertil?" The reindeer is no longer on the spot where he was tied the night before. That the reindeer is gone is portrayed as a surprise for the viewer, but it seems not to be news for the children taking part in this so-called "real" adventure, judging by Fanni's smile. Good shots are needed to make the programme, but it does not feature professional actors (cf. Lury, 2005; Ågren, 2008). Here it becomes clear that the children on screen are experiencing a different adventure than the viewers are. It is also possible that the adventure is only real when watched on TV. The fact that the reindeer is gone is also the perfect TV cliff-hanger to introduce the coming episode, and this is how the programme ends. Fanni, Brouk, and Nils took on the task of delivering Bertil the reindeer and now he is gone, which means that they may lose the *Expedition Wilderness* competition.

In this programme, the outdoors becomes a scene for the competition. Outdoor nature is portrayed as grand, dangerous, and not easily enjoyed without the proper professional gear and adult guidance. The children experiencing the adventure on screen are portrayed as taking part in the competition rather than dealing with the wilderness. The narrative is built up for the child audience and not to the same extent for the children taking part in the adventure. The outdoor nature is, in this respect, portrayed as wild and grand, but this content is perhaps most exciting, safest, and most enjoyable when seen on TV.

The Outdoor Nature and Childhood Notions

The analysis shows that the outdoor content produces different discourses of nature. The nostalgic discourse portrays the outdoors as beautiful, giving, and stable. It is safe and just waiting out there to be explored by children. But a glance at the camera

reveals even the most competent children to be a product of adult nostalgia (cf. Outka, 2009). The everyday discourse portrays outdoor nature as close by, ordinary, and in need of care. It is waiting for urban children to come out and help clean it up. Here, everyday outdoor life is portrayed as documentary and no narrated plot is revealed. The grand discourse pictures the outdoors as breathtaking, far away, and not altogether kind (cf. Cronon, 1995). It has its own conditions and children need expert help in order to make it there. This outdoor representation is said to be real, but a puppeteer is visible as well as the fact that the children are acting out a plot. In this way, how the natural outdoor environment is portrayed also differs across representations and over time.

Outdoor life also re/produces different discourses in relation to the represented children in these programmes. Outdoor nature thus depicts children as belonging to and enjoying outdoor life, but it positions them quite differently. Children in these programmes are shown to be competent users of outdoor nature, as cooperating to handle their everyday outdoor experience and as in need of adult guidance to manage. This is not dependent on age. The children in the programme needing the most assistance were the oldest. Moreover, this competence does not grow with time, as the programme portraying children in most need of assistance was the most recent. (There are, however, also exceptions. For example, in *Ants in the pants (Myror i brallan)* aired on SVT1, 10/4/2007, 18.00–18.30. Produced by SVT, several children, both very young and a bit older, are very knowledgeable about animals and outdoor life.) Something that can also be noted in the representation of children outdoors is that even if outdoor nature is portrayed as distinctly Swedish (cf. Halldén, 2009; Lindgren, 2009) – through the use of a once-upon-a-time approach, everyday Swedish life, and the Swedish world heritage – the children are not portrayed as stereotypical ethnic Swedes. All three programmes feature children with seemingly different ethnic backgrounds, judging by their names and appearance. They are all portrayed as Swedish children, and their respective backgrounds are not pointed out in any way.

These discursive notions of outdoor nature and of the category children also allow for different child-nature relationships. As the audience addressed by the nostalgic view on outdoor nature has little chance of living up to the depicted competence and beautiful location, they are thereby sharing in the adult nostalgia – once there were children and natural environments like these. The target audience for the everyday discourse of outdoor nature has a better chance of living the life portrayed, and what it needs to pick up on is the moral obligation to care about nature in one's surroundings. The audience addressed by the grand discourse of outdoor nature is more likely to be positioned in front of the TV than expected to take part in the adventure (cf. Kahn & Kellert, 2002). Thus, over the years, outdoor nature content has been used to target quite different child audiences, but they are all imagined to take an interest in and have a relationship to outdoor nature.

Environmental Issues: Children Saving Nature and the World

Environmental issues do not constitute a large programme content category, but they are present in the programming to the same extent during all the studied years (about 10%). Three examples of environmental issues, one from each year, have been chosen for in-depth analysis. These examples consist of parts of programmes that focus primarily on environmental issues. They also have characteristics specific to each year: In 1980, the environment and man-made problems are in focus. In 1992, environmental issues are often present in educational programmes. In 2007, children act in regard to the environment. The examples analyzed here target young children as well as youth. The questions in this section are how programmes containing environmental issues construct notions of the child-nature relationship in terms of how environmental issues are re/produced for children.

Adults Destroy: Technology Saves

The children's programme series *Our amazing world* (*Vår fantastiska värld*) contains many different parts. The episode analyzed here was broadcast on the 8th of April, 1980, a Tuesday evening. It contained what has happened on the 8th of April previously in history, the development of the postal service, camouflage in the animal world, the whooping crane, a science fiction series, and an animated series on human history. (*Our amazing world (Vår fantastiska värld)*, aired on SVT1, 8/4/1980, 18.10–19.20. It was produced by SVT. The clip on cranes looks quite old, but no credits for this part are shown so it cannot be dated, nor can the original producer be named.) The male programme host introduces all the different clips and is the voiceover for most parts of this 70-min-long programme. In this section, an 8-min-long clip on the whooping crane will be analyzed. The voiceover informs the viewers about different kinds of cranes but more specifically about the endangered whooping crane. He introduces the clip by saying: "Wouldn't it be a shame if this bird were not allowed to live any longer?"

The storyline focuses on cranes but also raises the issue of endangered animals more generally. "Facts" about them are presented and the reasons for their endangerment are said to be hunting and/or a massive decline in these species' natural habitats. "And this is the fault of humans," says the voiceover and continues by explaining that some humans are making amends for the damage humankind has caused. This brings the story to a nature reserve in the USA. In the reserve, the voiceover reports animals are not only protected, but efforts are also being made to improve their living conditions. The voiceover continues by saying that this improvement is accomplished using modern technology. Images are shown of how tractors and bulldozers shape nature in the reserve to make it more suited to the needs of endangered animals. "The humans are helping nature," says the voiceover.

The nature reserve staff are reported to fly over the reserve once a week to count the cranes and locate precisely where they are. Why that should be important is not mentioned. There is also no estimate of the environmental damage that the bulldozers and the planes could cause or mention that this damage could be a source of disturbance for the precious species. What is reported, though, is that tourists are allowed to visit the reserve only in very restricted ways so as not to disturb the animals. It is hence humans that cause disturbance and are a threat to these animals – machines and technology are not.

However, an oil company in the neighborhood and the US air force have adapted their transport routes in consideration of the animals in the reserve, but more space cannot be set aside for the cranes because the land is being explored for farming, industries, and residential areas, says the voiceover, who continues by stating that about 1000 animal species around the world are threatened. The cranes are reported to have lived for at least two million years, and the programme ends by the voiceover saying: "Now they need all the help they can get to only survive the next 10 years."

This programme draws on a risk discourse according to which the lifestyle of humans is causing other species to become extinct. However, in this programme humans are not expected to change. Still, with the help of technology, some of the endangered animals can be protected in confined areas. Humans are thus the culprits but with the help of technology also the possible saviors. The way the content of this programme is presented places the child audience in a peculiar position. Nothing is said about what children can or should do. It is completely the fault of adults that animals risk extinction, and it is only adults, with their technological knowledge, who can do anything about it. Thus, children should know about the state of nature, and they should be both anxious and slightly hopeful about the future of endangered species.

Adults Destroy: Politics Saves

The TV guide states that *Little News Billboard* (*Lilla löpsedeln*) is an educational news show for middle school and secondary school pupils and for children and young people. (Which means between 10 and 15 years of age. *Little News Billboard (Lilla löpsedeln)*, aired on SVT1, 21/4/1992, 9.15–9.30. Produced by UR.) The first topic on a Tuesday morning in April 1992 is the Baltic Sea and the serious pollution in those waters. One of the news anchors says that the Ministers for the Environment in the countries bordering on the Baltic Sea have had a meeting about the pollution. A female reporter is reading the speaker text as well as interviewing people in a 3.5-min-long reportage about the issue. The damages are reported to have been caused by industry, sewage, agriculture, and traffic. Swedish industry, traffic, and agriculture are mentioned, but the worst polluters are located in the area around St. Petersburg, the Baltic countries, and Poland, says the voiceover. This can also be seen in the graphic image where more smoke is shown coming from bigger industries placed on the eastern side of the Baltic.

The alarming effects of this are said to be reproduction difficulties among seals and death of the seabed due to the concentration of poisonous chemicals and eutrophication. It all sounds rather pessimistic, a notion that is supported by the Swedish Minister for the Environment, Olof Johansson. He says that there is no time to lose when it comes to the Baltic Sea. In his opinion, the current conditions could be considered an environmental disaster, especially on the eastern side. The minister is portrayed in his office, where several shelves of books and reports are seen in the background. This gives his statements seriousness and his conclusions a scientific framing.

A representative for the nongovernmental organization Greenpeace, Rune Eriksen, comments on the action plan for the Baltic Sea that the ministers have sanctioned. In his opinion, the actions suggested are not tough enough. The reporter asks him whether these actions will bring new life to the Baltic Sea's dead seabed. He answers quite firmly: "No." The NGO expert is portrayed outdoors with water in the background. He is thereby portrayed as being in closer contact with the actual water conditions than the politician is. Neither the reporter nor the spokesperson from the NGO questions the Swedish minister's view that the worst problems are on the eastern side of the Baltic.

Images are shown of dead seabed, industrial buildings with smoking chimneys, and foamy waters and of a tractor with a pesticide-spreading device. Where these images are supposed to be located is not altogether clear. But most of them seem to stem from the eastern side of the Baltic Sea, judging by how they are framed by the speaker text.

The reporter says that there is one positive side to the action plan, in that something has been decided about the Baltic Sea. The reporter adds: "In 10–20 years' time, the beaches will be clean and the water will be clean enough to swim in again." She frames the pessimistic story by ending in a prophesy about the effect the action plan will hopefully have. It is not made clear in the programme what the relations are between clean beaches, waters fit for swimming, dead seabed, and reproductive difficulties among seals.

The address put forward in this news clip is multilayered. The state of the Baltic Sea is grave and actions need to be taken now, which is declared by the minister in charge, as well as by the NGO and the reporter. The pollution in the Baltic Sea is presented as a disaster – and one that crosses national borders and requires serious action from politicians in several countries. Whether or not the suggested actions will be sufficient is contested, but the reporter decides to end the clip on an optimistic note. Even though the message draws on a risk discourse, child viewers are not to be left in despair by the newscast (cf. Carter & Davies, 2005). There are, however, no suggestions as to how children themselves can improve the status of the Baltic Sea, and children are not pictured in this clip. The viewers addressed by this newscast are to wait and see (cf. Buckingham, 2000), and hopefully they will have a Baltic Sea that is in better shape when they are grown up, in 10–20 years' time. This produces notions of passive children and passive nature, which both have to rely on adult politicians making things better and can do nothing about the disaster except hope for the best.

Adults Enjoy: Children Fix

The brain office (Hjärnkontoret) is a popular series on natural science that started in 1995 and is still active (The SVT website a). The show has a clearly articulated interest in science. The environment is in focus as regards waste and recycling in a section of the programme called *Junk TV (Skräp-TV*). This particular sequence was broadcast on a Saturday morning in October 2007 (*The brain office (Hjärnkontoret)*, aired on SVT1, 13/10/2007, 10.15–10.40. Produced by SVT.). *Junk TV's* content is inspired by watchdog journalism; it has an intro of its own and it is only 2 min long. In the intro, a pile of TV sets with screens showing the word "Junk TV" is shown, followed by fast clips in black and white, accompanied by music. The images show a young girl confronting people about their garbage. The voiceover introduces the girl as "Nadja, the Waste Detective" and advises the viewer to go to the programme website:

> Where you easily can influence what we throw away as garbage. Go to svt.se/skraptv and you will get lots of good advice on how you can make sure your family throws things away in the right way.

Then Nadja appears on screen in color with what looks like a portable broadcasting device in a backpack, with headphones and an antenna. She addresses the camera when she informs the viewer that she is somewhere in Sweden where she will control what is thrown away. She looks around holding up the antenna as if detecting something and says that she will start with the building closest to her. It is a block of flats. When Nadja enters the building, the scene changes and a living room table surrounded by three ladies is shown. They are having coffee and buns and playing cards. In the next sequence, we see Nadja again. She is exiting the elevator and bursts in on the ladies calling out "Waste control." Nadja declares that she will hold a competition. She then gets the bag of waste from the kitchen and empties it on the table in front of the ladies. The table is still set for coffee and buns.

Nadja informs the ladies that they have 30 s to put the waste into the right recycling containers. Nadja places herself in the corner with a stopwatch and asks: "Are you ready?" The ladies answer: "Yes!" They look quite happy and engage eagerly in sorting the litter into the right containers. Nadja keeps track of time.

Nadja cheers them on and the ladies manage their task within the time limit. "Well done. You did it!" Nadja says and adds: "Now we can celebrate with buns." She reaches for a bun on the ladies' cake stand. "All right, now remember to recycle. We must all help out with the waste experiment!" Nadja says and leaves. The ladies wave goodbye and continue playing their card game and drinking coffee.

In this short clip, it is the child who has the knowledge and the knowhow. Nadja knows how to recycle properly. That recycling is important is implicit in this programme and something that all addressed children should already know. Nadja also knows that not all people handle their waste in this way. She is competent enough to be the judge of whether they are doing it correctly. The fact that Nadja is bossy makes the clip funny. She has the authority to question adults, to interrupt, and also to make adults redo what they have already done in an unsatisfactory way. This is not how

children are usually allowed to treat adults. Coming up with a competition to make people do things is usually something adults impose on children. Thereby this programme manages to set normality aside, and the child serves to blur the norms of the child-adult hierarchy (cf. Baker, 2001; Prout, 2005; Taylor, 2011).

It is the child who not only forces adults to assume responsibility for their environmental footprint but who also assesses them. The voiceover also urges viewers to check out the website to get advice on how to manage their families in regard to recycling. It is the individual child's responsibility to set their families straight in the name of the environment and nature. This content is based on the notion that children should be interested in saving nature, and hence the world, by acting locally and assuming responsibility for the actions of their family members and other adults.

The Environment as Forming a Child-Nature Relationship

The discourse on environmental issues is largely the same one that is visible in all of the above examples. It is a discourse that draws on notions of risk and danger, according to which something must be done about the state of nature. However, how children are viewed in this discourse differs. In all of the programme content on environmental issues in the material, the environment is presented as a matter of importance for children. But in the first two programmes, no possible action is presented that is open to children (See however, *Day-care TV* from 1992, where children should and could pick up litter even if this was not portrayed as an action that would save the entire environment as such.). In these programmes, it is only technology, politics, and money that viewers can set their hopes on, but still the future looks grave. In 2007, on the other hand, the environmental discourse provides children both on screen and at home with a position from which to act on an individual consumer level (cf. Linnér, 2005).

In his study of Swedish educational programming on environmental issues for all target groups during the period 1962–2002, Björn-Ola Linnér (2005) points out that children are portrayed as the hope for solving the environmental crisis in all programmes, not only those targeting them. In *TV for children*, the child viewer is informed but not asked to act in 1980 and in 1992. All blame for environmental problems is thereby put on adult society. In 2007, however, children are asked to step up for nature and set adults straight. But when there are things children can do about nature's problem, this also has consequences. Children are all of a sudden responsible for controlling adults and thereby responsible for saving nature and hence the world. This relieves adults of their responsibility for acting on the crisis they have caused, placing it on children instead.

Conclusion

The analysis in this Chapter has focused how the child-nature relationship is constructed in TV material. Research spotlighting the child-nature relationship has been called for (e.g., Prout, 2005; Rydin, 2000; Taylor, 2011), and, for example,

Taylor (2011) has argued, drawing on Prout (2005) and Haraway (1991), that questioning both nature/culture and child/adult dichotomies allows us to study children and nature in new ways, focusing on how they interact. In the present analysis, these new ways have been shown in several respects. To start with, the vast presence of nature content in *TV for children* reproduces the discursive notion of children as being linked to nature (cf. Halldén, 2009, 2011; Prout, 2005; Taylor, 2011). But focusing on the relation between nature TV content and the category children also allows us to study the nuances of how this bond is upheld.

The nature discourse in *TV for children* does not only present nature as something good and positive in relation to children, as suggested in previous research (e.g., Halldén, 2009, Kahn, 1999; Kahn et al., 2008, 2009; Myers, 2007). The nature representations analyzed here also portray nature as manifold: for example, as magnificent, natural, everyday, nice, intriguing, dangerous, reliable, unreliable, funny, destroyed, and needing to be saved. Representations of a multiplicity of natures thus coexist in *TV for children* (cf. Macnaghten & Urry, 1998). But nature cannot be represented in all possible ways for children in the nature content studied here. It is neither evil nor almighty, and no natural disasters that leave people helpless in the face of the powers of nature are shown.

In these nature representations, children belong in outdoor nature, but they are also struggling to manage outdoor life, recycling to establish a place in nature's cycle, and working to save it. In these televised representations of outdoor nature, the environment and children blur boundaries and question dichotomies, neither of them being possible to label as pure "nature" or pure "culture" (cf. Baker, 2001; Haraway, 1991; Lee, 2001; Prout, 2005; Taylor, 2011). Notions of the child audience are embedded in these nature representations. Children are supposed to engage in nature, be interested in nature as well as want to watch TV programmes containing nature. In this way, televised nature for children also maintains the dichotomy between children and adults (cf. Lee, 2001; deCordova, 1994), as adults are not expected to be particularly interested in nature or to become engaged in environmental issues.

The representations of children and nature draw on primordial notions of children as mysteries of nature and nature as a mystery for children (cf. deCordova, 1994; Halldén, 2009, 2011; Änggård, 2009). These are indeed adult views on these categories, and they uphold discourses that construct the child-nature relationship in the TV content under study. This might seem obvious, as the people pulling the strings behind the scene are by definition adults. However, these adult notions of what children and nature are and should be determine what TV content for children is shown on TV as well as how children and nature are viewed in society at large. They are, thereby, maintaining anthropocentric and "adult-centric" notions and thus preventing children and nature to form other possible relationships based on other views.

A study of TV content reveals, in this way, that programming for children is about norms and notions that concern children as well as nature. The present analysis shows that the child-nature relationship in TV for children is strong during all the years under study, and there is no sign that this relationship is weakening. Tomorrow

(as of this writing June 12, 2017), the yearly summer break morning programme begins. It is a live show being broadcast outdoors with a child audience sitting in the grass around the programme stage. This year the audience will learn, among other things, how to become "planet carers" (The SVT website b). What this highlights is that our societal notions of children and nature are entangled and that it is difficult to even imagine a childhood that is not lived in a close relationship with nature and that is not ready to save it. This view of the child-nature relationship is, as we have seen, something that is also requested in earlier research (cf. Kahn, 1999; Kahn et al., 2008, 2009; Myers, 2007) and something that we, as adults in society, perhaps see little reason to question. But this view on the child-nature relationship might also be what leads us astray when it comes to critical questioning. Naturally, as a society, we need to be very careful about the natural world, which is the very foundation that makes life rich and possible. But as I see it, the important question is: Why should nature be a primary concern for children? The upshot of the matter is that adults have the power, legal possibilities, and the responsibility in society and are thus responsible for environmental damage and for clearing it up. The view of the child-nature relationship represented here is more of a burden, because it positions children as becoming adults, rather than as being children in the present. And the responsibility for nature is thereby assigned to children, who have limited or no possibilities and/or resources to actually do anything about the environmental disaster that is affecting us all. The child-nature relationship as reproduced in the TV programmes also leaves children with the impression that adults are unchangeable and unwilling to shoulder the environmental burden that they created in the first place.

The question that remains after studying all these hours of TV material is whether, after all these years of imposing a special relationship to nature on children, it is not time for adult society to shoulder both the special, caring relationship and the responsibility for the natural environment and set a good example?

Cross-References

- ▶ Artists as Emplaced Pedagogues: How Does Thinking About Children's Nature Relations Influence Pedagogy?
- ▶ Childhoodnature in Motion: The Ground for Learning
- ▶ Conceptualizing Parent(ing) Childhoodnature Through Significant Life Experience
- ▶ Moving Beyond Innocence: Educating Children in a Post-nature World
- ▶ Posthuman Child and the Diffractive Teacher: Decolonizing the Nature/Culture Binary
- ▶ Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective
- ▶ Socializing Superiority: The Cultural Denaturalization of Children's Relations with Animals
- ▶ The Nature of Childhood in Childhoodnature
- ▶ Wild Hope: The Transformative Power of Children Engaging with Nature

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Future Shock, Generational Change, and Shifting Eco-social Identities: Forest School Practitioners' Reasons to Train

41

Mel McCree

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Abstract

Why do Forest School (FS) practitioners choose their vocations? What role do significant life experiences (SLE) play in their choices? This chapter investigates some of the reasons behind their choices, as described by an ethnography of FS trainees (2010–12) using qualitative interviews and observation. Arising from the study, a new conceptual model of *eco-social identity* is described, framing the ongoing construction of self as *part of* nature. Environmental and socio-cultural influences are explored, including both negative and positive experiences, drawing on SLE research. Identity formation based upon life experience had an impact upon the trainees' choices and yielded some surprising similarities. Early childhood and adult experience in the wider natural world, role purpose, generational change, environmental loss, future shock, and a passion for pedagogy motivated the practitioners. The study contributes new insights into the impact of FS and similar training, the influence of socialization, environmental loss and degradation, future anticipation, ecological identity, and subjectivity in childhoodnature practice.

Keywords

Eco-social identity · Early life experience · Generational change · Environmental loss · Futures · Forest School

Introduction

Future Shock: the Significance of Experience Not Yet Lived

What do we anticipate future life on Earth will be like, for all species? What impact might this anticipation have upon us? Critical anticipatory studies attempt to imagine the not-yet possible, for instance, futures based upon socio-environmental justice principles (Amsler & Facer, 2017). In the 1960s, US trend-spotters Alvin and Heidi Toffler coined the phrase "future shock." They presented a convincing argument that we are negatively affected by the speed and uncertainty of change.

> 'Future shock'. . .the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time (Toffler, 1970, p. 37).

As some global populations experience more precarity than others (Shukaitis, 2013), any sense of future shock will vary. Yet with the advent of the Anthropocene (Crutzen, 2002), we all share a future shock upgraded for the twenty-first century

and writ large into the geological record. Past human actions are demonstrated to reach far into the distant future. Similarly, in our everyday lives, our past actions impact how we think about our future.

What implications might these time-traveling relationships have, specifically upon those engaged in the relational pedagogies of childhoodnature? This Chapter draws upon an ethnographic study of eight Forest School (FS) trainee practitioners in England, UK, undertaken in 2010–2012. The study investigates practitioner experience, including their reasons for training and identity formation as a "situated self" (Goffman, 1961, p. 85). The practitioners reveal relationships to future imaginings and past experiences that inform their present actions.

In the following discussion, identity formation is contextualized within "significant life experiences" (SLE) research from the environmental education canon. Then, a new conceptual model of *eco-social identity* is described, arising from the study, to frame the ongoing construction of a situated self as part of nature. From this frame, themed findings on practitioners' perspectives on their experiences are presented. These include early childhood and adult experience, role purpose, generational change, environmental loss, future shock, and passion for pedagogy. In discussing the findings further, I critique the role SLE played in the practitioners' choices to train and what the implications might be for childhoodnature research and practice.

Relationships Between Significant Life Experiences and Identity Formation

Since its inception in the 1980s, SLE research has been connected to identity formation. The underlying rationale is that there are some life experiences that significantly develop our environmental sensitivity. They may have the potential to change our life paths and lead to pro-environmental choices and behavior, such as environmental activism, conservation, or education work (Chawla, 1999; Chawla & Hart, 1995; Tanner, 1980). The earlier SLE literature cites three main categories that are influential upon choices made later in adult life:

(a) Interacting with wild natural or rural settings, as a child or adult
(b) Interacting with family, close friends or other role models, or related books and ideas
(c) Habitat alteration, including negative changes and environmental loss (Ceaser, 2015; Chawla, 1998, 1999 2001; Chawla & Derr, 2012; Palmer, 1993; Sivek, 2002; Sward, 1999)

However, early SLE research (e.g., Chawla, 1998; Palmer 1993; Tanner, 1980) stirred much debate, to the extent that two special issues of Environmental Education Research explored the subject in 1999 (e.g., S. Gough, 1999; Payne, 1999). Let us consider one or two challenges raised by SLE research that are relevant to the present study. Notwithstanding the immediate question as posed by A. Gough (1999b);

whose lives and experiences are significant? The early research focused on a narrow sample of mostly white, male, educated, privileged populations from the North Americas and Europe (Ceaser, 2015). Further studies have now emerged that consider SLE from other perspectives, attending to individual characteristics, e.g., from women and those under 30 (Gough, A., 1999), those not identifying as activists (Stevenson et al., 2014), more diverse populations, e.g., from Asia (Hsu, 2009; Furihata, Ishizaka, Hatakeyama, Hitsumoto, & Ito, 2007; Li & Chen, 2015), and from a postcolonial, environmental justice position (Ceaser, 2015).

There is a dialectic between two main hypotheses active within current SLE literature, agreeing or disagreeing with the impact of early experience as the primary influence on environmental sensitivity. Beyond the initial SLE studies, further research (Chawla, 2007; Fjørtoft, 2004; Waite, 2007; Ward Thompson, Aspinall, Bell, & Findlay, 2005; Wells & Lekies, 2006) supports the view that a caring disposition towards the wider natural world begins in early childhood experience. We cannot draw from this research that such formative experiences categorically go on to sustain a love and bond with nature throughout life and compel one to ongoing environmental action, more that they inform our choices. As individuals, committed action comes from complex sources in our selves and contexts and our lives are shaped by a multiplicity of choices and chances. Chawla's research (2006, 2007) shows the significance of positive role models, yet later in life we are surrounded by other role models and influences upon our adult lives.

Howell and Allen (2016) suggest that in order to commit to action on climate change, early experience is not necessary. In their study findings, social justice aims and motivations were more influential. Similar findings state the importance of student/teacher ratios and income levels over time outdoors or role models (Stevenson et al., 2014). Caeser (2015) has developed SLE research from the perspective of environmental justice activists and found three different SLEs: recognition of social/environmental marginality, embodied knowledge, and empowerment from environmental justice community work. As described later in the findings, this bears relevance to the present study.

Finally, Dillon, Kelsey, and Duque-Aristizabal (1999) suggest that SLE research lacks a thorough underpinning in identity theories to explain social and personal phenomena. In the following section, I make a contribution towards this through the concept development of eco-social identity.

Eco-Social Identity Integration: an Individual or Ecological Being?

What dynamics are there between identity formation and our relationships with the rest of nature? The study enquired into the identities and subjective experiences of the FS practitioners and their choices for training and practice. To include both relationships with the environmental and social contexts, I assessed critically the construct of an ecological identity and refined the construct to an *eco-social iden* (ESI). Here, I describe the process, to explain how ESI as a construct, and

accompanying theories, relate to the study. I then consider what, in FS practice, reinforces a sense of ESI and to what extent it contributes to becoming a FS practitioner.

An ecological identity (EID) is defined by Thomashow as "all the different ways people construe themselves in relationship to the earth as manifested in personality, values, actions, and sense of self" so "nature becomes an object of identification" (1995, p. 3). EID as a construct was first introduced by Mead (1934) and developed by environmental psychologists, sociologists, and educators, such as Chawla (1999, 2007) and Kaplan and Kaplan (1989). Bronfenbrenner's ecological theory of human development (1979) is perhaps the most widely known and applied model of EID formation, acknowledging the social sphere within an ecological view. Bronfrenbrenner defined ecological as relational rather than purely flora and fauna or more than human nature. He emphasized the interconnected, interdependent nested systems we live in.

An expanded sense of self that includes nature emerged in response to a critique of contemporary life in Minority western society, from ecofeminist and deep ecological positions (Sandilands, 1999). It chimes with evolutionary biologist Wilson's biophilia hypothesis, which posits an evolutionary and innate need for an intimate association with the natural world (Kellert & Wilson, 1993; Wilson, 1984). Various factors are seen to help form EID. Clayton and Opotow (2003) argue that it develops from an individual's "direct, personal, immediate, and emotionally significant experiences with the natural world that change the individual's understanding of self" (p. 14). Further factors in forming an EID can be deep experiences within nature, social interactions in and for nature (Gooch, 2003), beliefs that the environment is important in its own right (Clayton, 2003) and a socially constructed cohesive understanding of self and others, human and non-human (Chawla, 1999; Thomashow, 1995).

This summary of thinking on EID clarifies the area of identity politics and theory with implications for the study. Bragg (1996) argues that an ecological self is innate but stifled by modern life and in this statement a tension between theoretical positions can be found. Theories of ecological selves become inadequate when simply saying that we must become more connected with the natural world, identifying with it, to find our real authentic selves within nature. We live in a sphere of dominant social influence, and therefore, a seemingly purist stance closes itself to other sociological positions regarding the social self. Ecofeminist and deep ecological perspectives can be interpreted as too essentialist in their view of the ecological self, based on "the idea that humans can return to an organic state of grace by transcending the ways in which nature has been constructed in patriarchal development" (Sandilands, 1999, p. 70). Sandilands notes the danger inherent in this quest, for "ecological degradation is a complex social problem" (ibid.). Deep ecology and ecofeminism can be guilty of espousing modern romantic ideas that our *proper* place is as a natural being is distorted by an artificial society. These theories are in danger of reproducing an impossible dualism of nature/culture that they propose to stand against, arguing for a pure *pre-social* state which is impossible, yet a meme that has

been in place since Rousseau's time. Since the Romantic era, the endeavor of social theory has contributed to our understanding of self-formation processes and the complex interweavings of human social life. Therefore, a theory of ecological self can misrepresent sociological theories of social selves, which to a large extent do take into account our biological or embodied self (Goffman, 1961). From an eco-social perspective, we cannot be severed either from the natural or the social realm. We do not have an authentic self that predates our social self, or a relationship with nature that excludes society; we are social beings. Similarly we do not have an exclusively social self without our biological nature; we are natural beings.

Encouraging people to see themselves as part of nature is potentially advantageous in inspiring strategies towards more sustainable societies, but a socially complex view is necessary. Sutton (2004) makes the point that we tend to need to be shaken out of our social self, as the primary reality, to realize our innate biological self. Therefore, we need to accommodate both ecocentric and sociological perspectives to address self-formation that includes an ecological self or identity. With this in mind, I reframe EID and the project of the ecological self as *eco-social identity* (ESI), to overcome the theoretical obstacle of sacrificing the impact of the social self. ESI keeps our relations with the rest of nature in the frame, inviting in an ecocentric perspective, while considering identity from our unavoidably anthropocentric perspective. I return to Mead (1934) who framed identity as derived from the social process, the divide between I and Me, where we partially construct our identities based on the generalized reflections of ourselves from others. When considering the practitioners in the study, despite many of them having a deep affinity with the rest of nature (Kals et al., 1999), their identities are constructed and negotiated largely within social realms. Therefore, ESI has greater fitness for purpose for both the research and the aims of this Handbook.

Using *Eco-Social Identity* as a Conceptual Model

Figure 1 represents *eco-social identity* as a momentary cross-section through a human lifeline. The model reflects the ongoing formation of identity as a series of situated subjectivities across space-time, formed in multidirectional flows of experiential awareness. It is a spatial, phenomenological model that synthesizes the ecological perceptual learning of worldly "inhabitation" (Ingold, 2008, p. 1804) and the social processes more traditionally associated with identity formation (Mead, 1934).

Within the earlier discussion, laying the theoretical foundations for *eco-social identity*, I rejected either/or notions of an innately ecological or social self. With this I also rejected the related dualisms such as nature/culture, in favor of a position that conceptualizes shared processes and blended awareness of our biological nature within our unavoidably anthropocentric perspective. The blended colors in the model represent this position. There is no essential self, only ongoing relational processes. Constantly changing levels of implicit and explicit experiential awareness are present, as a basic constituent of being alive, of the processes of materials and

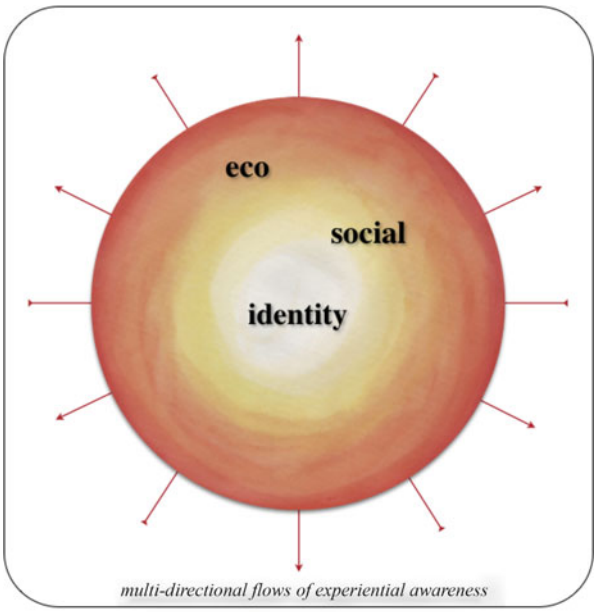

Fig. 1 Eco-social identity

forces shared with others (humans and more-than-human), be they physical, affective, social, or any form. These awarenesses are multidirectional, as represented by the arrows.

The model is in some ways the starter for a metaphysical template of life-itself (Kraftl, 2013) and an experiment in representing the nonrepresentational. It is useful to the study, as the model frames my ontological and epistemological position, and from there I have built the analytic interpretation. Re-conceptualizing *eco-social identity* helps to locate the practitioners' situated selves and subjectivities. However, as a cross-section, it is hard for this model to show movement or change in identity, the temperate nature of affect, or how situated subjectivities are absorbed into the self and continuously adapted. Recognizing the ongoing nature of identity formation, *eco-social identity* can also be shown as a lifeline, or red thread, representing life experiences running along space-time (Fig. 2).

What is Forest School?

Before I go on to introduce the study, first let us introduce the context of FS, as a distinct form of outdoor learning. FS has specific principles that include being in local woodlands regularly, ideally over all seasons, with a play-based, participant-centered pedagogy (Cree & McCree, 2013). Programs are mostly for children via educational and care settings but are provided for all ages (Murray & O'Brien, 2005). The agreed UK FS definition is:

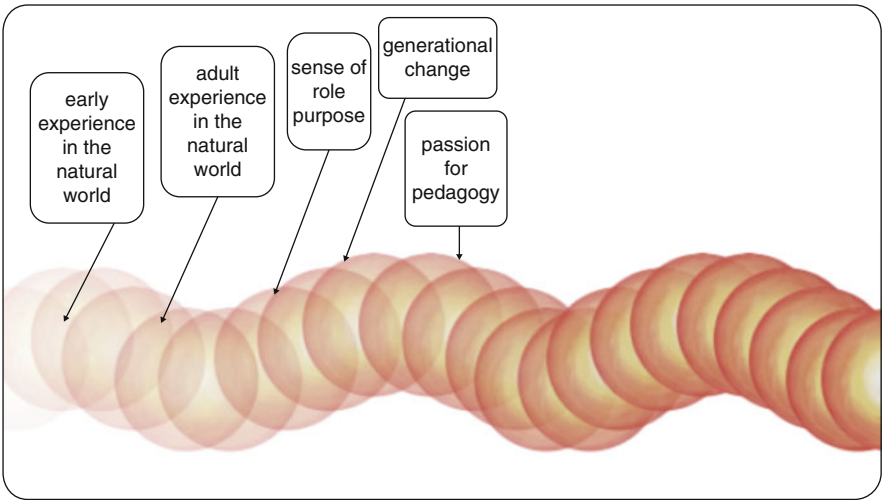

Fig. 2 The lifeline of ongoing eco-social identity

> an inspirational process, that offers all learners regular opportunities to achieve and develop confidence and self-esteem through hands-on learning experiences in a woodland or natural environment with trees. Forest School is a specialised learning approach that sits within and compliments the wider context of outdoor and woodland education. (FS IOL SIG, 2012).

FS builds on a rich tradition of outdoor play and learning in both Scandinavia and the UK, yet not all Scandinavian cultural understandings translate fully to the UK, such as "friluftsliv" (lit. open-air life), Danish Udeskole practice, or the inclusion of animistic nature spirit characters such as Swedish "Skogsmulle" (Cree & McCree, 2013). The UK FS movement emerged from practitioners' needs and interests, countering their context of mainstream education and care. FS can be located within various social or educational movements, including the growing demand for so-called "natural play" and "free range childhoods" (Austin et al., 2015; Gill, 2011), opportunities for outdoor learning, responses to educational pressures, and environmental concerns (ibid.) (Waite et al., 2006). From these grassroots beginnings, UK FS has now incorporated into many mainstream settings and private provision. Hybrid versions have diverged from "full-fat Forest School" meeting all the principles, such as compromised "Forest School Lite" or deeply tokenistic "Forest School Ultra Lite" (McCree, 2014). Hybridity helps a movement to spread and some amount of cross-pollination is inevitable, particularly as the popularity has led to commercial uptake. However, the full implications of tokenization are yet to be seen. For example, the importance of "full fat FS" distinctions and principles remain a key indicator of quality provision (McCree & Cree, 2017).

Method

The design was qualitative involving three stages of interviews and observation. Developmental stages (Miles and Huberman, 1994) reduced predetermined bias and informed further inquiry, hence, the emergence of the concept *eco-social identity* which arose out of the first stage and informed the analysis.

Participant Recruitment and Ethics

Ethical protocols was approved prior by the university committee, in line with guidelines from the British Educational Research Association. The eight FS trainees self-selected with informed consent to participate in the research. I attended four training courses to allow for autonomous voluntary sampling from an emancipatory standpoint. In the spirit of ethnographic research, I valued particularities and favored a depth of narrative and analysis over a large sample number. The participants represent a range of provision, reflective of current diverse UK FS practice for young children. There were two manager-practitioners, three early years practitioners, one teaching assistant, and two volunteers. Four had between 10 and 25 years professional experience and two less than 5 years. Six out of eight were earning below the national average wage. For confidentiality, participants have other species names.

Context

Fieldwork was conducted from 2010 to 2012, firstly at an English environmental education and FS training center, and afterwards in professional settings. The settings ranged from isolated village schools to play sessions in busy urban parks. Six had FS sites on their setting location. The landscapes, species, and affordances varied widely, ranging from 20 meters square of mixed young trees, shrubbery, and concrete, to established woodland set in acres of grounds.

Interviews

The first interview was made during training. The topics were participant background, reasons for training, perspectives on training, and FS ethos (relationship with the wider natural world, child-centered play, and risk taking). A second telephone interview focused on the challenge of taking training into practice, made about 6 months later. In this the participant chose an encounter to reflect upon within a framework of relationships between adults, children, and the wider natural world. A third phenomenological interview was conducted the following year after a session observation, with reflections on lasting impact. The interviews lasted

between 30 and 90 min and were audio-recorded with participant consent and transcribed.

Observations

Factors observed were training and work contexts and social norms; site relationships, type, and use; contextual background and team relationships; evaluation standards, quality, values, and attitudes in the setting towards FS; practitioner's interactions with adults and children; and environment and practical challenges. I witnessed a FS session with each practitioner, talked with team members and surveyed site affordances (multispecies, environmental, and socio-cultural).

Analysis

Using constant comparative method (Glaser & Strauss, 1967) to analyze the data at each stage allowed emergent themes to bear appropriate relevance. The role of the combined, triangulated data served the outcome of multiple instrumental case studies (Stake, 2005), verified by the participants. In synthesizing the case studies, I explored their ongoing construction of their self and professional practice, e.g., in how they approached challenges differently and with whom. I view practice not just as individual skills and knowledge, but as both dialogue and activity combined, "as complex socio-material accomplishments, multi-dimensional, situated, embodied, and fundamentally relational" (Lee & Dunston, 2011, p. 483). Therefore, I located the practitioners within spatial and relational frameworks (Bronfenbrenner, 1979; Ingold, 2011; Kraftl, 2013), including the relationships they held with themselves, others, and the world. Connections were made between common choices, perspectives, and relationships in cross-case comparison and differences highlighted.

Findings: Exploring the Identities of Forest School Leader Trainees

Within the participants, there was a unanimous feeling of passion for practice, with varying interests such as child rights, connection to nature, alternatives to mainstream education, and child-centered practice. The training validated the practitioners' beliefs and encouraged a sense of change agency. For this reason, and for the reason that the training had enabled them to exercise a widening of their professional identity, overall they valued the FS approach and ethos. The practitioners voiced clear concerns for children's wellbeing, in relation to decreasing outdoor play opportunities. A minority of the practitioners reflected on this lack in their own childhood experience. The other practitioners demonstrated varying levels of *eco-social identity*, feeling part of the natural world over their life course. While not everyone identified as an "outdoorsy person" (Maynard, 2007, p. 389), they all

constructed their role with a sense of purpose towards what they perceived children needed, in relation to eco-social justice and generational change. This strong link between their own life experience and their relationships to nature and society contributed to their passion for practice.

How Valuable are Early Experiences in Forming Identity Relations?

Continuing practice requires initial commitment, conviction, and the support to make it happen. Out of a total of eight practitioners in the case studies, five continued their FS practice and qualified: Caterpillar, Monkey, Moose, Rhino, and Salamander. They expressed stronger identity relations with FS and the natural world than the three who did not continue. Interestingly, all five, plus Lion, expressed childhood memories of free range unsupervised play in natural environments and a greater range of independent mobility than they observed in children today.

> We used to go poke fires and we'd be outside all day. My friends had a garden that backed onto an area of parkland and we just used to jump over the fence...they'd call us back in for our lunch or tea and that would be it. But we probably wouldn't do that necessarily with our own children. I tend to be, even though mine are out in the woods and stuff, I'm there, or I wouldn't let them go... even I feel a bit like that and I think that because of all the legislation that there is nowadays, you've just got to be so careful. (Caterpillar 3)
>
> When I grew up, I lived on a big council estate in a town, but the difference was...it's a cul-de-sac... surrounding three sides of it is woodland. As a child, I used to spend all day, every day, in the school holidays and at weekends, out in the woods. That is what my childhood was based on. (Lion)

Caterpillar highlighted how her own attitudes towards her children have changed despite how she used to play herself; I consider this later in terms of generational change. Moose, Caterpillar, and others gave the example of formative experiences of natural play in childhood as a reason why they value similar experiences for children now and why they choose to practice FS. Some practitioners had spent a continuity of time exploring the natural world throughout life. As Moose stated "*I've always spent loads of time outside from a child...I love being outside.*" Caterpillar's environmental knowledge stemmed from a childhood interest she had maintained and pursued into adult life. Caterpillar talked fondly of memories relating with other species in her early childhood play: "*I was always in the garden chasing hoverflies and bees and stuff so... it's a big interest of mine.*" She in particular had a passion for ecology that came through in her FS practice.

Outdoor Play Deprivation in Adults

I asked some FS trainers about how they discussed nature-society relations with FS trainees (McCree, private correspondence, 2012a, b, 2013). Horseman stated that now she does not ask about outdoor play memories, as she has found fewer

younger generation adults have had natural play experiences as children. Play memory sharing is a phenomenological method often used with adults in play or pedagogical training (Sebba, 1991; Waite, 2011a). For example, considering how you played as a child and your responses to different play situations as a responsible adult, e.g., unsupervised, risky, or natural play. In Waite's research (2011a), the values that emerged from preschool practitioners considering their own memories of the outdoors included: freedom and fun; ownership and autonomy; authenticity; and love of a rich sensory environment and physicality. These values were employed as a framework to analyze data from case studies, observations, and interviews in the preschool settings where outdoor play and learning was taking place. The study included open enquiry questions on what the practitioners wanted to share about their own lives in childhood. The topic of our own personal play memories can raise a number of questions such as what each person finds acceptable or not and indicate a wide range of values, attitudes, and differences in childhood experiences within a group of adults (Keichtermans, 2005). Formative childhood experiences can be enablers or disablers in our adult attitudes and perceptions towards nature (Chawla, 1988, 2007; Fjørtoft, 2004; Waite, 2007; Ward Thompson et al., 2005; Wells & Lekies, 2006). It is interesting to see how the sharing of memories in the study draws a parallel with these other studies. In the interviews, I asked the practitioners about their relationship with the natural world in their personal lives, yet I did not prompt them to speak of their early experience, which was instead freely associated and volunteered. Let us now consider those who did not state any significant early experience, but instead felt informed by their experiences as an adult.

Adult Experiences and Sense of Role Purpose

Three practitioners (Ant, Eagle, and Rhino) came to FS training and an exploration of their relationship to the natural world due to influences in their adult lives. They found meaning in a sense of professional purpose, mission, and responsibility. Ant explained that "*it's travel, for me, which reconnected me to the outdoors.*" His perception of reconnection with the rest of nature was important to him both personally and academically, informing his focus as a mature student.

Eagle's motivation for practice was professional and she did not identify with FS on a personal level. Her motivations for FS were because she felt it was "*really important for children*" as a child-centered approach that "*has a lot of positive impact. . .on their development as a person.*" Within her own life, she said she felt "*disconnected*" from the natural world without a strong sense of belonging "*we spend so much more of our time with technology now than we do with the natural world*." She was indoors at work and at home, with no outdoor hobbies apart from camping holidays.

Rhino had formed a clear purpose in her role as a home educator to take the children outdoors. This was very different to the rest of her professional life as a

dance artist and educator, yet she held strong views about the impact of modern life and felt a sense of imperative due to her concerns for the future.

From these first interview findings, I became interested in re-conceptualizing the ongoing formation of identity as a way to understand the practitioners' choices. The findings contributed to the concept of *eco-social identity.* The following sections investigate what helped further *eco-social identity* formation in becoming a FS practitioner. The impacts of generational changes are considered, including multiple senses of environmental loss, then a passion for pedagogy. The findings conclude with a final revisit to the impact of training.

Generational Change

A surprising emergence in the findings was that generational change featured strongly for all the practitioners. The topic emerged from open questioning in the first interviews around reasons for training and perspectives on the FS ethos. Asking the practitioners what they valued and why they were training gave way to many feelings being expressed; including fear, anger, sadness, and passion, with an overwhelming sense of loss. These losses were felt as generational changes and manifested as a form of future shock (Toffler, 1970).

Forerunners of the Future

Theory on generational change is undervalued in research and today, Karl Mannheim's theory of generations from 1923 is still the most systematic and fully developed treatment of generations as a sociological phenomenon. According to Mannheim, generational change designates "a particular kind of identity of location, embracing related 'age groups' embedded in a historical-social process" (1952, p. 367). Mannheim theorized that people are significantly influenced by their socio-historical environment and notable events they are involved in, that predominate their youth and form social generations. The people in that generation in turn can become agents of change and give rise to events that shape future generations. On the subject of forerunners: Mannheim said (ibid.):

> It occurs very frequently that the nucleus of attitudes particular to a new generation is first evolved and practised by older people who are isolated in their own generation (forerunners), just as it is often the case that the forerunners in the development of a particular class ideology belong to a quite alien class.

Mannheim's view of forerunners suits the profile of some of the practitioners in the study. FS practice is an alternative provision and inherently challenges the culture of mainstream schools and settings. In order to identify with a professional role that is rooted in an alternative, the practitioner needs to be resilient to negotiate an

alternative position within prevailing social norms. There are socialization challenges inherent in any setting context, yet the point regarding identifying or acting as a forerunner is worth making here. For the purpose of the study, it is interesting to note which generational changes the practitioners themselves saw as significant and how they expressed this in terms of their identity, or related situated subjectivity. The changes included environmental degradation, nature-society relations, increased urban lifestyles, the experience of childhood, education, risk, and the experience of time outdoors, within an overriding theme of loss. Here follows some of the practitioners' views within a discussion on the different aspects of loss as an overarching theme.

Loss of Relations to the Natural World for Future Generations

Most practitioners perceived that the human relationship with the wider natural world has changed within their generation, lessening in importance. Such losses were tied into a fear of the future and a nostalgia for the past. They expressed fear, uncertainty, and a gloomy outlook on future possibilities, with a continuing sense of loss.

> The relationship with the natural world is about not only this generation but the generations alive now, all of them, reconnecting and learning what's important. And, you know, I think that the transformative process for them is. . . going to be a realisation through something terrible. . .or through an attempt by man like. . .geo- engineering or bio mimicry or that kind of thing? . . . we're going to get to the point now as this battle between technology and the environment. . .they're going to clash. . . and something's going to happen and its going to change the way that everyone's thought about it. (Ant)
>
> We shouldn't be selfish . . .It's a world for us all to share, and I think we should look after it for everyone. And if we destroy forests and woodlands, what will future generations have?. . .. we look at it and we say 'well that's now extinct' but then what impact does that have on other food chains? (Lion)

Moose's beliefs linked to her practice clearly as a sense of mission to bring ecological concepts into education. She located her reasoning in how generations have changed in their perception of the use of natural resources.

> After the 2nd World War everybody thought they'd fought for it and they had the right for it and actually it's this generation now and our future generations that are paying for that. . .And I'm not saying that's the only reason why because obviously its corporations. . .I've a real thing about electricity and energy at the moment. . . and the way that we just use stuff and don't even know where it comes from. Most kids don't even know where electricity is, most adults probably don't even know how electricity is made, or how much they use, how much they waste. (Moose 1)

Rhino was motivated to do the training in part by a sense of past and future loss of natural resources, a modern day eco-survivalist view concerned with the next generation.

> I always liked the idea of knowing how to actually do things in the natural world rather than being just in a completely artificial environment where it's all kind of done for you, cos I think, it's so fragile, our artificial environment. . . it seems an unsafe place to me, to not know how to do certain things out in our world, if we ever had to. I think that our modern world actually sits on a knife edge. I know, perhaps people feel quite secure in it, but I don't, I look at it and I go 'Well, so what if the oil supply wasn't allowed through so then everything like fell apart and nobody knew how to do anything anymore?'It's not actually . . . that far away, you know, it wouldn't take very long . . . the supermarket would be empty pretty fast I think. And, you know, also I think about, there's a whole environmental thing about children being so separate from it that they have no appreciation for it and not take care of the resources and then they will be gone, you know, that kind of connection. (Rhino)
>
> I think it's crucial that children understand how to value their natural spaces, how to look after them and how to be a part of them. Because they're the next generation that has to pass that on to their children and so on. . . if you don't create that sense of amazement and beauty, then it's not going to be valued and we will lose it altogether. (Salamander)

Environmental Generational Amnesia

The problem discussed in the above quotations, where each generation has an increasingly degraded environment to measure as the normal or nondegraded experience, is a psychological phenomenon that Kahn has coined as environmental generational amnesia (Kahn, 1997, 1999), or adapting to the loss of nature. To halt the pace of change in children's experiences is a motivation for these practitioners. Most expressed a wish to help children to realize the value of the environment and our interdependence with natural resources. Ant and Moose shared a motivation to use FS to enlighten participants about current environmental problems. In this way, these practitioners and other environmental educators hoped to counteract the "forest of forgetting" (Hand, 1997, p. 11) that crosses generations and to safeguard what is left. Hand's paper concerns how present day Scottish people, living in one of the most deforested countries in the world, have little conception of how at one time the whole land was covered with forest. There is an interesting crossover with the word "safeguard" here, as again care plays a role; care for both children and the rest of nature enmeshed in the same emotive frame of motivation, for childhoodnature practice. All of the practitioners in the study saw the potential for forging a deep, caring relational identity within the wider natural world, to enhance wellbeing, health, and wholeness, tied to the rubric of biophilia (Kellert & Wilson, 1993).

A romanticized view of the past can be present when people talk about how things were "when I was a child," framing childhood in previous generations as a golden age of freedom and healthy outdoor activity. Yet Kahn (2002, p. 113) believes that a romanticized view of the past is acceptable if it is engaged, showing and investigating with children how the landscape around them has changed over the generations and helping to restore it. This can counteract the effects of environmental generational amnesia and perhaps be beneficial for adults with outdoor play deprivation.

In Rhino's practice, engagement was evident in how the children expressed an urge to want to coppice the woodland, understanding the historical purpose through

learning how to coppice poles for dens and firewood. They witnessed the abandoned coppice stands rotting in the woodland they played in and Rhino followed their interest. However, Rhino did not romanticize or proselytize, simply the children found their own way to this engagement through their direct experience, growing a sense of place and finding their own place within it.

Loss in Professional and Public Life

There were other senses of loss, including the morphing of professional services. Salamander spoke about play service changes and how she identified a gap in the market for outdoor play and FS, transforming practice within an entire borough.

> We have to kind of look at other ways of generating interest and maintaining what we do. . .it's great to be outside and validate. . . what we used to do when we were playing out years and years ago. . . Play work's moved from being. . . very outdoors. . .then it kind of morphed into this kind of centre-led kind of activity, and so [FS training] is allowing me to go back to the root of it and actually why I came into the service and into playwork. So you know, for me, its kind of we've come full circle. (Salamander)

Interestingly, there is an element of history repeating itself, which can be seen theoretically as generational conflict, or a cycle where things move in and out of fashion, in opposition to the previous generation.

Loss of Childhood

"Free-range childhood" is currently in fashion in the UK, challenging social norms about children's independent mobility and outdoor time (Cree & McCree, 2013; Gill, 2011). Losses of childhood were felt keenly by the practitioners.

> We are not very good at allowing children to be children. We create children to be citizens of the future, and we don't think about the here-and-now. And if we lose the here-and-now and they don't have that awe and wonder in their childhood, and are allowed to take risks and play, and be a part of the environment and be a part of the world that they are in, then actually they lose their sense of belonging, and who they are, and so they're never going to be a well rounded adult. (Salamander)

From the child-centered perspective of the practitioners in the study, children have been constructed in different ways by society over time. The effects of their contemporary lifestyles are played out in FS, with the practitioners stating how they need to help children to "*settle in*" to the environment of a wood, as many are unaccustomed to being in such intimate relationship with the wider natural world, in particular with the freedom to choose what to do and only the loose parts afforded by the environment to play with.

> There is this culture of kids being indoors and I was one of those kids you know, I had computers and I spent a lot of time. I'm the kind of cross-over generation you know, where computers were introduced in schools. (Ant)

Loss of Time

Children's free time was perceived as lost also. Practitioners made the contrast between structured time versus natural time to be and the impact that has on wellbeing.

> Children these days. . .have so much pressure on them. (Caterpillar)
> It's all supervised now isn't it? This school, this activity Monday, that activity Tuesday, that activity Wednesday. It's all so structured and regimented, there's no free time. (Lion)
> [Society] is not built for taking the time out to be able to look. Its not built for people to come on this course. . ..very few people have that opportunity to take time to think. . ..kids at school, they don't have that time. (Ant)

Here, Moose extends the loss of free time to the routines of adults, as a psycho-emotional loss, and how this in turn structures children's lives.

> There's so much stuck feelings. . . with adults. People get stuck with stuff but they're unable to shift and they just do the same things, go to work, stay inside, watch telly etc. . .I think its the same with children especially more and more now as we're living in a world where they're doing the same, they're going to work though they call it school, they're going to work, they come home, they put the TV on, they put the computer on, they do more work, they take that work into work and they come home and put the TV on and start to cry. . .I wonder how many people actually go for a walk? But if its been part of you as a child, and you can appreciate those shifts and those moments, then you make it more of a priority in your adult life and if you do that then you're bound to be happier and maybe you don't need as much stuff. (Moose)

Loss of Local, Cultural, and Intergenerational Ways of Knowing and Appreciation

The practitioners reflected on how things have changed from our own childhoods to now, in terms of indoor culture, affluence, and technology.

> In this country we don't see hardship do we?. . . They've got too many, what we class as everyday things, but in other parts of the world they're absolute luxuries and I don't think they appreciate what they actually have. . . But they've got a Wii. . . a Playstation 3. And it's still never enough. But does it really make them happy?I don't think it does. (Lion)

The impacts of consumerism, globalization, and industrialization were keenly felt. Ant felt that "*technology has just transformed things so quickly, that, you know, I*

don't think people have had the time to catch up," stating that an indicator of this process is "*the way our food is produced now.*" He felt that, in the short term, the way society operates has changed very fast and so reconnection and education about the natural world are imperative for the present generations, "*all of them.*" Yet he believed that this will not happen until there is a greater conflict in society, an increase in the "*battle between technology and the environment,*" that will "*change the way that everyone's thought about it.*" There was also a perceived loss of knowledge in the shifts in technology.

> There is this . . . indoor culture and it's been researched and researched and stated and stated but I think it's driven by industry, it's driven by the economy. . .[We need to connect with] people who are older, to be able to pass down their experience, because essentially they're the people that didn't live with this technology and can remember. (Ant)

To summarize the impact of generational change, loss, anger, fear, and future shock featured strongly. In particular, a sense of degraded relationship with the wider natural world invoked feelings of fear, concern, and responsibility for children as the inhabitants of an uncertain future. In contrast, the sense of loss also worked as a motivating force. In the next section I discuss practitioners' passionate responses.

Passion for Pedagogy

Despite the often negative expressions of future shock and losses through generational change, such experiences and perceptions contributed to a passion for relational, child-centered pedagogy. Doing FS involves an everyday deepening of a relationship with wider nature through direct contact, for both practitioners and participants. The focus and goal of FS practice is largely the impact upon the participant, rather than the impact on the environment beyond the immediate FS site. Therefore, a social aspect of our relationship with wider nature is in the foreground. In this section, further *eco-social identity* formations and their embodied values are considered. A sense of belonging within the wider natural world was seen as important by most to share and impart to the participants. Here Caterpillar talks about fostering a deep, respectful relationship with the rest of nature on her sessions.

> I think it's so important. . .we went outside with the children and instantly we all just went 'aahhhhh'. It was peace. It was so quiet and we couldn't hear anything other than the birds up above and them just chattering about things in the wood and that was, for me, what it's all about. They're in tune, they're looking, what plants are coming up, there's buds coming up now, making things with sticks. . .and just them getting in tune with the woodland really. . .there's still that respect for the natural world, and hopefully that's part of what its about isn't it? (Caterpillar)

Caterpillar was especially passionate about biodiversity, based in part upon early experience. Ant had very different early experiences and framed his relationship

with wider nature as a re-connection that grew deeper in adulthood, leading to his choice to train.

> In my past I haven't chosen to build on that kind of connection but I was always aware that it was there. . ...I think that everyone's just got an intrinsic connection with the outdoors, whether they're aware of it and choose to build on it. (Ant)

Ant thought that reconnection was a more accurate term than connection, that we innately belong to the world: "*I think intrinsically people belong there you know, they always were there and we've evolved essentially from that place*." Salamander saw developing our relationship with the rest of nature as part of her professional role.

> I think in a professional capacity, we have a responsibility to support our children and young people to understand how we can maintain our environment, and how we can take it forward and be sustainable, in a way that they can understand it. (Salamander)

Most of the practitioners chose to train in FS based in part on some concern for the future. Moose's motivation was primarily emotional: "*I get really angry that we just use up as many resources as we want to,*" locating her reasoning in how generations have changed in their perception of the use of natural resources. Her passion was self-evident and embedded in how she viewed her place within the world.

> I feel really connected to the natural world and again, always have done. . .It's the feeling of being part of the whole. . . It's understanding how everything is connected and I feel it down my spine. . . I don't feel that there is a border and a boundary between me and an actual world. I don't feel apart from it, I feel part of it. . . which is why I'm so passionate about it. (Moose)

Moose's view was passionate, yet seven out of eight practitioners shared some of this sense of feeling part of nature. Making a choice to train in FS could be seen as an act of passionate defiance in Moose's case or as a conscious choice to improve practice for Eagle, a way of personally redressing an eco-social balance and making an impact upon the future. Connection was a recurring theme for all of the practitioners, expressed variously in terms of a loss, of a disconnection and of finding it again, of reconnection. It was also expressed as a primary motivation for why they are training in FS, in order to facilitate the opportunity for children to connect.

> That's what I think is important about FS and what its doing. . . it can be a fantastic route for people to reconnect, and that in itself is an important thing, for people to go on to understand that you know we're not, that, the outdoors isn't at our disposal, its you know, we are at its. (Ant)

This last sentence highlights the importance ascribed to a holistic view of the self by the practitioners, as in a dialogue with the rest of nature with a priority of care for the world which houses the self. FS was seen as an important agent for reconnecting to the whole, for practical, conservative reasons.

> It's generation on generation of an urban lifestyle. Actually going out to the wood is a treat, or something that you do as a past time, as leisure time, not as something that has any value attached to it. Whereas I see it as part of being, and surviving and being part of it, and the world continuing and going on. (Salamander)

From this perspective, nature-centered practice was a conscious choice as part of working with children and young people. Further reinforcing a sense of ESI was their professional purpose and motivation.

> I think it's strange, we're all very good at talking about it, but actually doing it is another thing. I think if we all made a little bit more of an effort. . .it's about being part of it and taking responsibility for it, but taking responsibility for other people as well. (Salamander)
>
> I think the major contributor factor is, not fear of being sued, but actually apathy. Of not wanting to go the extra mile to allow it to happen. And I'm hoping that we are coming back full circle now, where with things like FS..the Play Strategy, although nationally the coalition government aren't really recognising it. But, it's actually to put that kind of thing out there in the open. . .it's been out there, and people have started to talk about it, and those people that are really passionate about it will continue to take that forward, I think. (Salamander)
>
> If you're the kind of person that has the foresight to look 20 years down the line, 50 years down the line, you know its, its just imperative that people are aware of these kind of systems that are happening around them. (Ant)

Advocacy for children and eco-social justice stemmed from passion in many of the practitioners, expressing strong views on pedagogical theory and policy. A common theme was a sense of socio-emotional values. Some of their previous professional experience had contributed to a building up clear ideas of aims and what is necessary for childhood justice, with enough life experience to form considered views. Salamander emphasized the need for a cohesive partnership approach to childhood.

> . . .a whole range of professionals. . .unless they understand the real importance of that child-centred approach and children have to be free to make choices and decision-make, then we're going to have. . .children who've got no common sense, who can't make decisions. . .can't look after themselves, have no sense of safety or accountability or responsibility. And this child-centred approach enables children to make sense of the world, through their own learning, as opposed to being told how it should be. (Salamander)

Moose's politicized view on child-centered practice extended to her world view.

> And so, my allowing children to be free and child centred is the same as I think it should be for everybody. So, if I think I should be like that for adults then how can I go into a group and tell them that that's the way its supposed to be? They need to discover it for themselves. And I believe that if we give that to children, if they make their own decisions they're going to grow up doing the same thing. And if they can make their own decisions and realise that they're powerful, as powerful as the next person, then maybe they'll make those choices themselves and go 'Actually, you know what? We aren't going to teach our children like that any more'. (Moose)

The affective roots of approaches to pedagogy ran deep for some of the practitioners such as Moose. Before that in this Chapter, some of the practitioners' situated

subjectivities have been explored in the themes of, early experiences in nature, and generational change. These themes all had an influence on the practitioners prior to training, helping to form a sense of *eco-social identity.*

The Impact of Training

How did the experience of Forest School training impact upon the practitioners? The analysis found four themes of *skills and knowledge, experiential process, values*, and *support*. Of these, *support* was the most significant as a meta-theme. Practitioners mentioned support in both positive and negative senses, as present strongly within training and mostly absent within settings. During the course time, support within the group was a positive experience for all the practitioners. The affirmation of shared *values* inspired confidence and purpose as a basis of affective support. Yet many struggled to implement socio-emotional child-centered values in practice, due to social factors and disparities in values in their settings. As they began their initial sessions and coursework, many of them felt that their need for support was not met, from either the trainers or settings, raising an important question of how to best support the realities of establishing practice.

In terms of *skills and knowledge*, practical skills were helpful in terms of resources, responsibility, and autonomy. The fundamentals of tool use, woodland skills, risk assessment, and safety were cited as significant. Practical experience had a knock-on effect, a cumulative learning process that combined with the affective, creating a sense of possibility to experiment and try things out.

The combination of theoretical, affective, and *experiential* was viewed as a powerful, transformative group process (Malone, 2008; Proudman, 1995). Time on the course gave the opportunity to find support by having a chance to reflect critically on both their connection with the world and with their practice. The experience of "*simply being*" in the woods was significant. Some held a politicized perspective on how free time within wider nature affords both emotional and ecological literacy, for both the practitioners and their future participants. Could this be a model for supporting opportunities for positive SLE? Certainly the experiential format bears similarities to many of the programs studied in the SLE literature (e.g., Chawla, 1998; Wells & Lekies, 2006). Therefore, supporting practitioners is of interest as a future SLE research topic.

Using the frame of *eco-social identity*, these themes are summarized in Fig. 3, adding to the themes given as reasons for training. Together, they represent the ongoing formation of *eco-social identity* in becoming a FS practitioner.

Summary

In this Chapter, I explored why these FS practitioners chose to train and what role identity formation and SLE played in their choices. Beginning with future shock and anticipation, I explored identity formation in connection

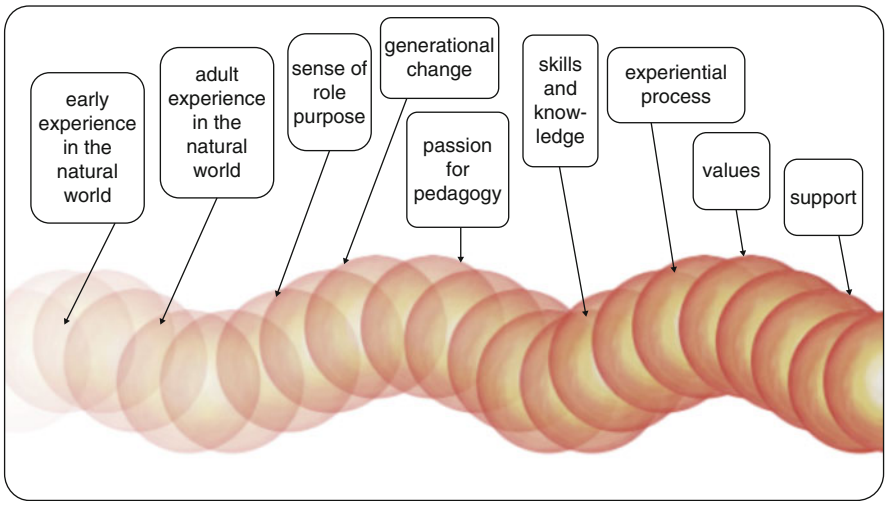

Fig. 3 Eco-social identity lifeline after training

with SLE research. I re-conceptualized *eco-social identity* as a relational framework for the situated self as part of nature. Themes of early childhood and adult experience, role purpose, generational change, environmental loss, future shock, and passion for pedagogy were discussed.

A common SLE perspective was that early experience goes on to influence adult identity. Concern for the future was unanimous, expressed positively in a desire to pass on values and skills to support children to explore their place in the world and care for it. Uncommon differences were that three practitioners stated no significant early experience but chose the training to improve pedagogical practice. *Eco-social identity* was present within their professional role purpose. Generational change preoccupied all of the practitioners, again politicizing the affective domain. Negative changes and experiences were located in a multiple sense of loss felt in themselves, their communities, and wider worlds. A sense of responsibility, anger, fear, and future shock were strong affective drivers. So too was a passion for pedagogy, in part satisfied by the FS training. More experienced practitioners had a sense of conscientization (Freire, 1970) adopting a critically reflective stance and advocating for childhood and eco-social justice. Finally a lack of support for ongoing practice often positioned practitioners at odds to the mainstream educational discourse and knowledge-power relations.

Conclusion

Having got this far, the reader has been through the forest and back again, to encounter a rich panoply of people and other beings situating themselves in the nooks and crannies where children play, telling their life stories. We have felt the

temperate changes of affect and traveled through time to nostalgic memory and dystopic future. Here in the present, I wish us to retain a sense of experimentality.

How might we critique the role SLE played in the practitioners' choices to train and consider the implications might be for childhoodnature research and practice? What authentic achievements can be offered from this study? How do we take action to strengthen the relationship of the human with the more than human? (Taylor, 2017). Can FS practice be construed as valid action? From what position can we act?

Through this study, some observations can be made about SLE research and its contribution to environmental education. Earlier in the Chapter, I explored the view found within SLE research that a caring disposition towards the wider natural world begins in early childhood experience, and those that refute this have found social justice influences later in life to be more influential (Ceaser, 2015; Howell & Allen, 2016; Stevenson et al., 2014). In the ranking of strong influences upon behavior, traditional environmental education ranked much lower down the scales (Hsu, 2009). What is also found is that for an early experience within the wider natural world to be significant in the intended SLE sense, it is necessary for it to be fun, engaging, frequent/regular (Wells & Lekies, 2006), alongside a significant other, with "opportunities to take action" (Chawla, 1999, p.21) as a "fundamental experience" (Furihata et al., 2007, p. 207). The FS approach suits this recommended type of experience.

Implications for research and practice might be to enquire as to how to support full-fat quality provision rather than tokenistic programs, in order for participants to have the chance of SLE impact intended. Connections can be explored between socio-environmental justice and FS, in particular where there are systemic barriers to practice and inequitable access (McCree, forthcoming; McCree et al., 2018). For example, if the school playing field has been turned into houses, as was the case for Lion in the study, where do the children go? If no children go unaccompanied into the woods behind the housing estate to play anymore, as with Caterpillar, what and who will support them to find spaces to play? If an urban multicultural play service closes down due to cuts, as with Salamander, how do we resist and provide alternatives?

More recent research on SLE indicates the importance of positionality, challenging privilege, and working with social justice (Ceaser, 2015; Howell & Allen, 2016). SLE research has been critiqued as prescriptive, for example, in Tanner's outmoded assumptions (1980, 1998) as to the right kind of subject, or that activists capable of saving the earth can be routinely produced via an instrumental SLE program (S. Gough, 1999; Payne, 1999). Bearing that in mind, is there potential for exploring how authentic opportunities might happen for SLE, as part of restorative, socially just FS practice? Therefore, how we support FS practitioners is of interest as a future SLE research topic.

Within the present study, negative experiences of habitat alteration, environmental losses, concerns, and fears were key motivations for the practitioners. Chawla (1998) suggests that there is an increase in negative experiences having an impact, yet Ceaser (2015) notes there remains a gap in SLE research that theorizes on this, particularly from the position of social disadvantage. Negative environmental

experiences are equally significant, or to be specific, and the positions of the people experiencing them are as significant as those having positive or privileged experiences. Can we bring an active sense of *eco-social identity* and justice to bear upon this and strengthen our resolve to act? Let's return to the idea of possible futures, of the not-yet-but-could-be, and reflect finally how the politics of hope and utopian imagination might inform our actions for childhoodnature. If we are to reduce ignorance through research, as Noel Gough suggests (2002), we might start in a small way by supporting FS training and practice with critical reflection and with underserved communities that have not yet given voice.

Ceaser (2015) theorizes on the toxic social/environmental relationships as part of the experience of marginalized power positions. All but one of the participants were women, which raises the specificities of social yet inequitable norms surrounding women's work and how this affects FS practice (Ceaser, 2015). From the position of most early years and similar FS practitioners, low status, low pay, and limited agency within one's role means that any sense of empowered professional identity comes with a challenge. One way to take action is within paid work, where one can afford to act and maintain multiple caring responsibilities and family roles, for example. The practitioners in this study expressed their criticisms of mainstream educational regimes by developing FS in their settings.

However, this very need to act within a professional setting implies a greater risk of losing jobs or challenging work relationships if actions are thwarted. And they often are, as the practitioners are not always supported by leaders and the culture within settings (Waite, 2010, 2013). FS practice that contests the status quo therefore needs further advocacy and collaborative effort to change a culture for effective practice.

This is in part how "FS Lite" happens (McCree & Cree, 2017, p. 224), where a watered-down tokenistic version of FS is landed upon in order to maintain norms within a setting. The dominant discourse has absorbed FS and altered it into "FS Lite" in many mainstream settings, rather than allowing it to change the culture of the school so that learning in natural environments becomes the norm (McCree & Cree, 2017). Yet FS remains a popular training choice and many new hopefuls return to practice with transformative aims and enthusiasm. A similar gap between philosophy and practice in environmental education was highlighted by Stevenson (1987) and in 2007; Barratt Hacking, Scott, and Barratt noted it was still present (Barratt Hacking et al. 2007). I would argue that in 2017, 30 years on, the philosophy-practice gap is even wider, as is the policy-practice gap concerning socio-environmental justice (Coote, 2015).

As Noel Gough argues (2002), research should help to reduce ignorance, and inform purpose to action by investigating our blind spots. What are we blind to already? These are questions that SLE research could ask, and not of the usual suspects. Who is involved in the topic of study but silent, who is least heard and what are their questions? That may help to reduce ignorance. It is clear from the impact of FS practitioners' experiences given in this study that losses are keenly felt, yet so is a passion for practice and this is, on the whole, a force for good. We can support this practice in collective endeavor, in particular with lesser heard voices, challenging

knowledge-power intersections that enclose and divide, to create a positive culture of childhoodnature.

Cross-References

- ▶ Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism
- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Remembering and Representing the Wonder: Using Arts-based Reflection to Connect Pre-service Early Childhood Teachers to Significant Childhoodnature Encounters and their Professional Role
- ▶ Significant Life Experiences that Connect Children with Nature: A Research Review and Applications to a Family Nature Club

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Conceptualizing Parent(ing) Childhoodnature Through Significant Life Experience

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Simone Miranda Blom

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Abstract

This Chapter explores the roles, responsibilities, conceptualizations, and practices of parenting, through the findings of a study into childhoodnature. Childhoodnature is an emerging concept within the field of environmental education that espouses there are no boundaries between childhood and nature and that even separating the words implies a binary exists. Utilizing an autoethnographic approach and founded in posthumanism and socioecological theories, this Chapter seeks to address the paucity of research that exists about parenting in environmental education and offers methodological, theoretical, and practical approaches to parenting in this context. The findings indicate that

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through adopting an honest, reflective approach and having a willingness to change, the perceived barriers to parenting childhoodnature can be reconstructed, reimagined, and reconceptualized.

Keywords
Significant life experience · Biophilia · Posthumanism · Socioecological · Autoethnography · Childhoodnature · Parenting

Introduction

A decade ago, UNESCO (2008) released a report that stated:

> Our societies urgently require new kinds of education that can help prevent further degradation of our planet, and that foster caring and responsible citizens genuinely concerned with and capable of contributing to a just and peaceful world. Second, these new kinds of education must be available to all. . .and take place in various settings, including families and communities. (p. 9)

This acknowledgment of the importance of environmental education in ecologically sustainable development has been supported by the current research in the field (see, e.g., Cutter-Mackenzie, Edwards, Moore, & Boyd, 2014) and in practice by many educators. Moreover, this statement from the UNESCO report also acknowledges the significance of the family setting in the educational environment, particularly the early childhood setting. These two aspects, environmental education and parenting within the family setting, are the focus of this Chapter.

In recognition of the role of families on children's learning about the environment, this chapter focuses on the significant life experiences (SLE) field of environmental education to highlight the importance of parenting in this context. The term SLE was coined by Tanner in 1980 who identified childhood experiences in nature as a key factor in determining environmental choices in later life. Since Tanner's seminal article, the SLE field has been the focus of many researchers (see the works of Blanchet-Cohen, 2008; Cachelin, Paisley, & Blanchard, 2009; Ceaser, 2014; Chawla, 1998a, 1999; Chawla & Cushing, 2007; Fägerstam, 2012; Finger, 1994; Gough, 1999a, b; Ji, 2011; Lewis, 2007; Palmer, Suggate, Robottom, & Hart, 1999; Sward, 1999; Wells & Lekies, 2006). The recognition of SLE is important given the current state of decline of the natural environment. Non-human nature is being altered at a rapid rate through the impacts of climate change, habitat loss, invasive species, and pollution among a myriad of other human-induced changes. Due to these changes, it has been suggested that we are now in a new geological epoch, aptly titled the Anthropocene (Crutzen & Stoermer, 2000).

The key findings of the prominent SLE research are discussed throughout this Chapter. Despite this wealth of research, there remains a serious dearth of research about parents' conceptualization of nature and their perceived role in influencing SLE for and with their children through enabling or disabling these experiences. In response to this lack of research, I conducted a study in this domain, focusing on

how SLE shaped my conception of childhoodnature from my perspective as a parent and how my SLE influenced my parenting choices.

To gain a deep understanding of the parent perspective "from the inside," the study utilized an autoethnographic methodology. This methodological approach drew on past memory data and artifacts to reflectively analyze visual research journal entries about my current perceptions of childhoodnature as a parent (Chang, 2008). The visual research journal was constructed as part of the research and is referred to in this Chapter. Through the autoethnographic research process, I gained clarity and insight into my parenting approach, and this changed and evolved during the research journey. This Chapter draws on the findings of this research against a review of the literature and seeks to offer "new kinds of education" by parenting through SLE and childhoodnature.

Conceptualizing Parenting

For the purpose of this chapter, I refer to the term "parenting" purposefully as I am only referring to my perspective as a parent and the responsibilities I see in my role as a parent. I have chosen this approach to ensure that my daughter's perspective is authentically described within this relationship. This is a different approach to that taken by O'Connor and Scott (2007), who use the phrase "parent-child" relationship to define the interaction between parent and child. The phrase "parent-child" denotes that the relationship between parent and child is bidirectional and interactive as they state that the term "parenting" denotes a one-way, top-down interaction. I acknowledge and agree with O'Connor and Scott (2007) that the relationship between parent and child is indeed bidirectional, as also described by Bronfenbrenner (1979) in his ecological systems theory. However, the term parenting more accurately describes the autoethnographic methodology undertaken in this study as I am only considering my perspective. In addition, I do not conceptualize parenting practice as restricted to biological children, although this is generally how it is used in this Chapter. I acknowledge that the parent role also refers to guardians, carers, and or the significant adult/s in a child's life.

In this Chapter I have conceptualized parenting primarily through ecological systems theory (Bronfenbrenner, 1979) that acknowledges the context that the individual, in this case my daughter, exists and lives in. This includes the family situation, the socioeconomic profile, the location, the culture, the religion, etc. The model in Fig. 1 describes the influence of the different factors on one another and is based on the work of Bronfenbrenner (1979); however his original work conceptualized and illustrated each system in a much broader context. The model used in this research (Fig. 1) was designed specifically for the context of this work and includes the influence of nature that was not described in the original model by Bronfenbrenner. The model in Fig. 1 also includes the influence of parent(ing) and education. The center circle denotes the social construct of childhood as the space that children live in and holds the ideas they operate under. The blurred lines

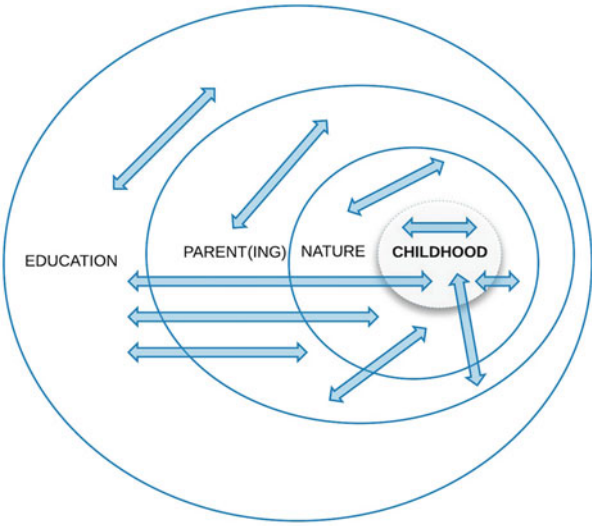

Fig. 1 Conceptualizing childhoodnature through ecological systems theory

between childhood and nature represent the fracturing of the childhoodnature binary to illustrate the boundaryless space that these concepts reside within.

The parent(ing) sphere in Fig. 1 symbolizes the bidirectional influence between the parent and the parenting approach and the childhoodnature concept. The parenting approach that I have adopted has been fluid and responsive. I have attempted not to practice a single style of parenting rigidly, but have been open to changing my approach in response to my daughter's needs. This way of parenting acknowledges and accounts for the developmental changes that occur as children progress into adolescence (O'Connor & Scott, 2007). Along with understanding the developmental changes that my daughter is progressing through, the way I respond to my daughter's behavior also acknowledges the outer influences that my daughter experiences (refer to the conceptual model Fig. 1 and also the original model by Bronfenbrenner). For instance, understanding the impact of how "being spoilt" by a relative or of someone "feeling sorry" for her may change her behavior. This awareness is significant as through understanding the impact of these external influences, it is easier to understand why she acts differently at different times. This way of understanding children and their behaviors is described through social learning theory that states "children's real-life experiences and exposures directly or indirectly shape behaviour" (O'Connor & Scott, 2007, p. 6; see also the work of social-learning theorist Bandura, 1977).

I perceive my responsibility in parenting is to not react to my daughter's behaviors and want them to change but to respond to them in a way that acknowledges that I understand *why* she is behaving in a certain way. Through this action I offer her an understanding of the impact of her behaviors on herself and those around her. I ensure I nominate the behavior as separate from her, so she does not identify with it. As parent and child, we reflect on the experience that caused the behavior. This process encourages, enables, and empowers my daughter to be aware of the

influences of the "outer world" so she can be discerning and know she has a choice about what to engage in. I respond in this way for both positive and negative behaviors and do not profess to being an expert in this practice but see it as a work in progress. This aspect is important as children "learn strategies about managing their emotions, resolving disputes and engaging with others not only from their experiences, but also from the way their own reactions were responded to" (O'Connor & Scott, 2007, p. 6). To practice this way of parenting, I accept the responsibility of modeling this approach through being aware of my own behaviors and discarding those that do not support me, my family, or my community.

I acknowledge that there are two other leading parenting theories: (1) Bowlby's (1969) attachment theory and (2) the theory of child-rearing styles developed through the work of Baumrind (1971); however neither of these theories resonated with my perceived approach to parenting. Bowlby's (1969) theory of attachment draws on the psychoanalytic perspective that attachment quality influences a child's sense of security and trust in people. Baumrind's (1971) theory considers acceptance, involvement, behavioral control, and autonomy granting as key factors that define a child-rearing style and its influence on a child's development. From a critical analysis perspective, I am not clear if my inability to see how my parenting fits neatly into these models is due to subjectivity, that is, that I am too deeply involved in my parenting to gain an outside perspective. An alternative reason is because I find these theories too rigid by definition and do not see my parenting approach as fitting neatly into any of the "boxes."

However, in my parenting practice, I have adopted the approach that my daughter is an all-knowing being. My husband and I often say "you are not 'just a little girl'; you are a person in a little body." This acknowledges and confirms her knowledge as valuable and equal and aligns most closely with the agentic child as described through the sociology of childhood theory by Sorin and Galloway (2006). Surprisingly, given the seeming changing attitudes around the conceptualization of childhood, my daughter is often still seen and treated by adults as innocent, unknowing, and incapable (Sorin & Galloway, 2006). The impact that I have observed on my daughter is that she becomes reduced: as she is treated as a "little girl" and incapable, she begins to behave in this way too.

Significant Life Experience and Parent(ing): A Scoping Review of the Literature

Within the context of SLE and I would argue outside of this field of study also, parents play a significant role in influencing and inspiring their children. This section explores some of the literature in these areas and how they have contributed to or align with my research study.

Generally speaking, SLE is a field of environmental education which seeks to identify the learning experiences that shaped "active and informed citizenry" toward nature in adulthood. Chawla (1998b) listed the major variables which define the adult environmental behaviors and attitudes that SLE is attempting to foster and

recreate as environmental sensitivity, "in-depth knowledge about issues, personal investment, knowledge of and skill in using environmental action strategies, an internal locus of control and the intention to act" (pp. 369–370). Since its conception by Tanner (1980), Chawla has contributed considerably to the SLE field of knowledge. In a study she conducted in 1985, Chawla analyzed 38 autobiographies to discover the type of intense environmental encounters that they recalled, the places that inspired these memories, and the effect that they see these memories had. Chawla (1988) reported that autobiographical authors in her study "attributed an inner sense of calm and connection to nature to profound feelings of communion with the natural world in childhood" (p. 17). The sense of connection felt with non-human nature has been attributed to positive experience in the outdoors (Chawla, 1988).

Palmer has also made substantial contributions to the SLE field through undertaking extensive international studies in association with others (see Palmer et al., 1998a, b, 1999). The findings from these studies led by Palmer, along with those from Chawla, reveal that the most important SLE are (i) having opportunities for positive experiences of, in, and with nature in childhood and (ii) the critical influence of an adult – a parent, teacher, or other family member (see Fig. 2) who inspired "environmental awareness and behaviours" (Palmer et al., 1999, p. 199).

Given these findings, there has been a severe lack of research into the SLE of parents and how they perceive these SLE as shaping their environmental choices and, also, how they view their role in being an inspiring adult for the younger generation. Furthermore, there are limited studies of parental conceptions of nature (see Kahn & Friedman, 1998; Payne, 2005, 2009) and a paucity of research analyzing how, where, and when these conceptions developed.

Parents, however, have been included in many studies in environmental education research, generally in the educational context. One such study that demonstrated some practical and tangible guidance for parents was the research by Chawla and Cushing (2007) who provided a rich analysis of socioecological agency, democracy, and competency in children and youth. Rather than the parental perspective, they looked through the educator lens, which I argue are one and

Fig. 2 The influence of a significant adult: my grandma

the same in many aspects. Their recommendations to educators regarding parental involvement were twofold: "reach out to parents to convey the importance of democratic parenting" and "encourage parents to take an active and supportive role in their child's experiences of nature and participation in community groups" (p. 16). These recommendations provided teachers with a practical way of including parents in the classroom's sociocultural values of agency, democracy, and pro-environmental behavior through personal and collective competence. The recommendations also offered parents a way to support their children to develop a connection with nature through involvement in community participatory activities and encouraging their child's contributions. The premise behind these actions being that these opportunities in nature may provide SLE for that child. Moreover, the underlying theme was to encourage an approach to learning in environmental education which involves the connections between child, teacher, and parent.

The research eliciting the contributing factors to children not having direct experience with non-human nature were found to be spending more time indoors with digital technology, time pressures of families and educators, loss of natural spaces, and parental safety concerns and fear around stranger danger, traffic, crime, pollution, and nature itself (Foster, Villanueva, Wood, Christian, & Giles-Corti, 2014; Louv, 2006; Malone & Tranter, 2003; Neumann, 2015; Palomino, Taylor, Göker, Isaacs, & Warber, 2016; Shaw, Anderson, & Barcelona, 2015; Sobel, 2008; Sweetser, Johnson, Ozdowska, & Wyeth, 2012). Shaw et al. (2015) further developed a model by Crawford and Godbey (1987) to categorize parents' perceived barriers to family participation in nature-based, outdoor experiences into three themes: intrapersonal, interpersonal, and structural constraints. For example, interpersonal barriers include parental time away from work and children's scheduling conflicts. For a more detailed explanation of these categories, see Shaw et al. (2015) or original authors Crawford and Godbey (1987). The model proposed by Shaw et al. (2015) also includes the cultural aspect of outdoor participation which was clarified to mean a system of shared values and beliefs. Without a hierarchical organizational system of constraints to parents' perceived barriers to family participation in nature-based, outdoor experiences, the influence of culture is described as an overarching theme that underpins the conceptual model.

These findings demonstrate that parents' conceptions of nature are influential in providing experiences in nature for children. This view is also shared by Payne (2006) who stated:

> Commonsense tells us that the mundane contexts of everyday home life embedded in family routines and habits, including parenting practices, life histories and functional relationships will significantly shape how the offspring, or children, respond to those educational interventions at school (or in the community) devised to increase environmental knowledge, change attitudes or modify specific behaviours. (p. 82)

In the home in situ, the research around intergenerational influences through the parent-child relationship has also looked at the reverse phenomenon: the influence of

the child on the parent in making behavior changes around the home. A recent study has confirmed that children can be the change agents, as parents of children who participated in an environmental education program were more likely to adopt sustainable practices in the home (Damerell, Howe, & Milner-Gulland, 2013). The results of my study did not draw on specific attitudes or behavior changes that occurred through intergenerational influence, but acknowledged that the entire study would not have been possible without the constant reflection and lessons that were offered by my daughter.

It is noted here that SLE research has not been without contention. Gough (1999b) posed the question which has fuelled academic debate of SLE: "Do the research activities described by SLE researchers actually explore which experiences are likely to produce environmental activists, or rather, what sorts of past experiences are particularly likely to be recalled as significant by those who have, one way or another, become environmental activists?" (p. 353). This idea was considered in my research, and I did question why many of my peers who had experienced similar SLE to me did not hold the same level of care, concern, and interest in ecological sustainability as I did. I acknowledged this critique of the field of SLE, but, given the limited scope of my research, identified that further analysis would be required to comment definitively about these concerns.

Additional to this contention has been the need to discover the most appropriate methodologies for SLE research and determining if past childhood experiences can be used to create influential experiences for children today (Blanchet-Cohen, 2008; Eilam & Trop, 2014; Gough, 1999b). This creates an issue as parents' ideas about what constitutes a SLE in nature may be vastly different to the needs of their children due to the context of the time in intergenerational differences. Criticism has also been given to the "disproportionate focus on privileged groups and positive experiences" (Ceaser, 2014, p. 205). Ceaser (2014) considered SLE and marginalized and disadvantaged groups and found that negative experiences (i.e., emotions such as fear, helplessness, and guilt) play a much greater role than positive experiences in determining environmental activism and justice in adult life, as does the embodied learning of these experiences. Similarly, Hsu (2017) found the negative experience of "losing a beloved natural place" ranked third of the eight most crucial factors for environmental action in the rural areas of Taiwan (p. 51).

This millennium has seen a new wave of SLE research, which has branched out in many ways. These include and investigate the role of personality, schooling, and community and compared the influence on behaviors with attitudes (Eilam & Trop, 2014). Research has also been conducted "on the meaning of both social disadvantages and negative environmental experiences" as motives for practical concern (Ceaser, 2014, p. 205). A study by Ceaser (2014) also highlighted the need for researchers to consider the influence of environment, society, and history on SLE (Ceaser, 2014, p. 215). Moreover, through SLE findings, it has been recognized that environmental education programs need to be assessed not only by cognitive responses but also affective responses (Cachelin, 2009; Pooley & O'Connor, 2000).

Classified separately to SLE, but also related to lived experiences, is the study of the life course path that identifies "interwoven pathways or trajectories" which

together form a life story (Wells & Lekies, 2006). Life course path demonstrates similarities to SLE, such that it builds on previous SLE findings that there is a relationship between childhood experiences and "adult attitudes among environmental professionals" (Wells & Lekies, 2006, p. 13). The findings of Wells and Lekies' (2006) study were concurrent with SLE research that childhood experiences in non-human nature link with both environmental attitudes and behaviors in adulthood (Wells & Lekies, 2006). The study by Wells and Lekies (2006) called for further research from this field specifically identifying the need for longitudinal studies that focus on "exploring people's relationships over time and during various periods of life" (Wells & Evans, 2003, p. 327). Finger (1994) used the phrase "life-world approach" to describe his research, which is fundamentally based on SLE. The findings reflect the similar trend discussed earlier that "the main factors predicting environmental behaviour, or absence thereof, are experiences in and with the environment (e.g., previous environmental activism, experiences with nature, and exposure to environmental catastrophes)" (Finger, 1994).

This section presented a scoping review of the SLE literature, drawing on parenting as a focus. The two major findings from this research named childhood experiences in non-human nature and the influence of a central adult as key determinants of lifelong attitudes and approaches to environmental behavior. The latter finding is significant as it forms the central foundation of my research: exploring the role and influence of the adult. The next section of this Chapter explores these findings through the context of a parent(ing) conceptualization of childhoodnature.

Conceptualizing Nature Through Significant Life Experience

Through my recent autoethnographic study titled Parent(ing) Childhoodnature, the extent to which SLE mediate parent(ing) with/as childhoodnature was explored (for full details of the methodology employed and theoretical framing for the study, see Blom, 2016). The theoretical perspectives of posthumanism, socioecology, and the sociology of childhood were utilized to frame the study (refer to Fig. 3). This angle allowed the distinctions between childhood and nature to be blurred to expose the possibilities that can be enabled through this process; so that there is nothing in between and nothing to separate, it is united: childhoodnature (see Fig. 1).

Prior to conducting research into an approach for parenting childhoodnature, it was necessary to gain a deep understanding of how I, as a parent, conceptualized nature. To do this, I drew on my SLE to explore the impact they had on how I related to and understood nature. What emerged was a complex and varied response to experiences with nature revealing a deeper understanding of myself as being with nature, but also as nature. The autoethnographic approach enabled this deep and reflective response to the research questions. Furthermore, it allowed the parent's perspective to be explored through intimate and in-depth research.

The findings of my research foray were not a neatly laid-out linear map as I had envisaged but a messy assemblage of current memories at times juxtaposed with

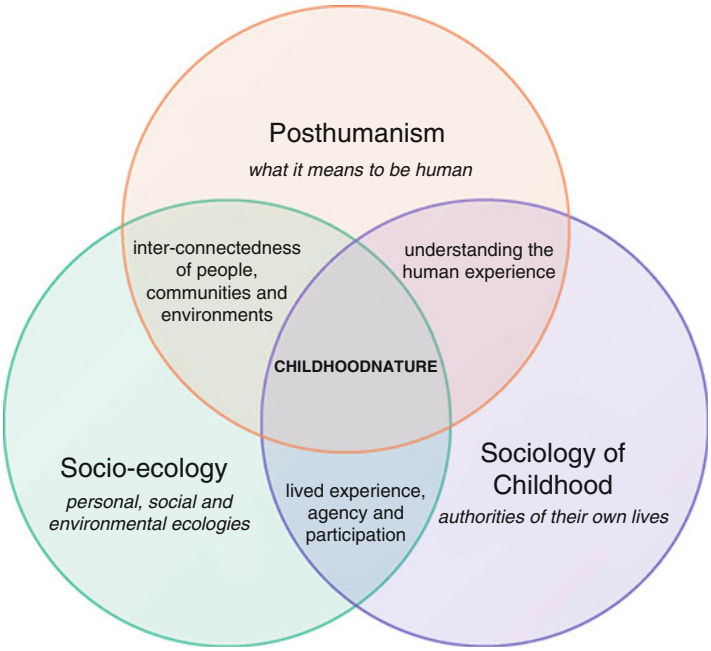

Fig. 3 A theoretical framework for childhoodnature (Blom, 2016)

artifacts from my past. The research found that to conceptualize nature, it was first necessary to develop an understanding of self through honesty, identifying values and an awareness of the images and pictures I operated under which, in effect, governed my movements. Second, the role of nature observations and interactions was identified as a key factor in conceptualizing nature.

Understanding Self

Honesty

My first purposeful foray into non-human nature as part of my research was taking a walk with my daughter in the local park. I came up against the barrier of time: experiencing the difficulty of relaxing into the pace of life on this outing. Through this experience I became aware that I needed to be deeply reflective and develop greater honesty with what I was feeling in each moment. From this walk in the park with my daughter, I was able to discover that non-human nature is much more than the scientific view of an interconnection of living and nonliving things; non-human nature offers space to support growth and development. Through the deep interconnection between human and non-human nature, nature has a knowing. It is there providing a sensory experience which I can choose to connect with and observe the wisdom that it offers. At the same time, non-human nature allows me to simply be and feel.

As a way to illustrate honesty in another context, I reflected on my relationship with tears and crying. This example was particularly relevant as I have always had a strong aversion to crying. To explore the reasons for this required honesty and identifying societal perceptions. Through my research, I drew on a past artifact in the form of a diary entry from my 14-year-old self while I was living on a school-based remote learning program. The program involved spending 8 weeks of the school year in a purpose-built village in the middle of a national park. The diary entry stated:

> After dinner [my teacher] had a chat with me and I began crying again. Why do I cry? I calmed down and walked up to the common room. After being there for five minutes, I began crying again. I kinda [sic] know what [it's] about and it's too hard to explain in the dull light of this torch. I decided to go for a walk to the gate. On the way I saw [my teacher]. He asked if I was alright? I said I was but he didn't believe me. He could tell I was unhappy inside even if I did put on a happy face. At the gate, I looked at the stars and thought about this beautiful place.

In my memory, the actual standout moment was not the tears beforehand but the blanket of stars above my head that reminded me that I was part of something much grander, more awe-inspiring. This reminded me of Carson's (1965) musings about the importance of connecting with the awe and wonder of non-human nature through the "recognition of something beyond the boundaries of human existence" (p. 88).

This reflection contributed to understanding my conceptualization of nature as I began to explore my human body as a continuation and part of non-human nature. I perceived the tears as "clearing the ground" of my body-as-nature allowing the learning moment with the stars to occur. Just as Carson (1965) shared "the Maine woods never seem so fresh and alive as in wet weather" (p. 30), through the crying process my body became "fresh and alive" in a similar way, open to the messages and offerings from non-human nature.

I questioned why I would refuse to allow myself to cry and to experience the lovely lushness in my body akin to the freshness of a rainy day. I concluded that it was due to the façade of two social norms: (1) what it looks like to be "okay" and (2) that as a woman I need to be superwoman i.e., to do everything and come out smiling. As I have grown, I have come to know that I am superwoman regardless of what I do and what it looks like. I don't have to hide behind a mask of pretense. I can be honest about what I am feeling, and this is what being brave and what being a superwoman is *really* about. Through honoring what I am feeling, I am nurturing nature: my body-as-nature.

The idea of the importance of connecting to the "senses and feelings" of the human body-as-nature is argued by Kidner (2007) who asserts that "our current reliance on cognition and our corresponding marginalization of sensing and feeling, in addition to undermining human wellbeing, may be ecologically catastrophic" (p. 123). He further explains this theory through exploring the idea of disembodiment:

> That is, by distancing ourselves from our embodied being and the world it has evolved to inhabit, and by an idealist focus on intellectual and social 'realities', so that thought is used to control and discipline the body and the feelings, intuitions and awarenesses that the body communicates", we can somehow make life bearable. (p. 138)

Furthermore, through this internalization of our individual selves into mental activity, there is danger of becoming disassociated with the physical world such that our society is "increasingly governed by its own internal dynamics and attempts to deny our ultimate dependence on natural processes" (Kidner, 2007, p. 139). These ideas align with my understanding and conceptualization that it is through connecting with our body-as-nature that we can more easily access our biophilia (Wilson, 1984) and feel the deeper sense of connection with non-human nature. Bai, Elza, Kovacs, and Romanycia (2010) support this view in the educational context by stating that education needs to bring children's attention to themselves through "being sense, being bodies, being perceptions, being feelings" (p. 36). They suggest that we are educating children away from their biophilia through a "consciousness that is busily and excessively into 'doing' and 'having', however educational" (Bai et al., 2010, p. 360).

Through adopting a critically reflective process about the social constructs I am a part of and honestly considering the influence these ideas have on my daily practices and movements, I am more easily able to let go of these strongholds of society and live more attuned to the song of nature.

Values

The idea of values emerged frequently through the data from my study, and it drew on many present-day moments and how they were rooted in past SLEs. I identified what I thought I valued in my life and then took stock of what values I live by. Ultimately our values are what we live each day not necessarily what we think they are or would like them to be (Carroll, 2012). This phenomenon has been labeled the value-action gap (see Blake, 1999). While using my values to develop and deepen my understanding of my conceptualization of nature, I resonated with something shared by Carroll (2012) about sustainability. I often feel there is an emptiness in many everyday household sustainable practices, and this was stated through Carroll's (2012) work who stated that sustainability:

> Requires far more from us than the cheap, shallow, and superficial measures commonly taken under the guise of sustainability, measures such as those in agriculture and food systems, in energy and in other ways. True sustainability requires a change in our fundamental values, it requires us to be fundamentally countercultural and revolutionary, at least to the common culture. (p. 2)

I likened this to the work of Latour (2004) who proposed that we no longer accept the value-fact divide if the collective we of nature (both human and non-human) are going to reconceptualize nature and society in a unified perspective. Through this exploration it became evident to me that I needed to let go of what I had accepted as environmentally sustainable and actions "for the environment" and radically open my awareness to the possibilities of what nature was and what a sustainable relationship with nature looked like.

This process allowed me to see how nature has and can be conceptualized such as intellectually thorough science or through a connection from within such as biologically or psychologically (see Kahn, 1997; Perrin & Benassi, 2009; Tam, 2013; Wilson, 1984). Through this analysis, I suggested that it is our biophilia that is our connection: an inner knowing that our body-is-nature and that it connects us innately with all other living and nonliving aspects of the natural world. This idea also correlates with suggestions by Payne (1997) and Kahn and Hasbach (2013) who described the nature within the human being as being the nature "in here."

I further explored my values by reflecting on past behaviors and choices that did not support or nourish me. When life became overwhelming through poor choices that did not care and nurture my body-as-nature, I was able to restore my sense of emotional, mental, and physical equilibrium through time connecting with nature: generally by going for a swim in the ocean or a walk in the forest. By reconnecting with my "biophilia," I felt myself again. I deeply appreciated the gift that nature offered through this process while at the same time the influence of significant adults, such as my grandma (Fig. 2), for sharing the magic of non-human nature with me during childhood.

Over the last decade, my relationship with nature has drastically changed. I no longer seek refuge and escape into nature as I once did. I now understand nature as *my parent* and appreciate the way nature interacts in my everyday life: from the little ant walking across my desk to the flash of a rainbow lorikeet's belly or the seemingly endless sky with clouds that appear painted on in their awe-inspiring perfection. I value and appreciate non-human nature for all of this, more so now than ever before. Nature provides a little reminder to support my biophilic connection when at times I feel like a mind in complete disconnect from the body that houses it. It is through feeling my body and remembering that it belongs to something much grander than merely the individualized self that I can be in harmony within myself and with all other living things.

The choices I make now are aligned with and respect nature more than they ever have been before. I consume less and live more within nature's cycles. Most importantly, I now understand that my body-as-nature is my and only my responsibility, and thus I treat it with the utmost care and love. I now have the intent of treating all others in this same way.

The idea that the human body and non-human nature are conceptually united has been discussed by many researchers, for example, Latour (2004), who states that through the very notion of conceptualizing and conserving nature we are separating ourselves from it. This unification is grounding of the childhoodnature philosophy that proposes that there is no distinction between the concept of childhood and the concept of nature: they have a deeply innate connection to their biophilic source. Developing an awareness of this connection and honoring this internal biophilia is something I value. I now know I no longer need to retreat in the untouched landscape to connect back to this feeling, for it is within me, my body-as-nature.

Images and Pictures

Images and pictures were the third concept presented through my data on conceptualizing nature and are founded on expectations. These expectations generally stem from societal ideals and beliefs that are so ingrained; often it is unclear that I operate under their guise. When I was in my twenties, I became acutely aware of how these images and pictures could be destructive in setting up a framework for disappointment. It was at this time in my life that I renounced many social traditions and norms such as a need for marriage, children, and getting a mortgage on a home, a car loan, and so on. I saw the detrimental effects these images and pictures had on people in my life so decided not to engage in them.

Through identifying the images and pictures I held about what I thought my relationship with non-human nature should look like, I was able to begin a process of letting these go and building a more authentic and natural relationship. Through analyzing the following diary entry from my 14-year-old self, it was clear that in my childhood and adolescence, the role that nature played in my life was simple; it was there to be appreciated, but, mainly, it was just there:

> We woke up to nice but windy morning. I felt like the tent was about to fall down or blow away. After we got up we went and sat around the gas stove. We had breakfast, it was bread and jam. The wind kept blowing sand into the food. Again it was beautiful weather, apart from the wind. The lake water was no longer fresh, it had sand and everything that had blown into it. We had to back-track along the beach. Even though we'd seen it before it was still unreal and beautiful.

The past reflections from my early adolescence are vastly different to my current memories of what that moment was like. The past reflections are devoid of what I remember now about the complexities I was experiencing as a teenager in a remote, highly socialized setting. The past reflections do not describe the depth of beauty that I felt being on that isolated, wild beach nor the impact that being in that place had on my wellbeing. These aspects are highlighted in my current memories of these moments. Through the process of contrasting this writing with my current memory of this SLE, many conclusions can be extrapolated. One is that even though I did not describe everything in detail at the time, it could be that my expression has changed as I have developed from a girl into a woman. As Muncey (2005) stated "although memory is selective and shaped, and is retold in the continuum of one's experience, this does not necessarily constitute lying" (p. 70). The differences in data representation do not deviate from their validity. Memory is an important and unique source of data (Chang, 2008). Chawla (1998a) supported this through her SLE research by advocating that memories are generally accurate around the general course of events, whether a single or repeated experience.

Another reason for the discrepancy between the two descriptions of the same event is that somewhere in the space between adolescence and early adulthood of my late teens and early twenties, I constructed more complex ideas about what non-human nature meant in my life. These were formed through observations of and interactions with non-human nature and are explored in the next section.

Nature Observations and Interactions

So far in this Chapter I have conceptualized nature through the lens of a parent and conceptualized nature *as a parent.* Nature has been shown to be inextricably linked with developing my relationship with self. This exploration is evident throughout my life path and has been a necessary part of resolving the tension I have felt in the current state of the natural environment. As reflected by Orr (2009), we need to answer the question of "who we are and what do we know of ourselves?" to get to this resolution (p.184). Through my reflective approach to understanding my connection with nature, I have observed how this conceptualization of nature has changed significantly along my life path and changed the direction of the path too through SLE. I draw on another example from my 14-year-old self on the school-based remote learning program to illustrate the influence, impact, and meaning-making of SLE from a retrospective viewpoint.

> For today I canoed with the teacher. I patiently sat in the canoe while the teacher took their photos. It was raining so hard and I just remember sitting there while everyone except me paddled off into the distance. We eventually caught up to the others. We had a bit of a yarn about the camp and stuff like that. Even though it was pouring and we were all rugged up, it was absolutely beautiful. I would never have imagined I'd be doing stuff like that. As my teacher said, "It's the time of your life."

The experience was also pertinent as through the SLE field of research it has been identified that the role of an inspiring and influential adult in developing a relationship with non-human nature is integral (see Carson, 1965; Chawla, 1998b; Hyun, 2005; Palmer et al., 1999; Young & Elliott, 2003). I refer to an excerpt from my school-based remote learning program diary (age 14):

> When I first came to this place the environment was everything around me – the forests, the village. It was a special, new place. But to me it didn't mean much – it wasn't my environment to worry about. I didn't know much about the forests – so I didn't care much. Through my time here I've learnt and thought about what's around me all the places and what they mean to me. I've become more aware about everything I do. Because nearly everything I do here will make an impact on the environment – the water I use and the rubbish I make. I'm hoping to use some of the things I've learnt when I return back to the city. Because my environment in the city is as important to me as this place.

Through reflecting on my past experiences of the school-based remote learning program, it is evident that as a collective SLE, it provided a key to my connection with both human and non-human nature. It also gave me the knowledge and skills to enable authentic agency in the practice of caring, advocating, and actioning for the natural environment. Kollmuss and Agyeman (2002) assert that direct experiences (such as seeing the impacts of logging firsthand) provide a stronger influence on environmental behaviors and attitudes than indirect experiences (e.g., learning about an environmental problem in a classroom), which focus on the dissemination of knowledge content of environmental issues. The school-based remote learning

program provided a combination of these strategies which may have contributed to the success of this approach in enabling a SLE.

While the school-based remote learning program was definitely a major shifting point in my life, there were many more SLE that continued to occur as I completed high school and moved into and through my twenties. The learnings from the school-based remote learning program held strong, and I continued to care and advocate for the environment; however, this had become problematic as I had developed a practice of caring more about non-human nature than my body-as-nature. This idea has been attributed to environmental guilt and has been experienced and observed by researchers (see, e.g., Schneider, Zaval, Weber, & Markowitz, 2017).

My next major SLE occurred in my early 30s. I was feeling exhausted by the endless inner conflict between being a citizen in a consumer-based society and being true to my environmental sustainability beliefs. I thought that there must be another way. So I retreated from my seaside residential life into what some may call "the Australian dream": my husband and I purchased a four-wheel drive and a camper trailer and went traveling around Australia with our 18-month-old daughter. After working in some remote areas and being "on the road" for 6 months, we realized that this way of living was not financially nor practically feasible or sustainable long term. We relocated and I began resolving my inner conflicts about being a part of society and living sustainably. The process I adopted to do this was to first accept that "retreating" from society did not work, and second, I let go of everything I thought sustainability was about. From the outside, I would not have looked the picture of someone who cares about the environment. But, on the inside there was resolve. I approached my environmental and sustainability actions through caring for my body-as-nature first. Only through practicing caring for my body-as-nature was I able to begin to understand what it meant to care for non-human nature. This idea was supported by Parker (as cited in Skamp, 1991) who asserted "If I am uncaring of myself, I am careless of my environment and my sister creatures" (p. 82).

I came to realize and understand that my body is made of the particles of the universe, which includes the natural world. My body can work in alignment to the rhythm of this universal order, just as is observed in nature. I am the one who knows and has control over my body, so it is my responsibility and choice to listen to and look after it in a way that respects the universality to which it belongs. Moreover, my body has a way of communicating exactly what is needed. It is my choice to remain open to listening to it, in the same way I "listen to" the nature outside of my body, non-human nature.

Parent(ing) Significant Life Experiences

I grew up in a leafy, city suburb in Australia, with only intermittent opportunities to experience wild nature. Given the profound support non-human nature provided me, I was determined to ensure my daughter had much more exposure and time in non-human nature than I did as she grew up. I was sure that I would be the significant adult in my daughter's life who would provide her with opportunities to be in wild

nature. This picture I held was just another ideal about how I thought things needed to be and what they needed to look like. Trying to live in a way that allowed my daughter to live the idealized childhood spent in non-human nature was not working financially, emotionally, or mentally for our family. I realized that to be a change agent I needed to actively engage in society and be a part of what I had always resisted and retreated from. For me, this was a major turning point in my life that could be described as an unconventional or nontraditional SLE. I started to make changes and critically reflected on some of the sustainability and "green" ways of living that I had adopted. I explored my relationship with food choices; I challenged the concept of time and I reflected deeply on the way I parented my daughter. These concepts are explored in greater depth here.

Food

Food is a sensitive topic for discussion as there are often strong emotional, social, and cultural connections with what and how much we eat. However, despite the discomfort and awkwardness that this topic might arouse, it is a necessary aspect of sustainability, environmental education, and understanding parent(ing) from the childhoodnature perspective. Moreover, food is part of caring for our body-as-nature and is in our direct locus of control. I recall personal SLE that are specifically related to food, which have also formed my beliefs about what it means to be sustainable and nurture childhoodnature.

Looking at food choices through the SLE lens, I can identify two SLE that have strongly influenced my food choices. At age 8, I ate a chicken nugget and was shocked to realize that there was a bone in it. Up until that point I had not considered deeply or acknowledged that a chicken nugget was actually from an animal. As my father was vegetarian, it was a simple transition for me to become a vegetarian in our family landscape and my parents accepted my choice. My second SLE around food choices occurred at age 31. My daughter was 2 months old and I had developed mastitis three times during this period. It was a devastating experience for the pain I experienced, the discomfort for my daughter, and the impact it had on me as a woman. At this point, I decided to stop eating gluten, dairy, and sugar to see what impact it had on my health (as I had dabbled with this way of eating in response to other health issues in the past). After changing my diet, I did not get mastitis again. I actually felt so good from eating this way that I continued, even when I had finished breast-feeding.

I continued to experiment with my diet and became aware that certain foods were causing bloating, raciness, and/or tiredness. Due to the discomfort of these side effects, I was willing to no longer eat these foods. After a few years of eating in this way, I started to hear the voice of my body through craving chicken and lamb. It was a challenging time to let go of the environmental and sustainable belief of vegetarianism that I had held onto for over 25 years, but in line with my decision to explore new ways of being sustainable, I chose to honor my body and renounced my vegetarianism. I thought my body would react to the meat and find it difficult to

digest. But it was the contrary; my body reacted well and had no side effects, except for greater vitality. This was also observed by White (2013) who found that eating meat restored her "healthy body" after a year spent as a vegetarian (p. 129).

Choosing to eat in this way has not been simple, but mainly through the social pressures I have felt and had to confront. It involved a process of letting go of what I had accepted as the social norms of what "healthy and sustainable eating" meant and being brave and trusting enough to accept that the changes I was making were the right choices for me. It gave meaning to the quote by Thoreau, "let your life be a friction against the machine" (as cited in Devall & Sessions, 1985, p. 8). The experience was reminiscent of my choice to become vegetarian at age 8 when it was much less common, especially for a "child," but the intensity at age 32 felt much stronger. Even writing this now I can see how challenging it is to accept that my body does not lie when it speaks. Even when what it says is in direct opposition to what I am being fed by society, such as the recommendations from the government. I problematized the current government nutrition and lifestyle recommendations through a collage in my visual research journal. The collage troubles the Australian healthy food pyramid and physical activity guidelines. These documents are designed to provide parents and educators with support in providing healthy food and lifestyle options for the children in their care. However, during my research process I questioned this advice considering the current "obesity epidemic' (WHO, 2000). It would seem that these promotions are not a sustainable solution for human and non-human nature. I decided to listen to the voice of my body-as-nature and for doing this, I have never felt better.

I would argue that the way I eat now is more sustainable than it has ever been – both for my body-as-nature and for non-human nature. I have become aware how nature is parenting me about how to eat and live through what I observe in animals. Animals don't worry about killing each other for food. They innately listen to their body: what and how much food their body needs without intellectualizing their diet. I propose that this could be a new approach to exploring sustainability in food choices. There is a lot of responsibility as a parent to ensure that my food choices and my relationship with food model that which I would want to see for my daughter. I see this responsibility as another reason to choose my food based on what my body tells me, as this is how I would like my daughter to develop a relationship with food: through discerning and making choices for what works for her body.

Time

Perceived lack of time is a notable barrier for parents in giving their children access to and experiences in nature along with seemingly busier lives of children, families, and society (Louv, 2006; Malone, 2007; Sandry, 2013; see also "interpersonal theme" in Shaw et al., 2015). Given that SLE research suggests that childhood experiences in nature promote future life paths into personal care and concern for the natural environment and careers in the sustainability and environmental education fields (Chawla, 1998b, 1999; Palmer et al., 1998b), it is an area that requires

attention. This concept is explored in this section through a recent SLE from my research data.

Through my research, I challenged societal conceptions of time in a way that could be practically implemented. The SLE that formed part of this process of letting go and reconceptualization of time involved observing my husband with my daughter. Through the data collection period, I observed their relationship and noted their connected, respectful, and loving care with each other in my visual research journal,

> When he is with her, he is with HER! He is not thinking about what he could be, should be, was or will be doing. He is listening to her, celebrating her, offering her his wisdom of lived experience, appreciating her wisdom and makes space in his life to do things together. It is not about what is being done, but understanding the importance of being with each other.

My husband realized that he did not have a lot of time given he was working full-time and studying part-time, so he challenged quantity by offering depth in his quality. The quality spoke volumes. I could see very clearly that connectedness was not about having to spend lots of time doing something, but was about the way that it is done: *it was about the quality and not the quantity.* The same idea applied to my husband's interaction with nature. He deeply appreciates nature in his everyday life, but does not need to retreat into non-human nature or spend a lot of time there. He honors and respects his body and treats it with great care, just as he does with non-human nature.

Through this observation, the concept of time has been fractured in its intensity. While it is obviously still an important aspect of being in society, it should not govern our thoughts and movements. Moreover, it should not be used as a reason not to engage in building relationships with each other or with non-human nature. We can appreciate the time we have without guilt or regret or wishing away life by wanting to be somewhere else. This lesson has been fundamental in reconceptualizing how I parent, particularly with the current wealth of images and ideas about what getting children back into "non-human" nature should look like. Through reconceptualizing time, I am able to practice parenting childhoodnature through the *quality* that I parent with and not on the *quantity* of time I have available. These ideas around parenting are developed in the next section.

Parenting

This section explores some of the reasons that may hinder the seemingly simple twofold actions described through SLE research of (i) providing children with opportunities to connect with non-human nature and (ii) being a role model: inspiring children through living the choices we wish to see in the world (Chawla, 1998b).

It has been suggested that a major reason that children are not given permission to play outside is the "fear factor" – the fear of stranger danger and the fear of judgment about bad parenting practices from others (Louv, 2006; Malone, 2007; Ridgers, Knowles, & Sayers, 2012; Shaw et al., 2015; Sobel, 2008). Through my research, I

explored this by reflecting on an experience in the backyard with my daughter. I was hanging out the washing while she was on the trampoline. When I had finished I went to go back inside to check the dinner. My daughter was clearly enjoying herself but hurried to put her shoes back on to come back inside with me. I asked her why she did not want to stay outside on her own and she said she was scared. The way she rushed to get off the trampoline certainly confirmed this. I pondered on this event to work out why she would have been afraid. As we do not have a television, I knew there would not have been an image or picture constructed about stranger danger from a television program. I had never told her stories about kidnapping or instances of children being lost. I realized it may have come from my movements, in the way I watched her closely. It was my own fear that my daughter felt and took on as her own. By doing this, I had created a need from my daughter. I realized that if my daughter did not need me, then what was my role as a parent and mother? Through the actions of constantly watching my daughter and making sure she was safe, I was in effect saying to her, "you need me to be okay." I know my intentions were to ensure my daughter was safe, to be a good parent, and to spend time together, but at times I know these actions conveyed an underlying message that my daughter is "vulnerable, incapable, and in need of guidance and protection" and thus a "welfare dependent" (Barratt & Barratt Hacking, 2008, p. 287). This view of children is opposed to enabling and empowering children to be the "young citizens" that they are through honoring their "strengths and competencies" and providing them with appropriate "recognition, respect and participation" (Neale as cited in Barratt & Barratt Hacking, 2008, p. 287). This required me to change my parenting perspective: from seeing my daughter as someone in need of protection to empowering her as a young citizen, not as belonging to me but as being her own being.

Part of acknowledging my daughter's independence, agency, and authority of her knowingness was to accept that she is all-knowing and that I am too. Throughout history and in education, children have often been viewed as tabula rasa or empty vessels – empty "mugs" needing to be filled by the "jugs," the wisdom of adults (see The Innocent Child in Sorin, 2005). Sorin (2005) presented an important recommendation for educators, for which I would argue is also a parental role:

> While supporting young children through the sometimes difficult transitions that they experience in early childhood, educators need to make transitions of their own, in their thinking about children and childhood, and to reconstruct their practice accordingly. (p. 19)

I see this as the honesty I bring to my self-reflective practice and my willingness to make adjustments and changes as needed to support my daughter to truly grow and develop and to allow our relationship to deepen. It has been more challenging to draw on and remind my daughter of her inner knowing since she began at school. Through observing this, I can understand why this would occur. Since starting school she has become more heavily involved in the education system than at preschool. She is now working within a system that operates on the foundation that the "students" within it are not all-knowing. The system does not support children to value or share their knowing. In effect, it is a system that is about

achieving outcomes and not about people first, which I argue it should be. This view is shared by Orr who stated that:

> The shortcomings of education reflect a deeper problem having to do with the way we define knowledge. (...) I happen to believe that our prospects depend more on the cultivation of political wisdom, moral virtue, and clear headed self-knowledge than on gadgets. In any event, it is time to ask what we need to know to live humanely, peacefully, and responsibly on the earth. (Orr, 1992, p. xi)

My husband and I continue to remind our daughter to share and act on how and what she feels and to ask questions from her inner knowing. I can see how this approach supports and empowers her in making choices and remaining in connection with her biophilia.

It is quite revelatory to know that I do not actually have to *do* anything: that my role is to inspire. I understand the practicalities of doing the things for my daughter that she is not yet able to do and therefore supporting her development in the practical sense; but I am also acutely aware of her capabilities as she grows. Children are so much more able than I regularly see them being given credit for. Knowing that I do not have do anything is not an excuse or a way out of parenting my child, but a way of reimagining what parenthood looks like. This way of parenting is about making decisions and movements through taking care with myself and connecting to my daughter as a first priority. To transition my parenting from one of need and busyness to one of connection with myself and my daughter first requires honesty and acceptance. I propose that through letting go of any beliefs, pictures, or ideals about what parenting should look like allows endless possibilities to unfold and invites a more open acceptance of the way it actually is. This applies to the childhoodnature lens. When I have held on to pictures or beliefs about what this looks like in practice with my daughter, it creates a deficit where I am always away from where I want it to be. By confirming through appreciation about what childhoodnature looks like as it is, it allows the next learning and lesson to be presented, therefore allowing a deeper understanding and practice of childhoodnature in our lives.

Conclusion

This Chapter has detailed a selection of the SLE that presented through my research that contributed to my everyday conceptions of parenting with/as nature. I view nature as a parent, offering constant guidance about how to live in harmony with human and non-human nature. I understand that my body-is-nature and speaks to me constantly. I can choose to listen and respect the universal order that my body belongs to or not. I have learned that as a human being I have this responsibility of choice, as does everyone. Through the sharing of our narratives and stories, we can learn from each other and, from our learning, discover new ways of experiencing and understanding nature in our lives.

The role of nature in my life has changed and developed over time; my SLE mark these changes. This evolution and changing relationship highlights the possibilities for reconceptualizing the human relationship with/as nature to match the evolving nature of all living things on the planet. I accept that the nature we are living with and experiencing is the result of the collective choices of humanity. Through the autoethnographic process, I have been enabled and empowered to deeply reflect on how my relationship with non-human nature has changed over my lifetime from a place of being to a place of refuge and escape to now, nature as a parent. Autoethnography has allowed my perspective as a parent to be considered from the inside, contributing rich, authentic research to this largely unexplored area of the SLE field. Throughout this inward and outward exploration of both human and non-human nature, I have reconstructed, reimagined, and reconceptualized my approach to parenting with/as nature. This research suggests that to enable and embody an approach to parenting with/as nature that any beliefs, ideals, and pictures about what parenting with/as nature should, would, or could look like needs to be deconstructed. It is then through reconsidering and redefining human relationships with honesty, values, time, food, and perceptions of being in the world that the parenting with/as nature concept can be reconstructed. Practical implementation of these concepts and research findings requires each individual to (a) take responsibility for caring for their body-as-nature and listening to their voice within: their biophilia; (b) be the living inspiration for what they would like to see in the next generation; and (c) utilize each moment with nature by being present at every opportunity and deeply appreciating the messages and wonder that is on offer. Along with the nature of research, this knowledge and understanding is dynamic and will continue to evolve and deepen along with the collective us of human and non-human nature.

Cross-References

- ▶ Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism
- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Moving Beyond Innocence: Educating Children in a Post-nature World
- ▶ Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development
- ▶ Post-critical Framing of Methodological Inquiry and Childhoodnature
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Rachel Carson's Childhood Ecological Aesthetic and the Origin of *The Sense of Wonder*
- ▶ Re-turning Childhoodnature: A Diffractive Account of the Past Tracings of Childhoodnature as a Series of Theoretical Turns
- ▶ Significant Life Experiences that Connect Children with Nature: A Research Review and Applications to a Family Nature Club
- ▶ The Nature of Childhood in Childhoodnature

► Wild Hope: The Transformative Power of Children Engaging with Nature

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Part VII

Childhoodnature Ecological Systems and Realities

Childhoodnature Ecological Systems and Realities: An Outline

43

Marianne Logan and Helen Widdop Quinton

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Abstract

Ecological systems thinking is an attractive conceptual tool for understanding the complexity of the entanglement of the biological environment (ecological systems including human social systems) with the physical environment. Attention to such interactions in light of Anthropocentric system changes, and the focus of this Handbook urges (re)exploration of ecological systems within childhoodnature. Accordingly, in this introduction to childhoodnature ecological systems and realities, we explore systems thinking and ecological systems, the interaction of humans within the systems and consider a posthuman turn for reconceptualising ecological systems thinking in childhoodnature.

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Introduction

Implicit in the childhoodnature theorizing that underpins this Handbook is the framing of children and nature as inseparable concepts (see Childhoodnature: Introduction). Accordingly, explorations of childhoodnature indicate inquiry into childhood and children with/in nature through the lens of an ecological systems conceptual framework. Our interpretation of the Earth's ecological systems is the integrated hydrological, geological, atmospheric, and biological systems that make up the entangled, dynamic, connected ecosystems of the Earth. Consideration of children and childhood as embedded within these complex ecological systems also aligns with global attention on impacts of increasing ecological disasters – environmental catastrophes due to human actions that are changing planetary systems. These widespread changes have prompted many scientists to signal a new period in the Earth's history, the Anthropocene, as a new era of lasting human impacts on a global scale (Crutzen, 2002), recognizing that human activity has changed the Earth "substantially and irreversibly" (Zalasiewicz, Williams, Steffen, & Crutzen, 2010, p. 2231). Framing childhoodnature theorizing, research, and practice through an ecological systems lens in this section of the Handbook is therefore both timely and pragmatic.

Traditionally the domain of the sciences ecological systems conceptualizing applies a systems thinking architecture to scaffold understanding about the complex interrelations between the living and nonliving elements that constitute the dynamic, emplaced, purposeful assemblage of an ecosystem. The ecosystem is the "unit" of natural planetary systems – the bounded, yet porous, collection of physical affordances of a space and the living things that thrive through interactions within this space (Capra & Luisi, 2014). Humans are one element of the many in natural ecological systems, but the view in society is predominantly one of humans as separate from natural ecosystems, highlighted in the English Oxford Living Dictionary's definition of nature: "The phenomena of the physical world collectively, including plants, animals, the landscape, and other features and products of the earth, as opposed to humans or human creations" (Oxford University Press, 2018).

Haraway's quote highlights the absurdity of this notion of the human/nature separation and the masking of our impact on Earth's ecological systems:

> No species, not even our own arrogant one pretending to be good individuals in so-called modern Western scripts, acts alone; assemblages of organic species and of abiotic actors make history, the evolutionary kind and the other kinds too. Just as other biotic and abiotic elements impact us, our actions impact Earth's biological systems (Haraway, 2015, p. 159).

Such posthuman and new materialist theorizing, which problematize human-centered perspectives, uncouples systems ecology framing from the traditional

scientific and often more anthropocentric approaches. Attending to posthuman conceptualizing in combination with ecosystem thinking opens up spaces for new ways of understanding humans with/in nature. An example of this is the transdisciplinary ecohealth theorizing and research by scholars such Parkes (2010) and Panelli (2010).

Ecological systems thinking to identify interconnected elements and influences in complex, active systems provides an attractive conceptual tool, not just in the sciences. Such thinking permeates the social sciences with human social systems as the primary focus in diverse fields such as education, business, health, and human development (e.g., "ecologies of human flourishing," Swearer & McGarry, 2011; "political ecologies," Mauro, 2009). Ecological systems framing is integrative, relational, and generative – a useful guide for theorizing our interconnected social and ecological worlds. The term socioecological has emerged in recent times to highlight this complex entwining of our natural and social worlds (Kyburz-Graber, 2013). Such socioecological systems thinking is essential in our modernity of a complex and rapidly changing world. To be able to understand our human impact on the Earth, it is important to consider the Earth as a global ecosystem but also appreciate the local "biological, physical, and social systems" and how we interrelate with, and impact these systems (Berkowitz, Ford, & Brewer, 2005, p. 236). Thus, taking a holistic "systemicity" (Wadsworth, 2010) viewpoint, where we think in terms of "relationships, connectedness and context" (Capra, 2007), is essential in conceptualizing children and childhood *as* nature.

Systems Thinking and Ecological Systems

The two main fields where system thinking originated were biology and engineering. The biological field goes back to early in the 1920s with Bertalanffy's "general systems theory" and Weiner's work in engineering in the 1940s relating to cybernetics (Sterling, 2003). Since these early works, systems thinking has moved to a holistic approach particularly in living systems which has resulted in a more participatory worldview where human impact on the Earth's ecological systems is debated and addressed (Sterling, 2003). Systems thinking requires a different way of thinking from thinking in parts to a holistic (Capra, 2007) "relational, ….systemic. . ..and. . ...connective way of thinking which is more concerned with process rather than substance, with complex dynamics rather than limited cause-effect, with pattern rather than detail" (Sterling, 2003, p. 102).

A systems architecture in ecology includes all living elements – every animal (including humans) and other organisms interrelating to create a living system. These biological systems interact with the physical systems (atmospheric, geological, and hydrological systems). These living systems are steeped in "renewal, change and transformation" (Capra, 2007, p. 12). Therefore, systems thinking requires us to think "from static state to a dynamic state, from parts to wholes" which brings different ideas, tools, and values (Sterling, 2003, p. 41).

Systems thinking has an influential ancestry in ecological science and environmental education fields. Lovelock's Gaia hypothesis (first introduced in the 1960s) poses the Earth as a living system which is capable of self-maintenance by keeping all systems in balance. Lovelock defines Gaia as:

> a complex entity involving the Earth's biosphere, atmosphere, oceans, and soil; the totality constituting a feedback or cybernetic system which seeks an optimal physical and chemical environment for life on this planet. The maintenance of relatively constant conditions by active control may be conveniently described by the term 'homoeostasis' (Lovelock, 2000).

Lovelock asked questions about how the relationship between Gaia and humans, who are part of the Gaian entity, has led to changes in the balance of this complex planetary system. These Questions are still pertinent decades later in our ecological systems querying of childhoodnature. The deep ecology movement, which also arose in the 1960s, takes a radical form of environmentalism that challenges the predominant anthropocentric paradigm of economic growth at all costs and the subsequent threat to ecological systems (Zimmerman, 2014). Rachel Carson's book, *Silent Spring* (Carson, 1962), was a catalyst for the deep ecology movement, through highlighting the long-lasting effects of human generated toxins added to the environment (e.g., Strontium 90 and DDT) – impacts that spread throughout ecosystems, including human health effects. Decades later, as we move well into the twenty-first century, and despite the identification of the human-impact geological era, the Anthropocene, humans continue to contaminate Earth's systems (Gaffey & Steffen, 2017). The mindset of humans as separated from natural systems prevails, with the Earth predominantly viewed as a resource for the benefit of humans (White, Rudy, & Gareau, 2016).

The value of systems thinking in ecological science and environmental education is not without dissent. Gough describes systems thinking as "reproducing a metaphorical treatment of nature that was initiated in the 17th Century and is reinforced by modern science and industrialisation" (Gough, 1991, p. 36). Gough criticizes systems thinking as an "unsustainable fiction" as it uses terms from mechanical or cybernetic systems such as "positive feedback versus negative feedback" (p. 37) that he warns can result in people thinking that nature can be fixed, just like a machine can be manipulated and fixed. Wolfe reflects on how some environmental researchers see systems thinking as a "post-World War II society's obsession with management, command and control apparatus, informatics reproduction, homeostasis, and the like" (Wolfe, 2010, p. 3). We recognize that there are also inherent concerns with ecological systems theorizing based on a traditional scientific paradigm that is essentially patriarchal and structurally based (Kahn, 2010). More contemporary feminist, posthuman and indigenous ways of theorizing are in tension with traditional scientific thinking that tends to be linear, analytical, measured, quantified (Capra, 2007), and human-centric. By marrying the more fluid and networked posthuman perspectives with traditional ecological systems framing of childhoodnature, our aim is to broaden the scope for exploring childhoodnature and ecological systems realities in this Handbook section. As Sterling (Sterling, 2003) highlights, mechanical systems are very different to complex living systems and so

require a different approach. He advocates that despite the criticism of systems approaches by some environmental educators, systems thinking is still a powerful way of thinking that can lead to greater understanding, particularly with regard to the underlying systemic issues that concern researchers.

In considering ecological systems, it is important to be clear what we mean by "ecological" through a focus on "ecology" and "ecosystem," despite the social sciences adoption of the term ecological to apply to human systems. Capra and Luisi's definition of ecology and ecosystem clarifies the key ideas behind the ecological systems approach that underpins the ecological systems framing of childhoodnature in this section of the Handbook:

> from the Greek *oikos* ("household") is the study of the "Earth household". More precisely it is the scientific study of the relationships between the members of the Earth Household – plants, animals, and microorganisms – and their natural environment, living and nonliving. The basic ecological unit is the ecosystem, defined as a community of different species in a particular area, interacting with its nonliving, or abiotic, environment (air, minerals, water, sunlight, etc.) and with its living, or biotic, environment (i.e., with other members of the community). The ecosystem, then, consists of a biotic community and its physical environment (Capra & Luisi, 2014, pp. 341, 342).

These definitions resonate with both the Gaia hypothesis and deep ecology discussed previously. There are also synergies with the concept of childhoodnature posed through this Handbook as children's everyday way of being and doing as/with/in nature and their "household" experiences of kith and kin. Navigating this "Earth household" necessitates ecological understandings that underpin holistic ecological systems thinking. Orr identifies the essence of this ecological literacy as "driven by the sense of wonder" and the "sheer delight in a beautiful, mysterious bountiful world" (Orr, 1992, p. 84). True ecological literacy is seen by Orr as being "radicalizing" as it makes us look at the causes of the detrimental impacts on the Earth's ecological systems not just focusing on the symptoms (p. 86). To be ecologically literate, humans/children must be aware of the organizational principles behind ecology and use these principles to guide everyday lives (Capra, 2007), in other words, use ecological systems thinking. Therefore, ecological literacy involves being able to interpret and understand the dynamic potential of ecological systems and use this knowledge to take action in our (human) lives to "maintain, restore, or improve" the state of such systems (Scholz, 2011, p. 18) and live in "partnership" with nature (Merchant, 2016). Since the issues central to the Anthropocene are "fundamentally systemic" (Sterling, 2003, p. 40), thinking in terms of systems is essential to gain a deep understanding of ourselves as nature and how the ecological emergencies of the Anthropocene are entangled with our/children's lives.

Humans in the System

The foundation of systems thinking is a holistic perspective, not just considering component parts in isolation without the fundamental interactions and process. Such

thinking is deeply complicated but, as discussed earlier, essential to gain a more realistic perspective of the workings of multifactorial, intricate systems, such as ecosystems. However, such systems conceptualizations are our constructions – conceptual tools for understanding – and as such open to interpretation (Wadsworth, 2010). As we highlighted earlier, an ecological systems lens weaves biological and social systems together. We recognize that there has been much debate about a nature-culture divide in our human mindset (see for example the mapping in White et al., 2016), with increasing interest in shifting worldviews to humans *as* nature *and* social. Taking an ecological systems approach identifies the mutual shaping influences of both natural and social factors. But the very complexity of our socio-ecological systems has meant that ecological systems scholarship can be slanted towards different interests. Ecological systems thinking as we have described earlier is defined by researchers in the full ecological sense as the interrelationship of living things with their physical environment. A popular alternative application of the ecological systems concept is Bronfenbrenner's influential social systems focused model for understanding human ways of being in the world. Originally termed an "ecology of human development" in 1979, later Bronfenbrenner referred to this as an integrated bioecological systems model (Bronfenbrenner, 1994).

Bronfenbrenner's ecological systems model has been used widely since 1979 in the fields of human development and education, particularly in the early childhood fields, and was innovative at the time in terms of encouraging respect for, and valuing children's perspectives. Despite the use of the term "ecological," in this systems model Bronfenbrenner's model does little to reflect children's interaction with, and interdependence on, other living or nonliving elements, which is at the heart of ecological systems. Instead this model relates to human-centered social systems (Davis & Elliott, this Handbook). Bronfenbrenner (1979, p. 3) describes the model as about "the evolving interaction" between the "developing person" and their external influences. Predominantly the social environment is evidenced with interaction between humans and human organizations, and the true "ecological" position of children interacting with the more-than-human world is largely missing. Bronfenbrenner's, 1979 model proposes a series of "nested structures, each inside the next, like a set of Russian dolls" (Bronfenbrenner, 1979, p. 3). The child is at the heart of this model surrounded by the *microsystem* which is the immediate influences on the child of parents, friends, schools, and neighbors. Surrounding the *microsystem* and interconnected to it are the *mesosystem* and *exosystem*. These systems may or may not include first-hand involvement by the child, but they influence the child's social development, such as relationships between friends and family, and the school and home, or the relationship between family members and the work place. Finally the *macrosystem* on the outside of these nested systems is the influence of culture, politics, and public policy. There is much interrelationship between and within these nested structures, and changes in any of these settings in society can result in changes in behavior and development of the child (Bronfenbrenner, 1979). Bronfenbrenner highlighted how comparison and analysis of his model's micro-, meso-, and exo-systems within and between different social, ethnic, or religious groups could allow researchers to systematically describe and identify the

environmental properties "of these larger social contexts" as settings for human development (Bronfenbrenner, 1979, p. 8). It is important to note that these systems were modified frequently by Bronfenbrenner throughout his life and later he added an additional system, the *chronosystem*. The *chronosystem* was to represent "change or consistency" in the life of a person (i.e., over time), which includes change in the "characteristics" of a person or the "environment" where a "person lives" (Bronfenbrenner, 1994, p. 40). An example of this change could be a change in "family structure or socio-economic status" (p. 40).

Now in the context of the Anthropocene and childhoodnature, where we acknowledge the interrelationship with the more-than-human world and how human actions have seriously impacted on all natural systems, Bronfenbrenner's model is problematic in privileging the social of our entangled socioecological systems. The lack of critical epistemologies in Bronfenbrenner's model is also problematic. Power and privilege of humans is implied through Bronfenbrenner's dominance of the social in his ecological model. Experiences of both society and ecology are not the same for all humans however – Minority western privilege influences how our socioecological living systems are experienced; inequities and injustices are evident within the human experiences of the world (White et al., 2016). When extending to experiences of all the entities of our planetary ecosystems, inequalities are very evident for the more-than-human individuals.

A Posthuman Turn for New Thinking

Emergent posthuman theorizing provides a fitting landscape for reconsidering ecological systems thinking in this childhoodnature space (Greedy Bags of Childhoodnature Theories). There are numerous interpretations of posthumanism. Wolfe (2010) suggests that posthumanism can be traced to cybernetics and systems theory from the 1940s to 1950s – the early influencers of contemporary systems thinking as discussed earlier – demonstrating the synergies between posthumanism and systems modeling. Murris (2016) describes a posthuman child as existing in "a complex (always) already entangled network of human and nonhuman forces" (p. 111). The posthuman approach problematizes human dominance over the more-than-human world and reconsiders our relationship with nonhuman others (Malone, 2018). Malone combines posthumanist and vital materialist thinking (including all matter as potential actors in the world), and this has encouraged her in her research to notice "other objects" that may be considered as "aesthetics" such as "animals, plants, buildings, earth and air" that are in fact significant components in a child's life (Malone, 2018, p. 20). The combination of posthumanist and new materialist thinking has led Malone to move away from identifying human and nonhuman bodies "as separate entities with distinct borders" to thinking of these bodies as "assemblages and interdependences" (2017, p. 21). A posthuman position disrupts our perception of humans as an individual dominant species, and it

challenges the dominant paradigm of our bodies being isolated and "fully autonomous" (Neimanis, 2017, p. 33). Neimanis uses the medium of water to illustrate human entanglement with natural ecological systems by reminding us that our bodies are two-thirds water, and this water is constantly being replaced by sweating, breathing, urinating, crying, and drinking. Water condenses, precipitates, and evaporates not only from bodies of water, but from the bodies of multiple organisms. This same water that maintains our bodies and that supports our early beginnings in the uterus connects us to these more-than-human others. Substances we ingest, for example estrogens, are eventually carried into waterways where they can have a detrimental impact on more-than-human others such as fish (Nikoleris, 2016). Just as our bodies interact via watery systems, other ecological system components such as microorganisms, air, metals, plastics, and other toxins flow through our bodies within ecological processes (Malone, 2018; Neimanis, 2017). Our organs, tissues, and cells are composed of elements from nature; essentially we are nature. Therefore, the view of nature as somewhere "out there" that children view from afar, or where, if permitted, attempt to venture into is problematic. A posthuman position opens up thinking to include humans' intimate relation to all nonhuman others (Wolfe, 2010) and complements ecological systems thinking by acknowledging the interdependence of humans with the more-than-human in the Earth's dynamic systems. A posthuman framing of ecological systems thinking is valuable thinking in times of the Anthropocene to position children within the reality of the entangled interactions of human biology, natural, and social systems.

Ecological Systems and Childhoodnature Realities

In this section of the Childhoodnature Handbook, we foreground a posthuman ecological systems lens as a powerful tool for exploring childhoodnature and enhancing children's nature interconnection research and practice. This approach is taken to disrupt the anthropocentric underpinning of socioecological systems perspectives that dominate much of the childhood development and education discourses. Recent popularity of (re)connecting children with the natural world through immersion in nature and nature pedagogies (see for example Louv, 2005, 2011) resonates more with developmental perspectives than weaving children – mind, body, and heart – into ecological systems. Therefore, this ecological systems section of the Handbook explores the realities of childhoodnature embedded within complex planetary ecological systems; problematizes ecological systems thinking in relation to children and nature; and contributes new theoretical perspectives, methodologies, and pedagogies to strengthen childhoodnature and/with/in ecological systems.

Our call for chapter submissions sought to draw from a range of theorizing, research, and practices of childhoodnature framed through ecological systems from different fields, methodologies, contexts, and perspectives (including those of children and young people). We invited authors to advance understanding of the complexity of childhoodnature within an ecological systems framing, in the light

of the magnitude of environmental change as a result of human activity. The Handbook called for inclusion of posthuman, Majority world, and cross-cultural perspectives, focusing on the view that children are nature as an integrating concept. Our hope for this section of the Handbook on childhoodnature and ecological systems was for authors to unpack some of the nuances of childhoodnature in terms of ecological thinking, ecological literacy, and ecological identification of children and young people from a range of contexts; in particular this was to be achieved, through a relational position that troubles the thinking where nature is out there and an object to be tamed rather than embracing the child's relationship with "nonhuman other" (Murris, 2016, p. 51). We anticipated authors problematizing existing ecological systems theorizing and binaries such as nature-culture, mind-body, minority/center/western-majority/periphery/nonwestern and rural-urban dichotomies. Collisions and tensions with other philosophies such as critical theory and ecofeminism, inquiry into methodologies and pedagogies related to science, nature and outdoor education, and inter/cross/transdisciplinary relationships were more possibilities for the section to generate new understandings of childhoodnature and ecological systems.

We recognize that the scope of this section of the Handbook is broad with multiple interpretations, subjectivities, entry points, and pathways in an ecological systems approach, particularly considering that our foundation concepts – childhood, nature, and ecological systems – are all constructs (please see Bryan Wee's ▶ Chap. 45, "The Nature of Childhood in Childhoodnature" in this section for an exploration of childhood and nature constructs). Author contributions to this section apply an ecological systems perspective in different ways, attending to different dimensions of ecological systems childhoodnature framing including theory-reality gaps, new imaginings of theories and practices, and narratives from across cultures and countries, including indigenous perspectives. Each chapter in this section challenges the status quo, focusing predominantly on the influences of culture, education, lived experiences, and adult determinations that shape children's development and learning of their childhoodnature. The chapter authors in this section explore ways of escaping from assumptions and entrenched ways of thinking in childhood development, nature experiences, education, health promotion, science, and outdoor education. The chapters consider the morphology of childhoodnature through an ecological systems framing in a range of global contexts, with different age foci (young children to adolescents), from historical to present-day influences, and with many focusing on practical dimensions such as pedagogical approaches, managing children's nature interactions and connecting to lived experiences of being and knowing nature. All use an ecological systems framing of childhoodnature to re-read and re-conceptualize ways of embedding children with/in natural ecological systems.

There is a convergence in many of the chapters in this section around Bronfenbrenner-influenced theorizing, research, and practices. This focus gives an indication of the deep entanglement of the human social systems with nature and how difficult it is to disengage from our human perspective. The reality is that we cannot truly divorce ourselves from our human perspective so

this inevitably must influence our inquiries, but the authors in this section of the Handbook direct attention to the tensions between the social and ecological in a systems framing of childhoodnature. Sue Elliott with Julie Davis and Bryan Wee in particular challenge assumptions about human centricity and social hegemony – Sue Elliott and Julie Davis critique and re-conceptualize Bronfenbrenner's model, while Bryan Wee includes exploration of cultural and language influences beyond Majority world perspectives. Broadening ecological systems framing of childhoodnature to diverse cultural contexts also extends to: ▶ Chap. 48, "Ara Mai He Tetekura: Māori Knowledge Systems That Enable Ecological and Sociolinguistic Survival in Aotearoa" Cross- and trans-disciplinary considerations and practicalities extend the ecological systems thinking about childhoodnature in this section with ▶ Chap. 47, ""She's Only Two": Parents and Educators as Gatekeepers of Children's Opportunities for Nature-Based Risky Play".

Each of the chapters in this section uses an ecological systems perspective in a different way. This is both the value and the danger of using a systems framing – systems conceptualizing is a tool, a device, that assists in organizing thinking and developing understanding, but as a construct it is open to interpretation. There is a survive and thrive, self-sustaining "intentionality" associated with living systems (Wadsworth, 2010) that contrasts with a purely posthuman notion of assemblages of elements, so it is not surprising that the chapter authors take a purposeful focus (e.g., early childhood education, health and wellbeing promotion, risk management, science education) for their explorations of childhoodnature through an ecological systems framing. Holistic systems thinking is challenging. There is a danger of collapsing into perpetuating fragmented and separatist human-nature thinking with single-focus systems explorations, but all chapter authors have resisted such narrowing with throughlines of posthuman and childhoodnature perspectives woven through their inquiries. This "level jumping" between focused perspectives and the whole systems perspective means the chapters in this section have opened up spaces for (re)discovering, (re)considering, and (re)imagining childhoodnature.

Conclusion: New (Posthuman) Ecological Systems Thinking in Childhoodnature

The chapters in this section illuminate possibilities and potentials for considering childhoodnature through a posthuman ecological systems framing. However, these chapters do not represent the full scope of such possibilities, rather a start in this work. Adult translations of an ecological systems approach to childhoodnature dominated this Handbook section. The agency of children and young people (adolescents) was only connected through Helen Widdop Quinton

with Ferdousi Khatun and Marianne Logan's chapters that incorporate children's voices. Expansion of a posthuman ecological systems consideration of childhoodnature in the future could include children and young people's agency and activism.

Other areas for expansion of the discussion we hope for in the future are building on Bryan Wee's consideration of power and privilege in the research, pedagogy, and language of nature, through explorations of other aspects of power and privilege such as colonialism, social and ecological justice, and gendered critiques. Inclusion of virtual and augmented realities and hybrid thinking could also advance discussion of posthuman ecological systems thinking about childhoodnature in a world of "new nature," that is, nature that has changed through human influence (Braidotti, 2013; White et al., 2016).

Coupling the established history and familiarity of ecological systems approaches with childhoodnature conceptualizing and a posthuman turn opens up ecological systems into new productive spaces for thinking and enacting different childhoodnatures suited to the Anthropocene. The multiple ecological systems subjectivities explored through the chapters in this section signal future directions in research and pedagogy for enabling vibrant childhoods as nature. Membership of Earth ecological systems is at the heart of childhoodnature. Privileging a posthuman perspective through new theorizing in educational approaches and attention to cultural and educational practices that establish childhoodnature revives ecological systems thinking as essential for enabling children and young people to become integral with the life sustaining living systems of the world.

Cross-References

- ▶ Ara Mai He Tetekura: Māori Knowledge Systems That Enable Ecological and Sociolinguistic Survival in Aotearoa
- ▶ Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism
- ▶ Challenging the Anthropocentric Approach of Science Curricula: Ecological Systems Approaches to Enabling the Convergence of Sustainability, Science, and STEM Education
- ▶ Childhoodnature: An Assemblage Adventure
- ▶ Childhoodnature Alternatives: Adolescents in India, Nepal, and Bangladesh Explore Their Nature Connectedness
- ▶ Everyday, Local, Nearby, Healthy Childhoodnature Settings as Sites for Promoting Children's Health and Well-Being
- ▶ Fostering an Ecological Worldview in Children: Rethinking Children and Nature in Early Childhood Education from a Japanese Perspective
- ▶ "She's Only Two": Parents and Educators as Gatekeepers of Children's Opportunities for Nature-Based Risky Play
- ▶ The Nature of Childhood in Childhoodnature

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Fostering an Ecological Worldview in Children: Rethinking Children and Nature in Early Childhood Education from a Japanese Perspective

44

Michiko Inoue

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Abstract

Ecological systems thinking is indispensable in order to build a sustainable society, and fostering an ecological worldview should begin from birth. However, learning about ecology in formal schooling is often superficial and insufficient. For example, in Japan, the content related to ecology appears first in the national curriculum only at the third grade (aged 8 years) of primary school, and for younger children there are no clear descriptions of ecological concepts in the national early childhood curriculum. As a result, early childhood teachers in Japan have little concern with providing opportunities for children to experience activities related to an understanding of ecology. On the other hand, early childhood education has recognized the significance of nature-based activities for young children's development since Froebel in the early nineteenth century. Early childhood education in Japan has been strongly influenced by this traditional pedagogy, and Japanese educators have practiced nature-based activities, such as gardening and caring for animals, since this time. Recently, interest in education for sustainability (EfS) has increased within early childhood education and has reemphasized the importance of nature-based learning activities. The question now asked is, "How can we distinguish nature-based activities for the purposes of EfS, which constructs an ecological worldview, from the traditional nature-based activities in early childhood education that have been in use since the nineteenth century?" To answer this question, this Chapter demonstrates through three vignettes how toddlers and young children might begin to realize the relationships between animals and the natural environment and their own connectedness to the natural world in a Japanese early childhood education and care center. The potential of learning from traditional primary industries or indigenous cultures and the importance of transforming the educator's lens in order to foster an ecological worldview about nature-based activities in early childhood are also considered.

Keywords

Ecological worldview · Early childhood · Japanese perspective

Introduction

Human population grew four-fold, and global fossil fuel consumption increased by 15 times during the 100 years of the twentieth century (Ritchie & Roser, 2017; Roser & Ortiz-Ospina, 2018). These characteristics of the Anthropocene epoch have caused numerous and complicated environmental issues (Steffen, Crutzen, & McNeill, 2007). Human society has recognized the importance of protecting our shared environment resulting in many governments having environmental policies and the development of Environmental Education (EE) in schools in some countries; many industries have listed environmental protection as their corporate social responsibility since the 1970s. For example, alerts about global warming started in the early 1970s; the international convention against climate change was concluded in 1992; many governments made management policies to reduce CO2 emissions under the Kyoto protocol (1997), and the Paris agreement (2015) will demand further policy changes in

each government; and textbooks for schools began describing global warming (e.g., Choi, Niyogi, Shepardson, & Charusombat, 2010; Koro, Nasu, & Kita, 2005). However, we are still confronted with climate change and environmental crises caused by global warming. This reality implies that existing strategies have not had enough effect in preventing the progression of environmental crises. Therefore, it is important to reflect on existing strategies and find new ways to change the world. This Chapter reflects on how the long history of existing nature-based education in Japan has lacked a focus on learning about ecology and ecological systems. I use the term "traditional nature-based activities" to describe the pedagogy for existing nature-based education such as caring for animals, gardening, and outdoor play, which have been practiced in Japanese early childhood education settings since the nineteenth century. Then this Chapter also introduces a new pedagogy for Japanese early childhood education to foster an ecological worldview, a view that is seen as indispensable to creating a sustainable society.

Fostering an Ecological Worldview

Ecology and the Anthropocene

As one of the fields in biological sciences, ecology has had a long history. The term "ecology" was first named by Haeckel, a German biologist, in 1869, and ecology became one area of biological science in the early twentieth century (Worster, 1985). In this Chapter, the terms "ecology," "ecological," "ecological systems," and "ecologist" are used in the sense of biological ecology, in contrast to discussions involving socio-ecological theory in social science or ecologism as a political ideology (e.g., Bronfenbrenner, 1979). The ecosystem concept, which was proposed by Tansley in 1935, describes living organisms and inorganic components interconnected with one another in a complicated network. The interconnected ecosystems that make up the Earth's ecosystem are not static; rather, they are dynamic, as they are always changing and moving. Human beings are also one of the components of the Earth's ecosystem. In the history of life on Earth, some organisms such as cyanobacteria radically changed the Earth's geology and ecosystems, but these changes took place over two or three billion years (Canfield, 2014). However, the speed of human-caused impacts now is extremely high – there has been no similarly rapid change evident in the Earth's history (Ceballos et al., 2015). Many scientists have termed the present world as "the Anthropocene," an epoch noted for human impact on the Earth's geology and ecosystems (Braje, 2015; Lewis & Maslin, 2015; Waters et al., 2016). In the Earth's history, there have been five mass extinctions of multiple species (Elewa, 2010), and many biologists have warned that we are now in the era of the sixth mass extinction (Kolbert, 2015). Although the causes of the past five mass extinctions are not scientifically clarified, it seems that there was a catastrophe that destroyed the environment and led to the mass extinctions (Benton, 2005). These previous mass extinctions present a warning to current human populations that a dramatic environmental change, such as we are experiencing with climate change, may be a catastrophe that could impact on the Earth's ecosystem and

therefore our human species survival (Ripple et al., 2017; Scheffer, Carptenter, Foley, Folke, & Walker, 2001).

Recently, the contemporary ecologist Schmitz (2016) describes the role of ecosystems in an ethos of sustainability: "from an ecological standpoint, sustainability means that ecosystems have the enduring capacity to be productive" (p. 4). This requires a holistic approach to ecosystem health as even nondominant species, which may not appear to have a significant role in the ecosystem, have been found to be important elements in maintaining the whole ecosystem (Schmitz, 2016). While the concept of sustainability is usually described as being equally divided into economic, social, and environmental (ecological) perspectives, the former two perspectives are impossible to achieve without ecological sustainability as our human systems would not be possible without the basis of human survival – Earth's ecosystems. Thus, it is necessary to maintain the Earth's present ecosystem (with its subsystems) and to regard this planetary ecosystem, not as a natural resource just for the human economy, but as a dynamic system for all life, including humans. As the Earth is considered a dynamic ecosystem, then humans (including children) and nature are one (childhoodnature) interrelated with all nonhuman others in the Earth's ecosystem; thus, the notion of the separation of humans and nature must be rejected. But as Schmitz highlights, "societies still tend to hold the worldview that humanly based and nature-based systems are largely independent entities" (Schmitz, 2016, p. 131). The perspective of childhoodnature where humans are recognized as nature and members of the Earth's ecosystem is not shared by everyone and is generally ignored in social or economic activities, as is illustrated in the following section which looks at ecology in education in Japan.

Learning Ecology in Education in Japan

In Japan, ecology as a subject is included in the national curriculum and ecological concepts – such as the relationship between organisms and their surrounding environment – first appear in the "science" learning area in third grade of primary schools (aged 8 years). Predator-prey relationships are included at sixth grade of primary school in Japan (aged 11 years) and students learn concepts, such as ecosystem, food chain/webs, producers, consumers, and decomposers in lower secondary school. Therefore, students of primary and lower secondary schools, which constitute the compulsory education levels in Japan, learn about those ecological concepts described in the national curriculum at age eight to fourteen. However, learning about ecosystems in Japanese schools does not seem to include the role of humans, and ecosystems are presented as static entities. As a result, even university students often report that they have never thought of humans being part of ecosystems or as one of the consumers whose lives interconnect with those of the producers and decomposers (other organisms on Earth) (Inoue, 2005). This implies that learning ecology in Japanese schools has given students superficial textbook knowledge, which does not influence their thoughts and behaviors in terms of environmental concerns. Research in EE or environmental psychology has also revealed that although people may have concern and knowledge about environmental issues,

those concerns and knowledge do not necessarily influence people's behaviors (e.g., Bamberg, 2003: Liefländer & Bogner, 2016). It seems that, for most people, environmental issues exist in a separate world and that ecosystem issues are not their problems, but rather other people's problems. In order to understand the significance of humans being part of the Earth's dynamic ecosystem and that human activities impact on this system, it is important to develop an ecological worldview.

Ecological Worldview

The concept "worldview" emerged in German philosophy in the nineteenth century, and since then, it has been given various meanings; therefore, this concept is often complicated and confusing. Worldview in this Chapter reflects the simple and standard dictionary meaning, that is, "conception of the world," which has been described as a holistic framework of both cognitive and noncognitive factors such as knowledge, beliefs, values, and emotions (Koltko-Rivera, 2004; Naugle, 2002). As worldviews are constructed through the influence of cognitive and non-cognitive factors, a person's worldview can be developed through life and so is individually and culturally acquired. An ecological worldview has been described in some literature as referring to environmentally responsible behaviors (e.g., Blaikie, 1992). For the purpose of this Chapter, however, an ecological worldview is simply defined as a worldview based on ecology, which regards human beings as one component of the Earth's ecosystem. This approach is aligned with that of Goldsmith (1988) and Krebs (2008); Krebs is a contemporary ecologist, who uses the phrase ecological worldview in contrast to an "economic worldview." People watch, explain, and interact with the world based on their worldview. An ecological worldview is, therefore, more than knowledge of ecological concepts or love of nature; it is a way of being in the world. We can find examples of an ecological worldview in many indigenous societies such as the Aboriginal Australians and the First Nations in Canada. Traditionally, the lives of indigenous people in many countries were guided by their ecological worldviews (Breidlid, 2012; Pierotti, 2012). These indigenous ecological worldviews, including traditional indigenous knowledge, have been transmitted from generation to generation by informal education in the community (Berkes, Colding, & Folke, 2000). Therefore, a philosophy of ecology as the basis of life was embedded in all aspects of their everyday lives. How then might people who live in the contemporary urbanized world develop their ecological worldviews?

Fostering an Ecological Worldview for Sustainability

Why Should Education for Sustainability Start in Early Childhood?

The rapid economic growth after the Second World War changed the local ecosystems and created many environmental issues in developed countries (Meadows, Meadows, Randers, & Behrens, 1972). Subsequently, those environmental issues,

such as climate change caused by global warming, desertification, and ozone depletion, have become more widespread globally (Meadows, Randers, & Meadows, 2012). In the 1970s people began to be aware of the relationship between human activity and changes in the environment (e.g., United Nations Conference on the Human Environment, 1972), and it was then that EE was first recognized. In the early 1980s, the concept "Sustainable Development (SD)" was articulated (International Union for Conservation of Nature and Natural Resources [IUCN], 1980), and in the 2000s, Education for Sustainable Development (ESD) was internationally recognized after the Johannesburg Summit in 2002 (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2014). As a result, the United Nations launched the United Nations Decade of Education for Sustainable Development (UNDESD) initiative from 2005 to 2014. Extending on this history, Education for Sustainability (EfS) emerged as an important educational theme in the twenty-first century for building a sustainable society, although the background history and relationship among these concepts are complicated and confusing (e.g., Bonnett, 2002; Fien & Tilbury, 2002; Hopkins & McKeown, 2002). EE emerged in the 1970s, and academic research has been conducted since then; however, early childhood EE research literature emerged later, firstly led by Wilson in the United States and then by Davis and Elliott in Australia (Davis, 2009; New South Wales Environmental Protection Agency [NSWEPA], 2003). In the 2010s, research concerning early childhood EfS/ESD increased (Cutter-Mackenzie, Edwards, Moore, & Boyd, 2014; Davis & Elliott, 2014; Huggins & Evans, 2017; Siraj-Blatchford, Mogharreban, & Park, 2016).

Recent research on infants' and young children's development strongly supports starting EE/ESD/EfS in early childhood (Samuelsson, 2011). Soon after birth, infants show sympathy with other humans, and this emotion develops through further experiences in human relationships (e.g., Eisenberg, Spinrad, & Sadovsky, 2006; Gopnik, 2010; Spinrad et al., 1999). Even new-borns are distressed after another infant begins to cry (Dondi, Simion, & Caltran, 1999). Then, after sympathy, empathy develops. The development of empathy could influence a sense of social justice in the future (Hoffman, 2001). Sympathy and empathy seem to be inherent characteristics of human beings gained by evolutionary process (Boehm, 2012); however, these emotions need to be fostered and developed through experiences. Sympathy can influence children's prosocial behavior (Malti, Gummerum, Keller, & Buchmann, 2009). A longitudinal study by Eisenberg et al. (1999) reveals that the emergence of a prosocial personality in early childhood is consistent over time. If sympathy with nonhuman nature (animals, plants, and other organisms) is fostered in early childhood, it may be possible to develop empathy toward nonhuman others, which then evolves into a sense of social justice with environmental matters. Many studies report that nature-based experiences in childhood correlate with future environmental behaviors and thinking (e.g. Chawla, 1998; Hosaka, Sugimoto, & Numata, 2017; Prévot, Clayton, & Mathevet, 2016).

To further reinforce the importance of sustainability/ecological learning in early years education, especially after the United Nations Convention on the Rights of the

Child (1989), young children are increasingly regarded as active agents with a right to participate in society and in matters of concern to them. Even young children have many opportunities to recognize environmental issues and their causes – recent research in EfS for young children has shown high interest in this agentic perspective with studies revealing that even young children can act to promote sustainability (Davis, 2008, 2014; Mackey, 2012). Promoting sustainability in early childhood education includes children's active participation and also critical thinking (Somerville & Williams, 2015). However, I contend that people who critically think and actively participate in the world based purely on an "economic worldview" may not be able to comprehend the true meaning of sustainability. People with an "economic worldview" regard the Earth as a natural resource just for human use and give priority to economic growth. An economic worldview approach may include critical thinking and active participation regarding protection of natural resources, but this is primarily for the purpose of economic use, for sustainable economic growth. Such economic sustainability thinking and participation appear to be appropriate for EE/EfS at first glance. Critical thinking and active participation are important for EE/EfS indeed; however, these views should be fostered based on an ecological worldview, not on an economic worldview, to build a sustainable human society.

Furthermore, it is recommended to start education for social justice as early as possible because children already have biases by the age of two (e.g., gender, ethnicity, and disability), and it is more difficult to change these biases after children reach their teens (Bussey & Bandura, 1999; Sparks, 1994). Many studies have revealed the existence of social stereotyping and prejudice by the age of four (Brown & Bigler, 2005), and salient social groups seems to influence children's developmental processes (Bigler & Liben, 2006). At age five, children in different cultures already show different prosocial behaviors and emotional reactions to the same experimental situation (Trommsdorff, Friedlmeier, & Mayer, 2007). These studies imply that even a toddler has already been influenced by the values of people, community, and society that surround her/him. This is also explained by Bronfenbrenner's child development theory (Bronfenbrenner, 1979), which focuses on the influences of quality and context of the child's environment. Social biases are developed by various factors in multiple levels, such as families, peers, or teachers (Bronfenbrenner's "microsystem"), the social media ("exosystem"), and cultural values ("macrosystem"). The fact that a child can be affected by the social values of their surrounding social environment at an early age could also apply to biases towards positioning children and nature. These biases could include children being considered as separate to or superior to nature and to natural systems, in contrast to the childhoodnature perspective where children and nature are inseparable, hence the importance of education for social justice in the early years.

Incorporating these ideas from the research relating to the importance of sustainability/ecological learning in the early years, I propose four key concepts to reshape early childhood EfS:

1. Critical thinking
2. Children's active participation

3. An ecological worldview
4. Empathy with (nonhuman) nature (Inoue, 2014a)

The latter two concepts are the focus of this Chapter. They are not widely recognized as important issues within early childhood education research, although they are supported in the general EE research literature over the last few decades (Gough, 2013; Palmer, 2002). Combining an ecological worldview and empathy with nature concepts, with established early childhood education approaches of critical thinking and children's active participation, creates possibilities for fostering young children's interconnections with nature.

How to Foster an Ecological Worldview from Early Childhood

As has been shown, learning ecology is indispensable for EE/EfS because human beings are a part of the Earth's ecosystem and cannot survive outside of it. In Japan we have much knowledge of ecology today, from school education and various media sources, however, this knowledge is separated from our own social and economic lives. It is argued that this human–nature divide can promote a view that ecological matters are not our problem; instead, these are considered the natural world's problems and exist outside the sphere of human lives. Such a view will prevent the creation of a sustainable society because it is not holistic or systemic and is in contrast to the childhoodnature concept. As noted earlier, indigenous worldviews are often described as "ecological" so it follows that learning from indigenous cultures can potentially nurture an ecological worldview. Indigenous ecological worldviews have traditionally been fostered through informal education in the community and embedded in all phases of social and economic lives. Sometimes, cultural resources such as ceremonies, rituals, stories, myth, legends, and songs have taken key roles in the development of the ecological worldviews (Cajete, 1993). Although it is difficult to apply indigenous informal education pedagogy into nonindigenous formal education due to dissimilarities in various aspects such as cultural backgrounds, values, and beliefs between them, there are examples of the application of indigenous perspectives among kindergarten teachers in New Zealand and Australia. National curricula in New Zealand and Australia require indigenous perspectives to be included in early childhood education (Department of Education, Employment and Workplace Relations [DEEWR], 2009; Ministry of Education, New Zealand, 1996, 2017), and early childhood services in both countries have started to incorporate indigenous cultural materials and provide opportunities to experience cultural events. Some centers have applied more holistic and whole-center approaches beyond just displaying materials or experiencing sporadic events (Duhn & Ritchie, 2014; Lee, 2012; Ritchie, Duhn, Rau, & Craw, 2010). In this way the teachers cooperate with indigenous people in local communities in order to incorporate resources such as traditional knowledge, stories, and legends. As a result, local indigenous practices and ecological worldviews, such as respect for the land, have started to influence early childhood practice including

activities for sustainability (Jacobs, Bursill, Lee, & Morgan, 2013); this has the potential to contribute to the development of children's ecological worldviews.

Nevertheless, there is evidence that many countries have lost or are at risk of losing their indigenous cultures with the disappearance of informal indigenous education in today's urbanized world (Johansen, 2003; United Nations, 2009). For example, in Japan the indigenous group of people, the Ainu, have lived for a long time in Hokkaido, a northern island of Japan. The Ainu people have been persecuted especially after the nineteenth century, and the Japanese national curriculum has not described the Ainu culture positively or included Ainu traditional knowledge; therefore, learning about the Ainu culture and ways of being is not promoted, especially outside Hokkaido (Ueno, 2014). As an alternative to learning directly from indigenous cultures, especially where such cultures are declining or absent from the local community, I propose learning from traditional primary industries. Primary industries are part of the economy and they have also contributed to the onset of the Anthropocene. However, traditional primary industries were conducted in more sustainable ways than modern ones. For example, in the last two decades, Japanese stakeholders for sustainability have been concerned with a Japanese term, "Satoyama," which was first used in the eighteenth century and is defined as "secondary woodland and grassland adjacent to human settlements" (Takeuchi, Brown, Washitani, Tsunekawa, & Yokohari, 2003, preface), "traditional forest and agricultural landscape" (Kobori & Primack, 2003, p. 307), or "a mosaic of ecosystems including wetlands, grasslands, woodlands, farmlands, paddy fields, and settlements" (Cetinkaya, 2009, p. 28). In the past, Japanese people who engaged in traditional primary industries had to maintain "Satoyama" (local woodlands and grasslands) to sustain their industries; therefore, "Satoyama" not only provided a variety of natural products for human living but also preserved rich biodiversity. In the process of maintaining "Satoyama," Japanese people had abundant knowledge about the natural world and how to live with the rest of nature. These traditional primary industries are completely different from modern ones which are dependent on fossil fuels and artificial chemicals; therefore, traditional primary industries can provide a resource to learn about sustainable living. Although "Satoyama" symbolizes a traditional Japanese way of living based on sustainable primary industries, including agriculture, fishery, and forestry, we can still find similar traditional, ecologically sustainable, ways of living elsewhere (Bélair, Ichikawa, Wong, & Mulongoy, 2010). For example, Garavito-Bermúdez and Lundholm (2017) reported Swedish traditional fishers had stronger place attachment and showed deeper understanding of ecosystem structure and dynamics than nontraditional ones. As an agriculture-based society for over 2000 years, especially rice farming, Japan has many kinds of traditional ceremonies, stories, songs, and folk arts that are specific to each district. These practices often express the human-nature interconnection, which has been transmitted through traditional informal education in the community. Although many traditional practices have been lost with the urbanization and globalization of the twentieth and twenty-first centuries, our food is still produced by primary industries that are informed by understandings of the natural world and some of traditional knowledge and cultural resources still exist. Therefore,

rediscovering and experiencing traditional primary industries could help promote childhoodnature and foster an ecological worldview.

As I have shown, in order to develop an ecological worldview, children need to understand the concept of ecosystems and how society, economy, and the natural environment are interdependent. However, in modern, urban life in Japan, young children tend to learn from their families about consumer society by going to the shops for food and other necessities; I argue that these experiences foster an economic, not an ecological, worldview. Anecdotal evidence from Japanese early childhood educators suggests that many young children in their care believe their food originates in shops and supermarkets. Similar misconceptions about the origins of food have been identified internationally (e.g., British Nutrition Foundation, 2013; Purvis, 2011). Experience of a modern economy results in a lack of awareness about the fundamental role of the Earth's geological, hydrological, and biological systems in food production. Components of food production include: soils, rain, water, sunlight, air, pollinating insects, invisible soil biota, energy (often from fossil fuels) for machinery and transportation, and human labor. These processes can be called shadow processes because the processes exist in reality, but the people who buy food at the shops may have no awareness of them (Vileisis, 2010). I argue that it would be helpful to experience traditional primary industries and think about these shadow processes in modernized life in order to promote an ecological worldview. The questions then follow: Does early childhood education recognize the importance of fostering an ecological worldview? Does early childhood education provide children's activities, such as experiencing primary industries, which could lead to an awareness of the ecological systems relating to food production? In the next section, I reflect on activities in the existing Japanese education framework relating to traditional nature-based activities.

Children and Nature in Early Childhood Education in Japan

Nature-Based Activities in the History of Early Childhood Education

The pedagogy of early childhood education has a long history of recognizing the significance of traditional nature-based activities. For example, Comenius, in the seventeenth century, believed young children learned about the natural world through their five senses (Comenius, 1962). Froebel, in the nineteenth century, from the Christian perspective, regarded nature-based activities as important because they lead children to understand how and why God made the world for human beings, "the natural world is the presence of direct achievement by God, the first revelation of God" (Froebel, 1972, p. 127). He thought young children become aware of God's revelation by caring for plants in their own gardens in the kindergarten and that such awareness produces the understanding of themselves as created by God. Therefore, nature-based activities were prioritized in Froebel's pedagogy. Montessori, in the early twentieth century, also regarded caring for animals and gardening as benefitting the development of young children (Montessori, 1971).

Centre-based early childhood education emerged in Europe in the nineteenth century, such as the first infant school established by Owen in 1816 in New Lanark, Scotland, and the first kindergarten by Froebel in 1837 in Bad Blankenburg, Germany. This movement spread worldwide with center-based early childhood education being established in many countries. In particular, Froebel's pedagogy influenced these movements. In Japan, early childhood pedagogy was imported from European countries after the Meiji government achieved power in 1868, and the first public kindergarten was established in 1876 as an attached school of Tokyo Women's Teachers College in Tokyo, Japan (the present Ochanomizu Women's University) (National Institute for Educational Policy Research, 2009; Phillips & Schweisfurth, 2014). Japanese early childhood education was explicitly based on Froebel's pedagogy in the early days; therefore, the first Japanese kindergartens used Froebel "gifts" (set of play materials) and created children's gardens in the playground. In 1881, the regulations for the first Japanese kindergarten noted that "outdoor play was most important for young children" and "playgrounds should have trees, flowers, fish, and birds for children's observation and joyful activities" (Ministry of Education, Japan, 1979, p. 59). The first Japanese national law for kindergartens (the Kindergarten Law) was amended in 1926 to include five learning areas, one of which was "observation" with the requirement that young children should observe their surrounding environment. Since this law was enacted, every following guideline for early childhood education in Japan has emphasized the significance of traditional nature-based activities (Inoue, 2000).

Early childhood education in Japan has had a dual system since the nineteenth century: nursery centers for children of working mothers aged from birth to 5 years old, and kindergartens for children aged 3–5 years as part of the formal school system. In 2006, the Japanese government started a new type of early childhood service called "Centres for Early Childhood Education and Care (CECEC)." Thus, at present, there are three kinds of early childhood services under three different national guidelines; however, the early educational curriculum is aligned in these three sets of guidelines. All kindergartens are legally required to have their own outdoor playgrounds, and over 90% of all registered nursery centers and CECEC also have outdoor playgrounds. Then, this poses the question do Japanese early childhood teachers practice traditional nature-based activities as established under the national curriculum guidelines?

In 1925, the Japanese Ministry of Education conducted a nationwide survey of kindergartens, which revealed that kindergarten children usually experienced gardening, caring for animals, and excursions to nature spaces in the community. After the Kindergarten Law in 1926, gardening and caring for animals were practiced more frequently (Kurahashi & Shinjyo, 1980). These traditional nature-based activities are still practiced in Japanese early childhood services. For example, I conducted surveys on practices related to traditional nature-based activities in kindergartens and nursery centers three times in 1997, 2004, and 2013. In all the surveys, teachers frequently practiced traditional nature-based activities such as gardening, caring for animals, and outdoor play (Inoue, 2002, 2017; Inoue & Muto, 2006). Thus, Japanese early childhood teachers have understood and been

following the national guidelines, and they have continued to practice traditional nature-based activities since the nineteenth century.

Traditional nature-based activities in early childhood education are recognized as important in not only Japan but also other countries. The surveys conducted in Australia and Korea by applying the same survey questions between 2012 and 2014 revealed that traditional nature-based activities such as gardening and caring for animals were also well practiced in Australia and Korea (Inoue, O'Gorman, & Davis, 2016; Ji, Huh, Baik, & Chung, 2015). Overall, this is to be expected because, as mentioned earlier, the early childhood education systems and pedagogies in each of these countries were constructed on the theories and practices of pioneers such as Froebel, although there were also influences based on their own cultures and histories. Early childhood centers across the globe have their own playgrounds often with flowers and trees, although the size and quality may vary. Furthermore, these spaces sometimes provide young children with opportunities of traditional nature-based activities.

Significance of Traditional Nature-Based Activities in Early Childhood Education

How, then, has the significance of the traditional nature-based activities been conceived throughout the history of Japanese early childhood education? Have they included any reference to ecology, systems thinking, or ecological worldviews? In 1904, the curriculum of one public kindergarten described that gardening and caring for animals fosters awareness of natural laws, instills love, and concern for the natural world and contributes to children's physical and mental development, whereas outdoor excursions can develop a sense of beauty (Ministry of Education, Japan, 1979). After the Second World War, the Ministry of Education published *Nursing Guideline* in 1948, which listed 12 categories of preferable activities for young children. One of the categories was "Observation of the natural world"; it was noted that gardening, such as cultivating soils, planting seeds, and watering plants, could develop the love of plants and observation of nature and deepen children's concern for nature. Such ways of emphasizing the significance of traditional nature-based activities are embedded in the latest national guidelines. *The Course of study for Kindergarten* (the national curriculum for kindergarten) includes five learning areas, and the descriptions referring to nature (emphasized in bold letters by the author) appear in four learning areas (Table 1).

This commitment to traditional nature-based activities aligns with the statements that early theorists and practitioners used in early childhood education, together with more recent research and advocacy. For example, Louv (2006) and Sobel (2008) describe nature experiences as significant for various aspects of child development such as physical and mental health, creativity, concentration, imagination, or environmental stewardship, while Harlan and Rivkin (2010) demonstrate that nature-based learning is necessary for foundational science education. Furthermore, in

Table 1 Descriptions about nature learning in the Japanese national curriculum for kindergarten (Ministry of Education, Culture, Sports, Science and Technology, 1998, 2008, 2017)

Learning areas	Descriptions
Health	Children should be encouraged to expand their interest in and curiosity about the outdoors, given the fact that free physical activity and play in a natural environment stimulates **the development of bodily functions**
Human relationship	In the learning area of "'Human Relationship," teachers are recommended to encourage children to **develop rich emotions** through close contact with surrounding nature, animals, and plant life
Environment	Teachers should devise processes whereby children can deepen their relationship with nature, given that the foundation for **rich emotions, curiosity, the ability to think, and expressiveness** is cultivated through direct contact with the grandeur, beauty, and wonder of nature, something which is very important to experience during early childhood This should be done in such a way that these various relationships enable children to foster **a sense of attachment and awe toward these things, as well as a respect for life, a spirit of social responsibility, and an inquisitive mind**
Expression	Children's **rich feelings should be fostered** through encounters with beautiful, excellent, and moving things during deep interaction with nature and their surrounding environment

Japan, there is a view that outdoor play contributes to young children's physical development (Sugihara et al., 2010; Sugihara, Kondo, Mori, & Yosida, 2006). Ogata, Shimada, and Seki (2013) report that the scores of physical skills were higher than the nation-wide average in children who attended a Japanese forest kindergarten. In environmental psychology, many studies have reported that nature spaces influence human physiological and psychological conditions (e.g., Alcock, White, Wheeler, Fleming, & Depledge, 2013; Mitchell & Popham, 2008; Park et al., 2007; Pretty, Peacock, Sellens, & Griffin, 2005; Ulrich, 1984). While most of the latter studies targeted adults, the evidence suggests that engaging activities in nature spaces also influence children's mental and physiological health positively. In a review of studies about the relationship between children and animals from the perspective of developmental psychology, Melson (2005) reported that caring for animals has a positive impact on children's mental health and their development of emotions and responsibility. Recent research on nature-assisted therapy and its contributions to public health provides further evidence for the benefits of nature-based activities (Logan, 2016; Selhub & Logan, 2014; Song, Ikei, & Miyazaki, 2016). However, when we reflect on the significance of traditional nature-based activities practiced in the long history of early childhood education and the more recent evidence-based research, we cannot find clear descriptions that relate to ecology, systems thinking, or ecological worldviews. Traditional nature-based activities tend to present a more instrumental view of people and nature interactions. Has the recent inclusion of EE/EfS/ESD into the educational setting, shifted nature-based activities in early childhood education to a focus on developing an ecological worldview?

Nature-Based Activities in Early Childhood Education for Sustainability

In the relatively short research history of early childhood EE, nature-based activities have also been recognized as appropriate practices. For example, one of Wilson's early works about early childhood EE entitled "*Fostering a sense of wonder at the early childhood level*" describes the importance of playing in outdoor nature spaces using the five senses (Wilson, 1993). *The Early Childhood Environmental Education Programs: Guidelines for Excellence* also identifies that "personal perceptions, attitudes, and connections with nature are the key goals at this [early] stage" (North American Environmental Education Association [NAAEE], 2016, p. 3). Furthermore, in Japan, the official *Teacher's handbook for environmental education* for kindergartens and primary schools describes similar content and goals (National Institute for Educational Policy Research, 2014). As a result of such learning, does playing in outdoor nature spaces, caring for animals, or gardening foster a sense of wonder and empathy with nature? Furthermore, does or can it contribute to building a sustainable society? Carson (1998) and Cobb (1993), seminal thinkers about the relationship between childhood and nature, describe the value of having a sense of wonder about the natural world, but they do not explain how this links to pro-environmental behaviors; behavior urgently needed now to address our environmental disasters. More contemporary EE, EfS, and ESD activities are targeted towards such behaviors.

For EfS or ESD, as an evolved version of EE, nature-based activities in early childhood education have been recommended. For example, OMEP (World Organisation for Early Childhood Education and Care) created an Environmental Rating Scale for Sustainable Development in Early Childhood (ERS-SDEC). To gain a "good" rating in the environmental sustainability section requires that "many resources are available including animals and plants in the setting" (Organisation Mondiale pour l'Education Préscolaire [OMEP], 2015 p. 3). In this scale, animals and plants are regarded as recommended learning resources. However, considering animals as resources represents an anthropocentric view, as it suggests that humans are separate to and have dominion over other animals, and these animals are there for the benefit of humans (children). The scale also refers to recycling, resource conservation, or environmental issues; however, it, too, does not mention about the value of developing ecological systems thinking or ecological worldviews in the early years.

Nowadays, much of the current human population live in cities where we cannot find abundant outdoor nature spaces. Until the middle of the twentieth century, more people were engaged in primary industries, which were closer to the natural world, such as agriculture, pasturing, forestry, and fishery. Children of past generations could experience nature-based activities more frequently, and these activities were closer to their ordinary lives. In addition, as previously discussed, children have had opportunities to attend schools or early childhood centers and experienced nature-based activities since the nineteenth century, because the importance of nature-based activities for child development has been recognized in theories of education. However, it is those past generations who have damaged the many ecosystems and

have triggered our current environmental crises. We can see this reality, not only in Japan, but across the globe. Reflecting, then, on the application of the theories and nature-based practices of traditional early childhood pedagogy and the daily lives of past generations in the nineteenth and early twentieth centuries, simply experiencing traditional nature-based activities in a kindergarten does not appear to foster widespread ecological systems thinking or ecological worldviews. This suggests that traditional pedagogy, which emphasizes the significance of nature-based activities, has not supported pro-environmental behavior. Nevertheless, experiencing nature-based activities in everyday life is still important. This is because the understanding of ecology and of the niche of human beings in the Earth's ecosystem through direct experiences and interrelating with other natural elements is indispensable. However, I argue that this is not enough to build a sustainable society.

Learning Ecology from Infancy: Vignettes from Japan

As described in the previous overview of the significance of developing an ecological worldview and the lack of fostering such a view in existing education, it is necessary to rethink early childhood education from the viewpoint of fostering an ecological worldview. In this section, I explore three vignettes from one Japanese early childhood service that indicates that toddlers and young children can learn ecology.

When early childhood teachers engage in their practices, the teachers encounter various words and behaviors of children in activities. For evaluating their teaching practices, the teachers have to focus on and identify specific words and behaviors. For example, when a teacher aims to promote learning ecology, she/he may intentionally observe how children see, observe, and talk about plants, animals, and the habitat. In Japan, traditional nature-based activities are frequently described in studies by researchers, magazine articles by experienced teachers, website pages and center curriculum documents by early childhood services, or other documentation recorded by teachers. However, they seldom refer to ecology, ecosystems, ecological systems thinking, or ecological worldviews (Inoue, 2009). When teachers focus only on children's development, they might overlook children's words and behaviors that refer to the learning of ecology; and so, they cannot support the children's deeper ecological learning. Therefore, to foster children's ecological worldview, teachers should attend to children's words and behaviors from the perspective of ecology. Furthermore, teachers should be conscious of their role in developing and exploring appropriate values for the environment, ecosystems, ecological system thinking, or ecological worldviews. Do teachers try to enhance children's understanding and encourage their sympathy or empathy with living things? I use the descriptive phrase, "ecological lens" to describe the teacher's consciousness of ecology, ecological systems thinking, and ecological worldviews.

Tomioka-Nishi Centre for Early Childhood Education and Care (CECEC) is located in a residential area of Sakai City (the city next to Osaka City in Japan). This center has developed a "practice study," which is a form of professional

development that is common in Japan, under the theme of EE, and I have supervised the "practice study" since 2010 (Inoue, 2014b). The teachers have improved the learning environment, reflected on children's activities, and conducted monthly meetings to discuss their practices as a result of their engagement. In this particular practice study, the teachers focused on learning about ecology. I encouraged the teachers to use an ecological lens when they arranged the learning environment, observed children's activities, and documented children's learning. The teachers gradually renovated the center's outdoor playground to increase biodiversity by planting various trees and indigenous grasses. The children and teachers use composting to learn about ecological cycles and relationships between the everyday lives of human and nonhuman organisms. This center has its own kitchen with a professional nutritionist and kitchen staff who prepare daily handmade lunches and snacks (this is a legal requirement for children aged from 0 to 2 in long day care type centers in Japan). Children take scraps of vegetables or fruits, which were produced in the cooking processes of their lunch and afternoon snacks, to the compost and then observe the compost process. Sometimes, they mix the compost and then use the matured compost soil in the vegetable garden. There are six age groups (0–5) at the center, and the teachers also care for small animals such as snails or insects in all classrooms. The teachers always consider animal welfare with children: some animals caught in the playgrounds are cared for a short while, for observation, and later released; others are brought by families or community people (usually from shops or breeders) and the teachers look after them throughout lives because it is inappropriate to release these animals to disrupt the local populations' genetics and habitat. Children of all age groups tend to harvest the vegetables in the garden. These vegetables are usually cooked in the center's kitchen for lunch or afternoon snacks. Sometimes, children over 2 years old assist in the cooking process.

5 year old children also experience the full process of growing rice (plant seeds, tending to the seedlings, harvesting, threshing, polishing by hand). They also make sea salt from sea water collected by some families during their summer vacation trips. The children make "Onigiri" (rice balls) with the handmade sea salt and the harvested rice. These simulated experiences of traditional ways of primary industries contrast with the children's everyday lives, where the family would buy rice, sea salt, and vegetables at the shops, potentially enhancing an economic system view through their shopping experiences. As part of the ecological systems learning at the Centre, the teachers prepare children's books and posters appropriate for learning the life cycles of plants and animals, eco-friendly life styles, and environmental issues. Children also attend excursions to the nature conservation park (four times a year for the 5 year old class, once a year for 3 and 4-year-old classes) and engage in EE programs conducted by outside professionals. The teachers frequently make newsletters for the families and ask them to participate in the Centre's activities. As the Centre aims to develop child-centered pedagogies, the teachers have always tried to achieve this by promoting children's talk and interests and using questions to promote children's thinking and problem solving skills. The teachers continually reflect on their practices and write an annual report from the EE

viewpoint at the end of the school year. The following three vignettes highlight three examples of ecological learning described by the teachers in the annual reports.

Vignette 1

Although caring for animals in the classroom is not a usual practice in lower aged classes (children aged 0–2 years), around 70% of Japanese early childhood services do care for small animals such as insects. The Japanese rhinoceros beetle is a large insect and popular with Japanese children (Fig. 1). Nowadays, it is difficult to find wild Japanese rhinoceros beetles in urban areas because of habitat loss. Usually, teachers would buy the larva or adult beetles at the shops and care for them until their death. Teachers of Tomioka-Nishi CECEC tried to find and care for the insect eggs after the adults' death and made opportunities for the children to learn about its life cycle. Female beetles lay their eggs in the end of summer, the larval stage generally lasts for 8 months, and a beetle develops to an adult in early summer after several weeks of a pupal stage. The larva is around 8 cm at its last stage, and the large larva attracted children; it was easy even for infants to recognize the large larva.

The 0 year old class of Tomioka-Nishi CECEC cared for two Japanese rhinoceros beetle larvae. Officially, the 0-year-old class has children aged from 2 months to 1 year 11 months. Because of their young age, the children could not care for animals by themselves; therefore, the teachers attended to the beetles. The teachers removed large piles of excrement, cleaned the beetles' case, and regularly moistened the soil with a spray to create a suitable environment for beetle larvae. This daily care work was undertaken on the floor where the children could observe the work closely. Sometimes, the teachers showed the large larvae and invited children to touch them. Children tenderly touched the larvae with their small fingers. Three months later, a larva turned into an adult, and the teachers named it "Kabumaru." The teachers continued to care for the beetles and the children continued observing.

Fig. 1 Young children fascinated by a Japanese rhinoceros beetle. (Photograph taken by a teacher)

One morning, Osamu (1 year 3 months) came into the classroom. First, he approached a beetle's case and said "n, n" to one teacher while pointing to the case. The teacher approached him, and they looked into the case together. When the teacher said, "Good morning, Kabumaru," Osamu said, "n, n" again while looking at the teacher and the case alternately. Then, the teacher asked him, "do you want to see Kabumaru?" Osamu nodded. The teacher put the case on the floor. Other children gathered to see the case, and all looked into it when the teacher opened the lid. Osamu stood up, went to the shelf, and pointed to a spray there. When the teacher asked Osamu, "do you want to give Kabumaru 'Shu-Shu'?" (onomatopoeia of spraying in Japanese), he nodded eagerly. Then, the teacher took the spray and sprayed water into the case. Osamu touched the bottom of the bottle as if he had helped the teacher. Osamu observed the beetles and the way the water changed the color of the soil in the case. After spraying, Osamu pointed to the direction of the place with the jelly food for the beetles. The teacher asked him again, "do you want to feed Kabumaru?" Osamu nodded with a smile. When the teacher took some jelly food and opened the lid again, Osamu held out his hand. The teacher put the food on his palm. He gently put it on the soil and observed the movement of the beetles. When the teacher took some more jelly food, another child, Daishi (1 year 1 month), also held out his hand. Daishi also put the jelly gently, just like Osamu. They then looked into the case for a while (Onaka et al., 2016).

Vignette 2

There were plants and small animals in the 1-year-old classroom. A red swamp crawfish named "Momo" had been cared for from when the children were in the 0-year-old classroom, and Momo moved with the children to their new classroom. The children guided a new teacher to Momo's case and told her its name. The teacher, realizing that the children cared about Momo, put cases of plants and animals on the shelves at the same height as the children. The children also loved to observe the larva of a small white butterfly and called the teacher when its food, "Japanese mustard spinach," was finished. When the larva turned into a butterfly, the children asked the teacher to set it free while saying "ah, ah" and looking at the window. The children also loved picture books about the animals they cared for. When snail eggs hatched, the children took a picture book and showed a page of snails that were eating leaves to the teacher. Even the children in the 1-year-old class were aware of other animals' needs. This class started to then care for two Japanese rhinoceros beetles and named them "Chacha" and "Chee" (Fig. 2).

One day, the teacher read a children's book about Japanese rhinoceros beetles. One page showed a picture displaying a beetle taking tree sap from a branch. After reading the book, one boy named Ryota (aged 2 years and 4 months) hurried to the case with the beetles. He looked into the case and the book alternately and said "no, no." He also approached his teacher and said "no tree" and "no leaf." Ryota seemed to be aware of the difference between the natural habitat described in the picture book and the case environment in the classroom. When the teacher said, "we had never seen Chacha and Chee fly, had we?" the children showed expressions of

Fig. 2 The 1-year-old children checking the water spray bottle used to moisten the beetles' caring mat. (Photograph taken by a teacher)

deliberation. Then, the teacher asked the children where they could find trees and leaves. The children answered "outside!" The teacher also proposed that the children release the beetles outside, and they agreed (Onaka et al., 2014).

Vignette 3

The children in the 4-year-old class loved animals and plants. They cared for a turtle and enjoyed finding and observing small creatures in the playground outside. They also tended to the vegetables in the garden (Fig. 3). In mid-May, children planted seeds of asagao (Japanese morning glory). The teacher prepared two large garden planter boxes, and the children put soil bought at a shop into the boxes. The teacher proposed an idea that the children should also add soil from the garden compost. The children mixed the compost soils into one box. When the teacher asked them, "in which soil would the asagaos grow better?" most children answered, "compost soil!" They could answer the questions because the children already knew that compost soil is more nutritious than normal soil. After the small leaves sprouted, the children went to see the boxes, compared them, tried to find the differences, and reported what they found to the teacher. In July, the asagao plants grew well, and the children were delighted to see and observe them carefully: They exclaimed, "the asagaos are starting to go up!" and "all the asagao plants twine to the same direction!"

One day in July, Hiroki (aged 4 years and 7 months) called the teacher and said, "there are different leaves on the asagao." The teacher realized it was a small cherry tomato. However, the teacher just answered, "Yes, we saw similar leaves somewhere else, didn't we?" Although Hiroki started to think about it, he could not get the answer at that time. Several days after, Hiroki called the teacher again and took her to other garden planters where cherry tomatoes were grown. Hiroki said "this leaf is the same!" Then, Hiroki and the teacher picked one leaf from the cherry tomato and went to the boxes of asagao to compare with the leaves of the unknown plant which had leaves that were exactly the same. Hiroki was satisfied with the result.

Fig. 3 The 4-year-old class checking their vegetable garden. (Photograph taken by a teacher)

Several days later, Hiroki told the teacher abruptly, “since then I’ve been thinking.” His statement was so abrupt, and the teacher could not understand what Hiroki was talking about, so she responded, “of what?” Hiroki said, “why a cherry tomato came up in the compost soil? We didn’t plant seeds of cherry tomato.” The teacher was surprised to know Hiroki had held his question about the cherry tomato for several days. Although she knew the answer, again, she just answered “yes, we just planted the seeds of the asagao. It is mysterious, isn’t it?” She did so because she wanted Hiroki to find the answer by himself.

In September, the children tidied up their vegetable garden after harvesting the summer vegetables. The children completed their gardening role by pulling out old cucumbers, eggplants, green peppers, and cherry tomatoes. The teacher found small fruits on the pulled-out stalks. She picked those small fruits and split them in half. The children looked inside and talked together as follows: “it’s a seed, isn’t it?” “the seed looks like a sesame!” and “we can have green peppers and tomatoes when we plant these seeds!” Then, the children cut and took those stalks to the composts. At that time, Hiroki suddenly said, “I got it! There were tomato seeds in the compost soils, and that is why tomatoes grew there!! I didn’t realize it because a tomato seed was hidden in the soils!” The teacher agreed with Hiroki’s solution by saying “a tomato seed had been ‘sleeping’ in the compost soils, hadn’t it?” Hiroki was excited to have found the answer to his long-held question. Afterwards, he reported this to the other teachers and his mother. When the cherry tomato that was grown with the asagao plants died it was taken back to the compost (Onaka et al., 2016).

Discussion of the Vignettes

The children of Tomioka-Nishi CECEC engaged in nature-based activities daily. In these nature-based activities, the children observed animals, plants, and other natural materials. They thought critically, derived questions, sought answers, and felt

empathy with the animals. Such activities have been recommended in early childhood education for a long time to contribute to children's emotional, moral, and cognitive development, as described in the Japanese national curriculum. However, I picked the above three vignettes not because they described the children's developmental achievements but because they included the processes of learning about ecology.

In vignette 1, Osamu cared about the insects and learned that other species also need food and water like humans but in different ways. The understanding of factors to sustain life is the starting point of learning ecology. Food and water are the basic and indispensable factors for all organisms on Earth, including human beings. However, the sort of food and the ways to get food and water differ among species. Osamu also placed the insect jelly "gently" into the caring case. It seems that even a 1-year-old child could feel empathy for other species.

Vignette 2 also described how a 2-year-old child could realize the difference between an artificial caring environment and a real habitat. It included two phases. First, Ryota realized that the beetles in the case and the beetles drawn in the picture book were the same animal. Then, Ryota recognized that the two environments (quality of habitat) were quite different. He understood that it was necessary to have trees in the environment for beetles from the book; therefore, he talked about the absence of trees in the artificial case. From his words, he knew that an environment with trees was better for beetles than an artificial case. This implies that Ryota already had developed basic caring values towards living things and the natural environment. The teacher agreed with his thought, shared his thought with other children, and encouraged his finding by releasing the beetles outside.

In vignette 3, Hiroki observed young leaves very carefully and recognized the difference between asagao and cherry tomato. In addition, this 4-year-old child had kept his question for 2 months. The knowledge gained through one's own experiences might have better retention and deeper understanding than the knowledge given as information from adults. A life cycle is an important factor in ecology; therefore, the recognition of a life cycle through experiences might contribute to learning ecology. In this case, the child understood about the life cycle of a cherry tomato: germinating from seed, sprouting, growing, flowering, fruiting, and dying. This cycle requires 1 year. It is easier to understand a life cycle by observing real plants and fruits. However, it might be more difficult for young children to imagine seeds dropping into soils and being dormant for half a year. In this case, the teacher selected familiar vegetables for the garden every year and used the compost soils for planting flowers and vegetables. In addition, the teacher had faith in Hiroki and waited for him to solve the problem by himself.

These vignettes show that young children including toddlers can learn basic ecological concepts. Even toddlers could understand the necessity of food and appropriate habitat for animals, and care about them. The 4-year-old child could understand a life cycle of a plant. These vignettes could be called traditional nature-based activities (caring for animals and gardening), and we can recognize many aspects of children's development within these vignettes. However, the teachers practiced these nature-based activities for not only the children's physical, emotional, moral, and cognitive

development, but also for the learning of ecology. It is the latter which will decide whether the activity is a practice of education for sustainability or not. The teachers at the Centre now always create learning environments from the perspective of learning ecology (e.g., compost, selection of children's books, vegetable garden, and caring for small animals in the classroom) and enhance children's awareness of the relationship between living things and their environment with their ecological lens. The learning and teaching experiences at the Tomioka-Nishi CECEC demonstrate that it is also important to connect different activities and repeat similar experiences many times from the viewpoint of learning ecology.

Ways to Rethink Children and Nature in Early Childhood Education

Fostering Teachers' Ecological Lens

Fostering an ecological lens perspective might be difficult for Japanese early childhood teachers because they have been provided with few opportunities to learn ecology in school themselves. As mentioned previously, although all Japanese students are provided opportunities to learn ecology in schools, the ecology they learn is very basic and superficial. In addition, preservice education for early childhood teachers in training schools (4 years in the university or 2 years in college), which is strictly regulated by the government of Japan, provides various subjects under the national law and regulations. However, most subjects are related to pedagogy, psychology, sociology, or teaching skills. Most training schools do not offer enough opportunities to learn environmental science, EE, and teaching skills for nature-based activities (Inoue, 2008). There are also few opportunities to learn ecology or sustainability in the teachers' professional development once they are in the workforce (Inoue, 2017). As a result, Japanese early childhood teachers may not have deep knowledge of ecology, and this knowledge has limited influence on the teacher's thinking, beliefs, and teaching; that is, the teachers' education and professional development rarely support their development of an ecological worldview.

Japanese early childhood teachers already have many resources for teaching traditional nature-based activities through professional development, books, and professional magazines. However, I argue that simply using materials or programs of traditional nature-based activities will not foster an ecological worldview. As shown in the vignettes, the teachers with an ecological lens can plan activities with appropriate aims of learning ecology, arrange an appropriate learning environment, and observe children's words and behaviors from the viewpoint of an ecological worldview. At the early stages in the 8 years of the practice study by Tomioka-Nishi CECEC, the teachers were unable to focus on words and behaviors that indicate children's awareness or experiences of ecological systems. The teachers just talked about children's development. Teachers with an ecological lens do not regard animals and plants, which are the components in the Earth's ecosystem, as teaching resources or materials just for human benefit. When a

teacher looks at a leaf through an ecological lens, she/he may find a hole on it and think of what caused the hole or find the tree from which the leaf came and imagine what kind of insects, birds, or other animals will use the fallen leaf or the tree. This extension of concepts through an ecological lens might lead early childhood teachers to reflect on their practices. To foster an ecological lens in early childhood teachers beyond a textbook knowledge of ecology, it is necessary to strengthen preservice teacher training curriculum and professional development from the viewpoint of ecology.

Pedagogy for Fostering an Ecological Worldview

The vignettes of Tomioka-Nishi CECEC focused on nature-based activities such as caring for small animals, gardening, and outdoor play. Although the vignettes were based on the children's on-going activities and seemed to be fragmented at a glance, such real activities were not fragmented in the children's daily lives. For example, the children encountered a variety of organisms, managed compost, and recognized life cycles and food webs through gardening. They were able to observe the same vegetables that grow in their Centre garden being sold in shops, the cost of the vegetables, and the separation of the vegetable wrappings or waste from vegetables from the Earth's ecosystem in contrast to their composting of scraps. They were also able to consider how and who produced and transported the vegetables in the shops. Through these experiences, the children learned how economic and social events are fundamentally related to the natural world. So the children's various experiences in their everyday lives could be connected and integrated as a whole to foster an ecological worldview.

Summary and Conclusions: A New Role for Nature-Based Activities

In the late twentieth century, EE/ESD/EfS emerged as a new educational field in response to the environmental crises of the Anthropocene. Furthermore, in recent years, such forms of education are recommended to start in early childhood (Davis & Elliott, 2014). Although the role of ecology has always been described as one element of sustainability concepts, ecological systems thinking or ecological worldviews have not been identified as a high-priority topic in education. However, a sustainable society is actualized only on the basis of ecological worldviews, not of economic worldviews (Krebs, 2008; Schmitz, 2016). Therefore, the proponents of EE/ESD/EfS have recognized the importance of nature-based activities such as gardening, caring for animals, or playing in outdoor nature spaces to promote ecological worldviews. However, for example in Japan, such traditional nature-based activities already have been included in formal early education for a long time (since the nineteenth century), and their aims and objectives have focused on children's development per se, and not on

the development of ecological systems thinking or ecological worldviews that might contribute to addressing sustainability concerns. The vignettes from a Japanese early childhood center illustrate that even children at the earliest stages of their lives have the potential to learn ecology and that it is possible to foster an ecological worldview at this age. I propose that learning from traditional primary industry practices or indigenous cultures might contribute to fostering ecological worldviews; however, the teacher's role in this is most important. As the Japanese vignettes presented in this Chapter show, those teachers with an "ecological lens" can rethink existing nature-based activities to foster learning about ecology.

In Japanese early childhood education, theorists and practitioners recognize that the quality of the learning environment is extremely important for children's development. However, for many teachers, the natural world is just a material or an educational resource. This paradigm is homogeneous with a worldview that the natural world exists for the use of human beings and contradicts the childhoodnature perspective that is central to this Handbook. Education in this paradigm reproduces people whose economic worldviews place value mainly on their own selves. However, the health of the natural world is the most fundamental and essential factor for sustainability where humans are recognized as nature and thus interconnected with nonhuman nature, as represented by childhoodnature. Therefore, a paradigm shift from education based on the economic worldview to education based on the ecological worldview is necessary for sustainability. This signals a new role for nature-based activities in education, including early education. Education remains one of the important strategies for building a sustainable society, as Dewey (1916) aptly summarizes in the following: "In directing the activities of the young, society determines its own future in determining that of the young" (p. 48).

Cross-References

- ▶ Ara Mai He Tetekura: Māori Knowledge Systems That Enable Ecological and Sociolinguistic Survival in Aotearoa
- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective
- ▶ Responsive Environmental Education: Kaleidoscope of Places in the Anthropocene
- ▶ Rethinking Children's Connections with Other Animals: A childhoodnature Perspective
- ▶ Significant Life Experiences That Connect Children with Nature: A Research Review and Applications to a Family Nature Club
- ▶ Situating Indigenous and Black Childhoods in the Anthropocene

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The Nature of Childhood in Childhoodnature

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Bryan Wee

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Abstract

We appeal to non-human nature as the standard against which human uses of natural resources should be judged, while childhood is often viewed as a natural state of being that is universal across all settings and children. Yet there is no natural childhood, and nature is a profoundly human construct. I offer this perspective as one way to frame childhoodnature. This Chapter explores the fundamental essence of childhood (*its nature*) and problematizes childhood vis-à-vis nature in order to question the assumptions with which we articulate our world. Integrated into this Chapter are memoirs of my life as a child and a scholar. A systems approach draws

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attention to the networks of power and privilege that shape the physical as well as lived realities of children. Children's drawings from different countries are presented to highlight how visual, written, and unspoken narratives normalize culturally based ideas of people-place relationships. They reveal children's connections to the environment and help us understand not only what children are thinking, but also what they are being taught to think. Recognizing the nature of childhood in childhoodnature is to confront this reality.

Keywords
Childhood · Nature · Symbolism

Introduction

This photograph of a young child at the annual National Western Stock Show in Colorado, USA (Fig. 1) portrays the symbolic and at times, paradoxical nature of childhood. Notice how she is dressed in ways that conform to sociocultural conventions (e.g., Stetson, boots) and gendered norms (e.g., pink clothing) at the Stock

Fig. 1 Image of child at the National Western Stock Show, Colorado, USA (photographed by author)

Show. She is being acculturated into a known adulthood yet unable to, as a child, inhabit adult spaces. Dressed as a "cowgirl" and juxtaposed against the whiskey bottle in the background, she is simultaneously in and out of place.

The Symbolic Nature of Childhood

I begin with this image and interpretation because childhood "is more often than not the outcome of negotiating and enduring the mythologies of social reproduction" (Aitken, 2001, p. 59). Childhood is a human construct embedded in cultural and political structures that regulate (via social reproduction) the ways children think, how they act, and critically for this Chapter, how we think and how we act with regard to children. Furthermore, the symbols that we use in our research and teaching, such as language, are governed by a collective set of beliefs about what childhood is/is not. Dewey (2000) emphasizes the importance of symbolism in human experience when he writes that:

> Symbolism dominates social organization...rites, designs and patterns are all charged with a significance which is immediate and direct to those who have and celebrate them. Symbols are...condensed substitutes of actual things and events, *which embody actual things with more direct and enhanced import than do the things themselves* [italics added] (pp. 82–83).

Examples of symbolism in childhood include myths of "childlike purity" (Cronon, 1996) and romanticized views of children as innocent beings (Baader, 2016). Piaget's (1969) stages of natural development categorized learners' cognitive growth based on age, a symbol of linear maturation. A greater recognition of sociocultural influences on learning (Vygotsky, 1962) has promulgated development of the whole child (Dewey, 1990) but this ideology continues to be contested in modern industrialized societies, particularly schools (Stevenson, 2007). Schools embody an enlightenment view of the child as *tabula rasa* – a blank slate on which societal norms and values are inscribed (Baader, 2016). Symbolically, therefore, schools are institutional spaces for children, governed by adults' perceptions of appropriate knowledge and behavior (Stevenson, 2007; Thomson, 2007). By extension, the practice of schooling serves to prepare children for participation in adult society. We have, by and large, popularized views of children as naive learners and childhood as a relatively deterministic process by which children simply "become" adults (Holloway and Valentine, 2000). More recently and specific to this volume, research has shown that children tend to invest nature with symbolic qualities, e.g., anthropomorphism, as well as moral imperatives, e.g., anthropocentrism (Kellert, 2002; Wee, 2012). Linked to these broader themes of child-environment relationships is the modern-day crisis of children missing out on symbolically valuable experiences in nature, as children in Minority western nations spend more time indoors and are increasingly disconnected from their surroundings (Hayward, 2012; Louv, 2005).

My intent is not to point a critical finger at the ways we have constructed meanings about childhood or the meanings themselves. Instead, I wish to highlight

the prevalence of symbolisms in our everyday moments of life and describe how symbols and their meanings structure the-way-things-are for children. I am hopeful that this Chapter will examine carefully accepted norms with regard to childhood and nature, so as to "bracket the inescapable presuppositions and biases of our horizon" (Chawla, 2002, p. 205). As Jones (2002, p. 18) astutely notes, "if we wish to readjust [human-nature relationships], we have to excavate and critically examine the understandings and assumptions with which we articulate the world." We need to ask where or how things came to be, and where possible, investigate the contexts within which this happens. Consequently, the goal of this Chapter is to explore the fundamental essence of childhood (*its nature*), then to problematize it vis-à-vis nature in order to clarify and advance the concept of childhoodnature.

Systems and Childhood

This focus on the symbolic nature of childhood vis-à-vis nature is intended to encourage a deeper appreciation of the fact that we are bound together in interdependent, complex networks of people-place relationships, or systems. Systems refer to an ensemble of interacting parts that is more than just the sum of its components (Chen and Stroup, 1993). Systems thinking de-emphasizes reductionism, where parts are examined independently and without consideration of contexts (Simon et al., 2013). Relationships within/between components of systems are integral to understanding how they operate as pieces of a larger, interconnected whole. The use of systems in this context sensitizes us to people who are either spatially removed or on the margins of societies, as well as to places we may not be directly connected to but are nonetheless impacted by our actions or inaction (McEwan and Goodman, 2010). For example, Project WILD is an environmental curriculum written in the US but implemented with a broad, cut-and-paste approach worldwide, e.g., Japan. A systems perspective helps us to recognize the challenges of translating words as well as meanings across socio-linguistic settings. It also illustrates how children's agency is materially constituted through performative practices e.g. environmental learning with Project WILD in Japan is framed by a different (US) set of cultural views and values (Spyrou, 2016; Wee and Mason, 2016).

More specifically, systems help us understand and appreciate childhood as a construct shaped by "asymmetries of power and privilege" (McLaren 1989 in Aitken, 2001, p. 170). During a study with children in Stockholm, I asked them whose responsibility it was to solve environmental problems. In one interview, a 13-year-old boy explained that:

> Adults should 'handle' the environment. Kids can do it too, but the adults know more than children, and they can tell the children what to do (translated from Swedish).

Contained in this quote are references to different systems of power and privilege. Firstly, there is the hierarchical power structure that governs adult-child interactions, e.g., "adults know more than children" and "adults can tell children what to do."

There is also the material reality of this child's life, where his perceived ability to affect environmental change ("kids can do it too") may reflect a privilege in Stockholm relative to children in other cities or countries.

Systems also help us consider how childhood interacts with the processes of globalization, and the corresponding spatial representations of power and privilege (Massey, 2013). For example, back-to-nature movements that involve getting children outdoors are an increasingly common phenomenon in Minority western nations, particularly as spaces urbanize. However, the accompanying global discourse about children's safety (or lack thereof) robs them of their autonomy as local places are systematically transformed into structured landscapes where children can "safely rehearse for a known adulthood" (Aitken, 2001, p. 177). Any discussions about childhoodnature, therefore, need to consider not only the physical realities of our world, but also the systems that shape the lived realities of children who inhabit it.

Children | Childhood | Nature

While children and childhood are terms that overlap in use, they are not synonymous with each other. For instance, children who interact with their surroundings represent, "the familiar world of everyday life characterized in terms of the individual" (Barab and Roth, 2006, p. 7). Childhood, on the other hand, embeds children's interactions in cultural systems that determine what it means to be a child. In other words, children inhabit the socially defined world of childhood. Intended to be distinct from adulthood, childhood is in fact largely determined by adults (Thomson, 2007). Toys, playgrounds, textbooks, illustrations, and other primary forms of learning in childhood are typically designed, constructed, written, drawn, and taught by adults for children. Likewise, children are typically presented with an adult-driven idea of nature (in children's literature, television, animated films, games, and other media), symbolized by scenes of wild nature or visions of pristine landscapes that are really more about aesthetic, perhaps even artificial, vistas than they are actual places (Proctor, 1996; Jones, 2002). These are, according to Bavidge (2006), some of the most powerful ways by which nature is interpreted for and explained to, children. Not surprisingly, children's references to nature tend to conjure images of natural habitats untouched by humans when in reality, only a handful of places remain that exist independently of humans. Indeed, any decision to maintain a place in its natural state is already a human imprint, if only abstractly.

Placing childhood and nature on either end of a human–non-human spectrum, however, is misleading because it does not represent those extremes. We appeal to non-human nature as the standard against which human uses of natural resources should be judged (Cronon, 1996), and childhood is often viewed as a natural state of being that is universal across all settings and children. Yet there is no natural childhood, and nature is a profoundly human construct. I offer this perspective as one way to frame childhoodnature. For example, my experiences as a child were shaped by a particular versioning of childhood in the early seventies, and it influenced how I view nature. Similarly, because nature is a construct that exists in a

socially-defined setting, that in turn influenced my experiences as a child and gave rise to different ways of accessing natural spaces. This interdependent relationship between children, childhood, and nature has led geographers like Yi-Fu Tuan (1977) to describe how we dwell in places, that is, how human feelings and experiences render new spaces familiar over time. When children attach meanings to places, they carry these attachments with them to guide their interactions with nature. To better appreciate these connections, therefore, we need to understand how children (how we) dwell in places. We need to know their (our) stories.

The following sections ("My Childhood;" "My Early Years as a Scholar: Children's Environmental Views;" "My Later Years as a Scholar: Children's Environmental Discourse") are personal narratives or memoirs that describe a life lived along the contours of childhood and nature. They also point to our responsibilities as researchers to approach our work with more nuance, intentionality and respect for the lives of children. *We are our stories* (H. Mason, personal communication, July 9, 2017).

My Childhood

Growing up in what was then a racially diverse, backwater space in Singapore, I ran around barefoot, played in storm drains, and whenever I could, tried to avoid adults and their rules about acting more like a "grown-up." They could not understand why someone would spend hours squatting at a ditch trying to spot/catch a multicolored rainbow fish, or why I cried when the tadpoles in my hands stopped wriggling. Thankfully my parents recognized this early affinity for living things, and over the years I was afforded the privilege of caring for a menagerie of animals. When I was allowed to read during school break (books were considered a distraction from homework), I would go to the public library and immerse myself in the adventures of James Herriot and Dr. Doolittle.

I never considered myself a child raised "in nature" – this was simply the environment I grew up in, and I adapted to its opportunities as well as constraints. For example, I hated staying at home because that meant I had to listen to my parents yell at each other or at my grandmother. As a child, therefore, the very first thing I saved up money to purchase was a bicycle. I relished the freedom it provided, the power to escape bickering adults, to choose where I would go, and to learn about the place I lived. I traveled along tree-lined roads, up and down hills, and eventually across the entire island several times. As a youth, I volunteered at the local animal shelter, took a position as a zookeeper and cleaned cages while learning how to breed/raise endangered bird species. Following that, I surveyed populations of feral pigs and invertebrates on an offshore preserve for the national parks board. At the time, I felt I had exhausted all the opportunities that (a rapidly urbanizing) Singapore could offer in terms of nature-related experiences. And so, I ended up in a land far from everything familiar to pursue graduate studies in conservation biology and later, environmental education. By then, I had effectively become isolated from my peers and family. I was in my thirties and still in school, studying a subject that was

not really understood or appreciated. I had no full-time job and massive student loans. Swept up with my new life abroad and consumed by my studies, I did not maintain relationships. To my friends in Singapore, I was an anomaly. To my parents, a disappointment.

My Early Years as a Scholar: Children's Environmental Views

How did I end up on such a trajectory? Was my childhood, with its privileged affordances to nature, a turning point in my relationships with places and people? These questions drove me to explore children's environmental views. It is important to note that I was unfamiliar with the construct of childhood at the time. My motivations for research with children were grounded in personal experiences rather than a notion of the individual/child nested within broader cultural systems. I based my work on social constructivist views of learning, surmising that children actively construct meanings from diverse interactions with (in) their environments. As a result, different children will generate different ideas about the environment, and these vary by place. This necessitated inclusive approaches not only in educational practice but also in the ways I engaged research with children (Barratt Hacking et al., 2007). For example, I spent one semester in a middle school classroom getting to know the teacher and students as people (not as participants) before gathering data for my dissertation. Mixing the expertise of my graduate advisors with personal interests in photography, I utilized qualitative and visual methods (drawings, photo-elicitation, interviews) to ask children from different countries one essential question: **What is the environment?**

My research about children's environmental views spans four countries and three continents: US, China, Singapore, and Sweden, each representing different geographical, sociocultural, and linguistic contexts. All the while I strove to understand the environment from children's perspectives – how did children view the environment, what were the dominant themes if any, that permeated their thinking and guided their actions? Table 1 outlines a typology of children-environment relationships that have emerged from over a decade of this work (see for example, Wee et al., 2006; Shepardson et al., 2007; Wee, 2009, 2012; Wee and Mason, 2016).

For children, the environment is largely synonymous with non-human nature; it exists separately from humans. In this drawing of the environment (Fig. 2), the child

Table 1 A typology of themes that consistently appear in children's drawings of the environment

Theme	What is the environment
Nonhuman nature	The environment exists separately from humans
Stewardship	The environment needs to be protected and cared for by humans
Anthropocentrism	The environment allows humans to survive and/or thrive e.g. oxygen from trees, food from plants and animals
Positive nature | negative humans	The environment is "in balance." When the environment is "out of balance" it is primarily due to large-scale human impacts, e.g., deforestation, climate change

Fig. 2 Drawing of the environment as non-human nature, USA

writes, "open fields that no one pays attention to." This dualism between humans and nature, however, exists in varying degrees. Children living in highly urbanized settings, such as Singapore and China, are more likely than their counterparts in rural areas to include human elements such as roads and buildings. It makes sense that life in different places represents different sets of realities for children. Children inhabiting cities, for example, tend to be immersed in built environments. Over time, these landscapes become part of children's everyday lives. How then, to explain the dominance and consistency of children (from different countries) viewing the environment as being synonymous with non-human nature? It is plausible that in addition to place-specific qualities, children's realities are also embedded with dominant environmental discourses that interpret the environment *for* children (Hajer, 2000). As noted earlier, this can take the form of textbooks, children's literature, social media and other outlets where formal as well as informal environmental learning occurs.

In addition to a synonymy with nonhuman nature, children's representations of the environment tend to include ecosystems "in balance." Animals are happy, symmetrical trees are always in leaf and the sun is shining (Fig. 3). Very few children, if at all, include dynamic environmental systems e.g. predator-prey relationships or changing weather patterns. This echoes the point made earlier about the prototypical version of nature that is presented to children by adults. Within this hierarchical power structure, children internalize nature as pristine and static. When ecosystems are thrown "out of balance," these are typically attributed to human activities (e.g., deforestation) rather than natural events (e.g., hurricanes). Negative human impacts are often extensive and visible. For example, air pollution (smoke stacks, car exhaust fumes), water pollution (toxic or solid waste), and more recently, climate change. Humans are also regarded by children as environmental stewards, e.g., since trees provide oxygen and clean the air, humans are responsible for the long-term care and protection of trees.

Children's environmental views are well documented (see for example, Kahn Jr., 2002; Kellert, 2002). It is not the purpose of this Chapter to delve into that literature,

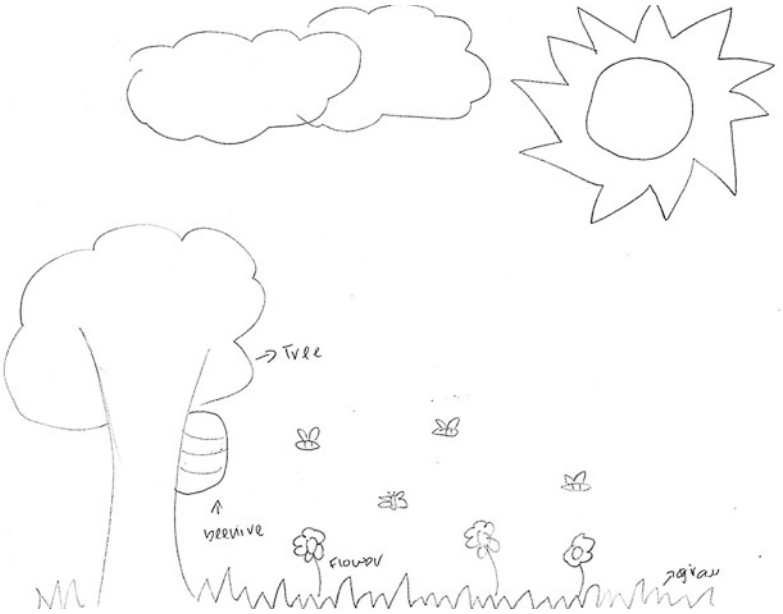

Fig. 3 Drawing of the environment "in balance," Singapore

suffice to say the stewardship ethic described above continues to reinforce the stereotype that nature exists to serve people's needs. When natural resources are key to the wellbeing of individuals and communities, the extrinsic (rather than intrinsic) value of nature tends to guide decision-making. Though well intentioned, this places human welfare at the forefront of political action and moral concern, whereby humans are both a part of yet above nature (Kopnina, 2012). This form of anthropocentrism also "divides the contiguous fabric of life into oppositional binary categories" (Whitehouse, 2011, p. 296) – human and non-human. Consequently, there are those who argue for an egalitarian viewpoint, one that embraces the intrinsic value of all life as a rationale for environmental protection. Deep ecology, for example, views humans as one of many species that is no more or less important in terms of value to healthy ecosystems (Capra, 1995). My goal is not to debate the varied positions but to ask deeper questions about the social norms and discourses that regulate children's environmental views.

My Later Years as a Scholar: Children's Environmental Discourse

Why do children's environmental views seem almost ubiquitous across time and space? That the environment is embedded with discursive meanings did not occur to me until I began to wonder about repetitive patterns in my findings. Language, in particular, is one of the (many) contexts within which meanings are defined, accepted and carried over from one generation to the next. Furthermore, the meaning of the word

"environment" is related to something outside itself, and it shapes research in/with/about the environment. In the English language, for example, the environment is typically defined as the abiotic and biotic factors that affect an organism. This in turn objectifies the environment, turning it into an entity that can be managed to insure survival. This "nature-as-object" perspective is reinforced when the environment falls within the language of the natural sciences, which is often the case in English-speaking countries (Bonnett, 1999). Conversely, Whitehouse (2011) describes how indigenous Djabugay in Australia have no externalized environment in their language. For the Djabugay, people and places are expressed linguistically as the sum of their parts.

It dawned on me that research on children, childhood and nature had primarily been conducted in English, the dominant language within higher education and indeed much of the developed world. By extension, it made sense that the sociolinguistic properties of "environment" might be different in different languages. For example, there is no equivalent word for "environment" in Chinese. Translational equivalency does not always exist, nor should it, because different realities are constituted differently by different languages (Whorf, 1956). With that in mind and given my sociolinguistic heritage, I elected to shift my focus toward the Chinese language, and how children used it to describe the environment. China and Singapore are two places where I have engaged in this work. Both nations showcase rapid economic growth spurred by local as well as foreign investments, political structures that allow for unilateral decision-making, and guarded optimism about progressive cultural changes. In that regard, these countries represent a unique mix of "Western and Asian."

The fact that Chinese-speaking children held similar environmental views to their English-speaking counterparts suggested to me that there might be a standardized account of the environment, reinforced by language and other forms of discursive practices (Wee, 2012). For example, China and Singapore draw heavily on western ideologies to inform environmental and educational policies. In some instances, environmental education curricula are directly translated from English to Chinese, then applied wholesale in classrooms (Wee and Mason, 2016). For children to communicate effectively in linguistic communities, they are required to use words and meanings that are made available to them through learned behaviors. In other words, the language used to describe the environment tells us not only what children are thinking, but also what they are being taught to think.

Language and discourse are examples of hidden mechanisms in systems that maintain power once words have achieved the status of "common sense" (Foucault, 1972). Yet we are rarely asked to articulate the fundamental essence of words. We do not have to redefine words like environment because they represent,

> ...relations and identities which have themselves been reified into institutions...the discursive constitution [of these terms] does not emanate from a free play of ideas in people's heads but from a social practice which is firmly rooted in and oriented to real, material structures (Fairclough, 1992, p. 92).

The prevalence of similarities in children's environmental views across cultures suggests that default modes of thinking are being utilized. If so, then problematizing

childhoodnature presents an opportunity to uncover the wider social and institutional relations within which children's language and discourse about the environment is situated, and ultimately shaped.

Problematizing Childhoodnature

The term "problematize" does not refer to a critical analysis of childhoodnature discourses but rather, the questioning of deeply held assumptions. In this regard, problematizing is similar to the notion of "troubling," where to trouble is "to unsettle," to "reject the all-too-easy and unproblematized desire to render children and their worlds comprehensible and transparent" (Spyrou, 2016, p.106). As a graduate student and even as a tenure-track faculty, I was never encouraged to problematize or trouble my research. There was simply no incentive to transgress boundaries or to embrace resistance, especially when the consequences of doing so could prove dire for tenure, funding and/or my perceived credibility in academia. Instead, I shaped myself into a scholar who, like many others, never explicitly questioned if research efforts reproduced stereotypes or reaffirmed inequities. For example, while I advocated for the rights of children and for the validity of their perspectives, I never really considered that my positionality as an adult might inadvertently reinforce certain views of childhood. I was trained to be introspective as a researcher, but not to recognize myself as co-shaper of children's realities through discursive practices in research. It is for this (and other reasons) that I have tried to illuminate the processes that gave rise to my voice, and from there, to provide an entry point into a critical look at childhoodnature.

Childhoodnature

Childhoodnature offers a unique opportunity to touch on the subtleties of our scholarship in ways that emphasize dynamic relationships between children and nature. For example, children *as* nature rather than children *in* nature represent a decidedly less anthropocentric perspective. Similarly, Whitehouse (2011) describes how in Australia, the term "country" has been adopted in lieu of "environment" to emphasize relationships between humans and the land, "to recover the concept of caring for country as a means of managing the environment" (p. 300).

Childhoodnature offers a timely response to the realities of a rapidly changing world. De-emphasizing an anthropocentric relationship between children and nature can promote the intrinsic value of natural environments. At the same time, however, this should not cloud the fact that childhoodnature as a concept operates at a cultural interface, whereby an implied ethic filters and dictates views of our scholarship. As described earlier, research and teaching is governed by a collective set of beliefs about what childhood is/is not. These are manifested in our languages and practices. When we advocate for children's rights, greater agency for children or a shift away from anthropocentrism through our work in childhoodnature, we are using moral and epistemological standards to address broader issues. This is not to say that we should

never attempt to advocate for a particular worldview. On the contrary, it is precisely this type of dialogue that helps us identify broader material transformations (Aitken, 2001). It does entail, however, the need to be cautious in our efforts to claim something as being better or true because even well-intentioned efforts could potentially end up privileging one set of imperatives over others (Kopnina, 2012). As Tuan (1991) notes, "speech – the right to speak and be heard, the right to name and have that name 'stick' – is empowerment" (p. 685). Any consideration of childhoodnature, therefore, needs to include discussions about whose childhood we are referring to, as well as recognition that contestations of nature constitute everyday realities for children.

Whose Childhood?

When Proctor (1996) asks "whose nature" is being prioritized in resource conservation, he is referring to a dominant viewpoint established within a cultural-based idea of nature. In the same vein, one could ask "whose childhood" is being prioritized in childhoodnature. In the Environmental Education Research special issue on Childhood and Environment, Barratt Hacking et al. (2007) describe ways to engage children more equitably in research and to support children's participation in environmental learning. While commendable, there was no explicit mention of the need to first reveal the underlying norms that presuppose our expectations of research processes and outcomes that are deemed inclusive. For example, we seek "authenticity" in our research by building trust and using methods that are accessible to children. However, we also seek data that are "usable." Armed with a compulsion to systematically capture children's voices from our perspectives as researchers, we may unintentionally render children silent (Spyrou, 2016). Features of childhood that are incongruent with our methodologies are likely to escape us, along with nuanced meanings of what children are trying to say. Lather (2009) in Spyrou (2016) adds that the desire for empathy establishes oneness between researchers and children when in fact respect for differences should guide our inquiries. This enables us to move beyond fixed points of knowing that exist within pre-conceived categories of childhood (Spyrou, 2016).

Childhood learning is not only about the degree of choice that children have in exercising their options, but also about the choices that are made for children, either intentionally or unintentionally. For example, "charismatic megafauna" continue to dominate the characters used in children's books, as well as mainstream television programs and animated films for children. Nature also plays a significant role in children's stories about the development of morals and identities (Kellert, 1993). In fact, Mergen (2003) asks the difficult question of whether we are, as adults, imposing our preferences on children because we are the ones who wish to live vicariously through them. This suggests that the argument to be in/as nature is for *everyone*, not only children. We create archetypes when we accept without question, the everyday, even though it is "an important sphere of contestation, struggle and resistance" (Giroux, 1992), and it reiterates the need to question our assumptions of childhood.

Children in Nature Contested and Resisted

In the US, a popular view of children in nature involves idealized experiences such as climbing trees, digging holes, peering under rocks, getting dirty, and generally being immersed in the textured details of their immediate surroundings (Mergen, 2003). In this case, nature refers not only to the setting where children's activities take place but also the presumed "naturalness" of children's behaviors. Yet this idea of children in nature is frequently *contested* as children face increasing concerns about their safety, which results from adults' fear of crime, bullying as well as inadvertent injuries. Importantly, even if children were given the spaces and freedoms to behave instinctively, not all children would necessarily lean toward these idealized interactions. Children from racial minorities residing in low-income urban neighborhoods, for example, *resist* stereotypes of nature-based interactions when they prefer to run in the streets or simply hang out with relatives (Wee and Anthamatten, 2014). Baylina et al. (2011) found that children in Mexico City frequently used playgrounds located under busy highways. Children and youth living in densely populated, high-rise apartment buildings in Singapore spent time at the "void deck" (open spaces at the base of these buildings) instead of natural spaces such as gardens or house yards that they had no access to (Skelton and Hamed, 2011).

Our views of childhood and nature often end up dictating children's experiences. For example, the stereotype that nature is dangerous may result in fewer outdoor experiences for children (Kong, 2000). When children are "in nature," our expectations of childhood places them under such scrutiny that they are, ironically, discouraged from seeking their own adventures. Children also face immense pressure to follow adult-sanctioned rules. Physical and social borders firmly entrench children in their position as "adults-in-waiting." We put up fences in playgrounds or parks, and post signs that issue a list of acceptable behaviors (Thomson, 2007). Gender norms are also a contributing factor, where girls are given less freedom than boys at the same age to travel afar (Wee and Anthamatten, 2014). In Singapore, adults maintain spatial hegemony over children and youth by policing for "delinquent" actions in public spaces (Skelton and Hamed, 2011).

Rules regarding "proper" behavior distances children from the environments they inhabit, making it much more difficult for them to interact with (in) nature. Is it any wonder then, that we worry about children losing their spontaneity and creativity to fully experience their surroundings, or that they grow up to become adults who prefer seeing breathtaking views from the comfort of their car than they might on a trail? This is not to suggest that there is a right way for children to experience nature. Instead, we should recognize how childhoodnature is inherently shaped by the normalizations of childhood. Children growing up in an information and technology era, for example, have different views and realities about nature. Hayward (2012) describes how young children growing up on Google earth (in reference to the free software program that provides real time aerial as well as street-level views) are more comfortable learning about places on computers than they are actually exploring them in person. In his study of Boys and Girls Clubs in Denver, Martz (2017) found that experiences "in nature" were not significant enough to warrant inclusion in children's journals. These children spent one week engaged in outdoor activities at a camp with less adult supervision than

they encountered on an everyday basis. When these children were later asked to provide pictures of places where they enjoyed spending time, they chose familiar, urban spaces (e.g., fast food outlets) where they "hung out" with friends and/or family.

The Nature of Childhood in Cities

Worldwide, the majority of children live in cities (UNICEF, 2012). It is important, therefore, to consider the relationship between urban spaces and childhood, especially how systems of power and privilege affect children. With urban growth and development on the rise, green spaces gradually become adult spaces as children become less prominent in the design/use of urban terrain. For example, children who "hang out" in public parks or streets in the United Kingdom "transgress the boundaries defined by adults [through the] nonconforming usage of places" (Matthews and Limb, 1999, p. 69). Contrary to such practices in Minority western countries, children in Singapore are actually welcomed in shopping malls as these are considered "training grounds" for consumptive practices that are encouraged by the government (Skelton and Hamed, 2011). Nevertheless, spaces for children have undergone transformation as the intensity of urban living increases. Removing unofficial uses of spaces for imaginative play also removes children as a feature of contemporary life in cities and leads to the withdrawal of children from public urban spaces.

The city also presents a symbolic tension between romanticized notions of childhood as a state of innocence, and the urban as a place of corruption and danger (Jones, 2002). This dichotomy is problematic as adults' expectations and assumptions about children change in urban spaces, e.g., safety concerns may limit the types of activities children engage in, where and with whom they play. Berg (1972) in Jones (2002) notes that, "cities hate children because of the lack of contact with nature, because of the fear which confines them, and because of the control placed on them" (p. 22). In response, people have moved to suburban areas where families are afforded more "freedom." As Malone (2007) points out, however, children in these places still end up being "bubble-wrapped" for protection, with few opportunities for individual mobility or autonomous explorations/play. Adult expectations of childhood continue to persist regardless of setting (urban or suburban). This places constraints on children's lives and how they choose to live them. Furthermore, this "flight from the city" may bring with it unintended consequences such as gentrification, where rising property prices driven by middle class in-migration isolates poorer families, and ironically makes it more difficult to access children's places such as schools and parks (Malone, 2007).

Malone (2007, p. 525) argues for a shift away from this "protectionist paradigm" toward communities where parents and children can feel safe, and for teachers to engage students in active learning. Gill (2008) suggests a space-oriented approach that would provide easy and welcoming access to public areas, a child-friendly transportation system, and school grounds that are freely available when the school day is over. Here, the emphasis is not on bringing children to nature or vice versa (both of which accentuate the human-non-human divide), but on changing our conceptions of children, childhood and nature. In addition to these proposed changes, there are facets of

modernity that have brought advantages to children in a rapidly urbanizing world, e.g., the ability to view nature through high-resolution images on smartphones (Barton, 2012). This, however, physically distances children from natural spaces, e.g., there is no need to venture outside if nature is available on the phone. It is also important to recognize that access to technology is a privilege in a digital world, e.g., there are over 300 million children and youth who are not connected to the internet (UNICEF, 2017). According to Jones (2002), these tensions represent the globalization of childhood, with Internet and communication technologies reconfiguring how children inhabit urban environments and how they access public outdoor spaces.

Conclusion

This childhood we are discussing is different than those of our parents and their parents. Children's lives today "seem more confined, pressurized and commodified, and yet maybe they are liberated in other ways too – through access to information, technology and related lifestyles and identities" (Jones, 2002, p. 17). This new world exists for children in ways that as adults we may never know or come to understand. Recognizing the nature of childhood in childhoodnature is not only to confront this reality, but also the boundaries of our/children's existence. Borders are drawn for children within differentiated systems of power and privilege. Childhood and nature are managed in ways that conform to adult expectations. We recognize the need for children to be in nature but are reluctant to let children do so themselves. It is a contradiction maintained by normalizations and discourses, as evidenced by this sign at the zoo that reads, "have fun playing in nature but stick to the pathways, please." (Fig. 4).

Fig. 4 Image of a sign at the Denver Zoo (photographed by author)

This paradox brings the concept of childhoodnature into sharper relief and highlights the need to further explore its fundamental assumptions. Whose ideals does childhoodnature represent and what roles do children have in that vision? Children's realities are either expanded or constrained based on the representations of childhood that are imposed on them. Will future generations of children simply echo our voices of change or can they become the change that this world needs? The answer to that question requires us to move beyond the what of childhoodnature to further investigate the *why* and the *how* of it.

Cross-References

- ▶ Children in the Anthropocene: How Are They Implicated?
- ▶ Conceptualizing Parent(ing) Childhoodnature Through Significant Life Experience
- ▶ Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature
- ▶ Uncommon Worlds: Toward an Ecological Aesthetics of Childhood in the Anthropocene

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Childhoodnature Alternatives: Adolescents in India, Nepal, and Bangladesh Explore Their Nature Connectedness

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Helen Widdop Quinton and Ferdousi Khatun

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Abstract

Enhancing children's connections with nature has emerged as a "hot" topic in child development and learning discourses over the last decade and in the

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context of childhood that is increasingly screen mediated. Priveleged, Minority western modernity perspectives dominate, with a harking back to a romantic view of (usually young) children frolicking in nature. Rarely is there consideration of diversity within the discourse, in terms of lifestage or cultural, geographic, and socioeconomic contexts. In this Chapter, adolescents from a range of Majority (world) situations in India, Nepal, and Bangladesh contribute their perceptions, conceptualizations, and practices of nature in their lives as researchers within a "child-framed" methodology (Barratt Hacking et al., 2013). Socioecological factors influence the adolescents' nature knowledge, attitudes, and pro-environmental behaviors. The adolescents in these Majority contexts live intimately connected to natural systems, but the life for these adolescents in India, Nepal, and Bangladesh is very different to that of dominant conceptualizations of Minority western-style childhoodnature. The factors that influence their nature connectedness provide alternatives for conceptualizing and nurturing childhoodnature.

Keywords
Ecological literacy · Majority (non-Western) context · Nature connectedness · Socioecological · Adolescents · Culture

Introduction

> This grasshopper has two different colour – one is green and the other is a golden and black, so it looks a nice colour. A natural creation, the gift of natural. (We) enjoy the jumping. (Adolescent boy, Chuikhim village, India)

Orr (2011) describes people who have no recognition of their connectedness with natural systems as "ecological yahoos" (p. 252), as ecologically illiterate with little or no knowledge of the natural environment and natural systems. Orr's colorful language reflects popular contemporary concerns about the increasing separation of people and nature in a context of global attention on the need to enhance nature connectedness and pro-environmental behaviors. Such perspectives predominantly originate in privileged, Minority western contexts and do not reflect the realities of many children and adolescents in Majority world countries.

This Chapter explores silences in the "New Nature Movement" (Louv, 2011) and disrupts the often nostalgic view of childhoodnature through the nature connectedness and ecological literacy of adolescents in less privileged, Majority world regions in both rural and urban areas of Bangladesh and remote Himalayan regions of India and the Kathmandu Valley of Nepal. We share a collection of "stories" from adolescent researchers (aged 14–17 years) involved in different studies in these regions to highlight possibilities for enabling and enhancing adolescents' nature connectedness. The childhoodnature experiences of the adolescents portrayed here are different from the carefree and romanticized idyll Louv (2005) promotes in his call to reconnect children with nature. Such differences serve as a reminder that childhood does not follow a universal pattern and childhoodnature perspectives drawn from mostly affluent Minority western perspectives are not the only indicators for our attention.

Through their photographs, drawings, and conversations, these adolescents give voice to their childhoodnature perceptions, beliefs and practices, and the position of natural systems in their daily lives. Their voices disrupt the dominant childhoodnature discourses and aspirations that permeate the "New Nature Movement" of "No Child Left Inside" (Louv, 2011) and recognize alternative perspectives and approaches. Sociocultural influences, postcolonialism, neoliberal realities, and indigenous perspectives impact on these adolescents' childhoodnature experiences; this illuminates key determinants of environmental knowledge construction, practices, and meaning making and extends our understanding of childhoodnature to rarely explored Majority world contexts.

Conceptualizing Childhoodnature

Systems thinking influences our exploration of adolescents' nature connectedness in India, Nepal, and Bangladesh. By systems thinking, we refer to consideration of the constituent elements and interconnections that are structured into a productive "whole" (Meadows & Wright, 2008), be this a system in nature or a human-created system. Systems thinking focuses our attention on parts, connections, and "flow" of

the dynamic sociocultural and ecological systems of adolescents' lives. Systems insights direct attention to factors influencing childhoodnature connections following Capra's proposal that "to understand a (system) pattern we must map a configuration of relationships" (1997, p. 81).

Making connections with nature has been recognized as an essential element of human development (Brody, 2005; Hasbach & Kahn, 2013; Kahn & Kellert, 2002). Humans, particularly children, have been observed to have a natural affinity and curiosity with nonhuman nature. Wilson (as cited in Orr, 2004) called this phenomenon *biophilia*, a term that has been used by many to describe this human affinity with nature across time and cultures (Kahn, 1997). Natural systems are at the basis of all life on Earth. The global apex species humans are powerful manipulators of nature, such that many are now identifying a new geological era, the Anthropocene, to recognize human environmental impacts on a planetary scale (Steffen, Grinevald, Crutzen, & McNeill, 2011). Despite human changes to natural systems, our basic survival needs are still ultimately dependent on the networked ecosystems of the planet. Humans are also embedded in our social systems – the cultural, political, economic, and more recently techno systems of our lives. Historical philosophizing on human ways of being created a nature-culture dichotomy of thinking that has only recently come under challenge (see, e.g., the writings of Haraway, 2003; Latour, 1993, 2005). Perceptions of a separateness of humans from nature, and the dangers of this in the light of concerns for the sustainability of natural systems, are increasingly part of academic and popular discourse. As Jordan poses, "the split with nature is at the heart of our environmental crisis" (2009, p. 30).

The term childhoodnature introduced in this handbook reflects challenges to the traditional nature-culture divide that is encapsulated in Haraway's term "naturecultures" (Fawcett, 2013; Haraway, 2003), reflecting the inseparableness of nature and culture. Complex, mutually defining interrelations occur between culture (the human way of interacting with the world) and nature (the networks of natural systems human biologies are situated in). Aligned with this is now the term childhoodnature introduced in this handbook that we are using as a provocation and reminder of the embeddedness of children and childhood as part of the natural world, guiding our exploration of the lived experience of nature for adolescents in India, Nepal, and Bangladesh.

What do we mean by nature? Williams (1983) identifies "nature" as complex and difficult to define. The "nature" adolescents interact with is variously described, with related terms including the outdoors (outside), the (natural) environment, the "nearby nature" (Kaplan & Kaplan, 1995) of created and landscaped "green" locations (parks, gardens, etc.), and relatively undisturbed natural (wild) ecosystems. Our use of nature encompasses any green, white, or blue (Korpela, Borodulin, Neuvonen, Paronen, & Tyrväinen, 2014) nature-rich setting. This includes house gardens, crop fields, the snow-covered Himalayan mountains, water catchment areas, forests, and urban rooftop gardens. Human "nature" is another version of nature entirely as Williams established in his five-page discussion of the meaning of this key (English) word. For our purposes, we consider the cultural "rules" that permeate human societies, as well as the personal meaning making of psychological processes (such as self-discovery that is particularly relevant to the lifestage of

adolescence), as the "culture" dimensions of naturecultures and childhoodnature (Matsumoto & Juang, 2008). A lens selected for manageability while still recognizing that this is a narrowing of the encompassing concept of naturecultures (and childhoodnature).

Increasingly nature or natural systems (biology and ecology) are coupled with social/cultural processes to frame onto-epistemological explorations of human-nature relationships and interactions. Examples of these new merged ways of thinking are Ingold's notion of humans as "biosocial becomings" (2013, p. 9), while White, Rudy, and Gareau call for imagining a future through "hybrid social natures" (2015, p. 215). Similarly a socioecological lens for conceptualizing learning and being is becoming more widely used (Brown & Harris, 2014; Kyburz-Graber, 2013; Wals, 2007; Wattchow, Jeanes, Alfrey, Brown, Cutter-Mackenzie, and O'Connor, 2014) to focus consideration of nature-culture entanglements. The dynamic interplay of environments and cultures that impact on a person's experience of the world is represented by the well-known ecology of human development framework proposed by Bronfenbrenner (1977, 1979, 1993, 1995) and Moen, Elder, and Luscher, (2001). Bronfenbrenner describes a hierarchy of influences based on a systems approach to locating the complex array of factors and interchanges through which an individual gains their knowledge, makes sense of their world, and in turn impacts on the world. We have found that Bronfenbrenner's nested systems of dimensions (shown in Fig. 1), that an individual interacts within,

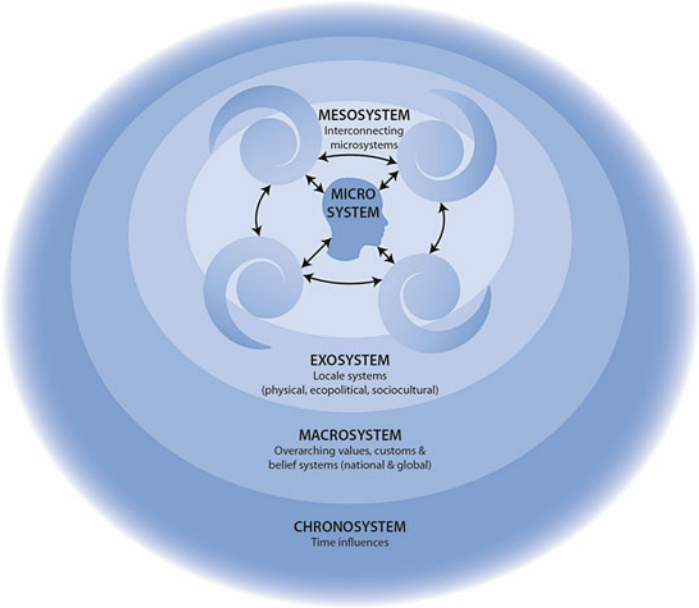

Fig. 1 A representation of the socioecological influences in an adolescent's life based on Bronfenbrenner's (1977, 1993) social ecology systems theory of human development (Widdop Quinton, 2015)

provide a framework for analyzing the people, places/spaces, and cultural factors that are important to adolescents in their nature-connectedness explorations and for making sense of their positioning of nature. We realize that Bronfenbrenner's theorizing is problematic with its marginalization of the natural environment and a strongly human-centric focus. So we use the framing of intersecting systems of natures and cultures, overlaid with a focus of attending to the natural and more than human, to aid our conceptualizing of nature-connectedness mediation factors in the context of Majority world cultural.

Nature Deficits?

The proposal of "nature-deficit disorder" popularized by author and journalist Louv (2005, 2009) has generated much interest in popular and academic discourse about the need for promoting children's experiences in nature and local natural places. Nabhan and Trimble (1994) and Pyle (2002) previously posed concerns regarding modern lifestyle impacts on childhood experiences of nature; however, Louv's writing has catalyzed a passionate response in the wider education and environment communities which has led to the slogan "No Child Left Inside" (Louv, 2007). Louv maintains that there is an absence of nature in the lives of today's "wired" generation of children. Griffiths has continued this emotive portrayal of modern childhood as "unnatural" and disconnected from "kith" or homeplace nature (2014, p. 11). Going further, Louv links the lack of connection to nature in children's lives to some of the most worrying childhood trends: obesity, severe anxiety, attention deficit disorders, and depression. The trends reported by Louv were initially taken up more strongly by the wider community than the academic community, although research in the early childhood field in relation to children's nature connectedness has increased more recently (Munoz, 2009).

Ecological literacy or ecoliteracy has been used to describe a person's understanding of natural environment elements and systems, including the interconnectedness of people, societies and nature, and the application of this understanding for sustaining socioecological systems (Capra, 1997; Cutter-Mackenzie & Smith, 2003; Orr, 2011). There is some consensus related to concerns of declining environmental or ecological literacy evident in affluent Monority western societies (Baker, 2007; Cutter-Mackenzie, 2004; Orr, 2011). However, the childhoodnature experiences promoted by the popularist "New Nature Movement" (Louv, 2011) are not necessarily a realistic picture of childhood experiences in nature, based as they are in romanticized affluent Minority western perceptions (Munoz, 2009). The rural childhood idyll of the nostalgically portrayed "good life" is in fact not the case in many contemporary contexts (Government of India, 2014; Matthews, Taylor, Sherwood, Tucker, & Limb, 2000). Louv's work is problematic in that it is based solely upon trends in the USA and does not acknowledge other contexts, such as the Scandinavian tradition of *friluftsliv* – of spending time outdoors (Henderson & Vikander, 2007). There is limited knowledge about the environments that children experience in diverse cultural contexts (Barratt Hacking, Barratt, & Scott, 2007; Chawla, 2007;

Fawcett, 2013; Sobel & Orion Society, 1996) despite some recognition that contextual factors shape children's nature connectedness differently (Collado, Íñiguez-Rueda, & Corraliza, 2016; Müller, Kals, & Pansa, 2009).

The focus on (re)connecting children with nature is primarily on younger children (see, e.g., Louv, 2007), while older children/adolescents' nature relationships are underrepresented (Mannion, Sankey, Doyle, & Mattu, 2006; Pointon, 2013). This may be due to an observed decline in interest in nature during adolescence (Hart, 1979; Kaplan & Kaplan, 1995, 2002; Korpela, KyttÄ, & Hartig, 2002; Nabhan & Trimble, 1994; Sommer, 1990), such that researchers are dissuaded from pursuing research with adolescents. it would seem, however, that this area of research is crucial in order to identify the most effective means of keeping adolescents connected with nature in a climate of concern about humans perceiving themselves as separated from natural systems.

All nature experiences and relationships are not the same. Popularist views of child-nature interactions are primarily restricted, even somewhat prescriptive, representations with little recognition or understanding of childhoodnature beyond nostalgic, affluent Minority western conceptualizations. The adolescents' stories from Bangladesh, India, and Nepal highlighted here extend consideration of childhoodnature beyond early childhood and Minority western contexts as a way of broadening our understanding of factors that shape adolescents' relationship with nature and natural system connectedness.

Nature Benefits

Apart from nature and natural systems powering all life on Earth and supporting humankind's physical well-being as discussed earlier, human-nature relationships can also benefit people's psycho-emotional health and well-being. The restorative effects of time in nature are recognized with theorizing of attention restoration and stress-recovery responses (see, e.g., Basu, Kaplan, & Kaplan, 2014; Hasbach & Kahn, 2013; Kaplan & Kaplan, 1995) and the body of work on environment restoration by Korpela & Hartig (1996), Korpela, Hartig, Kaiser, and Fuhrer (2001), Korpela et al. (2002, 2014). Nature connectedness for children (and all humans) is vital for holistic health and well-being. Indigenous ecohealth scholar, Arabena (2006), goes as far as posing socioecological impacts she terms a "disconnect disorder" for the layered disconnection of people and nature-referent ways of being. She identifies this disconnect for both indigenous people and for those "ensnared" (p. 45) by the ultimately empty and unrewarding consumerism of affluent modern life (2006). Considering nature connectedness at a community and planetary level, many scholars pose interactions that lead to a bonding with nature as an important first step in fostering a nature-caring ethos necessary for sustaining the planet (Chawla, 2007; Gruenewald, 2003; Leopold, 1966; Orr, 2011; Sobel, 2004). How adolescents' nature connectedness is constructed through their many and varied socioecological experiences is therefore important to explore – for people and planetary well-being.

Child-Nature Relationships

In exploring people-place relations, such as our focus here of how adolescents in India, Nepal, and Bangladesh position nature in their lives, the theoretical understandings of the role place plays in the human psyche are connected. This is particularly relevant for the adolescents at this time in their lives that is characterized as one of self-discovery (Marcia, 1983). Place interactions affect a person's perceptions of themselves as "places hold and shape our experiences" (Greenwood, 2013, p. 93). In environmental education, there is a growing interest in linking connections between perceptions of self in relation to natural places and caring for nature behaviors (Clayton & Opotow, 2003; Devine-Wright & Clayton, 2010). Descriptors of ecological identity (Thomashow, 1995) and environmental identity (Clayton, 2003) as specific examples of self and place identity have developed in the discourse, and Orr (2011) poses a sense of place that connects with nature as promoting ecological literacy (what he describes as proficiency in knowing nature). Self-place interactions align with Bronfenbrenner's human ecological systems theory that informs our research.

Time spent in nature does not necessarily promote ecological identity and pro-environmental behaviors; however, nature experiences enhanced by positive emotional connections are more likely to strengthen adolescents' affinity with nature (Müller et al., 2009). There is a large body of work about significant life experiences that influence affinity with nature and pro-environmental behaviors. Positive childhood experiences in nature, often mediated by an adult guide, is a key factor in enhancing nature connectedness (see, e.g., Chawla, 2002a, 2007; Palmer & Suggate, 1996; Palmer, Suggate, Robottom, & Hart, 1999; Wells & Lekies, 2006). Families in particular are the social conduit to an environmental ethos (Francis, Paige, & Lloyd, 2013; Payne, 2010; Robottom, Malone, & Walker, 2000). Indigenous ways of knowing nature and the land are similarly socially mediated (Cameron, Mulligan, & Wheatley, 2004; Cameron & San Roque, 2003; Wheaton, 2000; Yunkaporta & Kirby, 2011).

Previous explorations of self-nature relationships categorize young people's positioning of nature as ranging from simple (object) perspectives of nature as elements and background to more complex cognitive, embodied, and affective (relational) perspectives of nature integrated within their lives (Cheng & Monroe, 2012; Collado et al., 2016; Loughland, Reid, & Petocz, 2002). Beyond childhoodnature studies, theorizing also identifies anthropocentric (human-centered) and ecocentric (nature-centered) perspectives of human-nature relationships (Eckersley, 1992). In an interesting departure from the object-relational, anthropocentric-ecocentric binaries, Evernden (1989) poses a third category of "nature as wonder" that does not seem to have permeated the literature. Minority perspectives dominate such self-nature theorizings. Our research with adolescents prompts us to ask are such relationships universal to childhood or expressions of cultural conditioning?

"Child-Framed" Research

Majority world children's worldviews in our research illuminate alternative child-nature relationships. Working with adolescent research partners following a "child-framed" methodology (Barratt Hacking et al., 2013) contributes an insiders' perspective, giving adolescents agency and voice in the research. Taking a child-framed approach addresses calls for greater representation of young people's perspectives (Rickinson, Lundholm, & Hopwood, 2009; UN, 1989) and pragmatically recognizes that places and nature significant to children and adolescents may not be identifiable by adults (Fawcett, 2013; Gold & Gujar, 2007; Hart, 1979; Korpela et al., 2002; Nabhan & Trimble, 1994). Our qualitative, child-framed approaches have generated visually rich narratives that we draw upon here.

The Nepalese, Indian, and Bangladeshi adolescents' contributions to this chapter are childhoodnature highlights from four separate qualitative studies involving adolescents as active research participants exploring connections to the natural environment in their lives:

- In Nepal, four adolescents, aged 14–15, contributed to a study on community reuse of water.
- In the Eastern Himalayan region of India, 12 adolescents aged 15–17 in a remote rural village and 10 adolescents aged 14–16 from a semi-urban area researched the most important places in their lives.
- In Bangladesh, participants exploring adolescents' ecological literacy were aged 14–15 years, with 42 from an urban area and 42 from a rural area contributing their ideas, with 25 of these adolescents undertaking their own research and participating in group discussions and interviews.

Most of the Nepalese and Indian participants were Hindu or Buddhists of the Nepali cultural group, while the Bangladeshi adolescents were predominantly of Muslim faith.

Despite geographic, language, political, spiritual, and social differences between these adolescents, they are historically and culturally connected. All three countries are South Asian and have some shared historical influences including a recent history of British colonization and exploitation in the seventeenth to early twentieth centuries. Both India and Bangladesh were occupied by the British, and Nepal fought for territory dominance with the British East India Company with the British eventually becoming a highly influential ally. The current postcolonial situation in India exhibits a huge divide between the wealthy elite and the majority, rural, subsistence poor (Guha, 2010/1999) that is mirrored in Bangladesh and Nepal.

We must point out that although our young partners had agency in the research activities, their contributions may have been subjectively skewed to what they regarded as acceptable to share with us. This was inevitably influenced by the situational dynamics inherent in the created research relationships between our

adult selves and these adolescents. This was compounded at times through some language barriers. Only one of us is of Majority world background, so some of the research activities were conducted with the assistance of local translators and guides. As adults and visitors to the adolescents' communities, we were always mindful of researching ethically and with sensitivity to minimize the impact of our relationship power or personal interpretations, ensuring the adolescents could authentically "voice" their ideas. A focus on visual representations (photographs, maps, and drawings) elicited powerful expressions of the adolescents' nature connectedness that were not reliant on self-reported or translated perceptions and behaviors.

Childhoodnature in Bangladesh, India, and Nepal

Exploring childhoodnature – how children are part of and relate to nature – was not necessarily the main focus of our research activities with the adolescents in India, Nepal, and Bangladesh. Yet the importance of their relationship with nature, the position of nature in their lives, and their lives in relation to natural systems is evident through the adolescents' photographs, drawings, maps, and conversations.

Nature is not just a pleasant background to their lives. The adolescents regularly identify nature as an actor and affiliate in their everyday lived experiences. Nature permeates their lives, often determining their activities – be this working with life-sustaining resources, engaging with community-significant natural places, mediating culture and spirituality meaning, or enabling positive emotions such as enjoyment and relaxation.

In India, Nepal, and rural Bangladesh, the adolescents roam freely around their community. Their lives evidence a seamless integration of their socioecological systems including home, family places, village or community spaces and the nearby nature of gardens and crops, and the wild nature of the forest, with much of their day spent outdoors. Bangladeshi urban boys are free to roam their communities, similar to the Indian and Nepalese adolescents, but the Bangladeshi urban girls are more restricted due to social and safety factors. In urban Bangladesh, adolescents tend to spend more time inside and experience nature through rooftop gardens, parks, and ornamental lakes. Their wild nature experiences occur through visits on family holidays and on school excursions.

Despite most of the young researchers living in close contact with nature, this was not an idealized nature frolic characterized in affluent Minority western children-in-nature discourses (Munoz, 2009). The tough realities of survival translate into a focus on nature as a providing partner with the adolescents' prime motivator for nature relationships as family and community wellbeing. Acknowledging the physical demands associated with many of the community's rural, subsistence lifestyle in nature, one of the adolescents, Laxmi, in India comments about his photograph (Fig. 2) of a villager using a traditional basket to transport materials (rocks, cut foliage for the animals, wood, etc.) around the village and surrounds and states that "In our village the people work harder, they work very hard on their land."

Laxmi's comment suggests a personal experience of the hard work associated with the village, rural lifestyle that is consistent with the contention that adolescents in Majority

Fig. 2 Laxmi's photograph of the hard work associated with village life

contexts are positioned differently to adolescents in affluent Minority societies. Brown, Larson, and Saraswati (2002) characterize adolescents in India as dutifully engaging with societal expectations and responsibilities in a society shaped by the echoes of colonialism and the caste system, a hierarchical social system. So the adolescents' local economic and physical factors (Bronfenbrenner's "excosystem" influences) and overarching cultural influences (Bronfenbrenner's "macrosystem" factor) are indicated in the adolescents' development of their relationship with nature. This situation contrasts with the affluent Minority western positioning of childhood as a time free of responsibilities (Munoz, 2009). Laxmi's recognition of the collectivist efforts for community good is echoed in other Majority world and indigenous contexts (Appuhamilage, 2017; Gold & Gujar, 2007; Panelli & Tipa, 2007). The Indian, Nepalese, and rural Bangladeshi adolescents' experience of their outdoor life is in direct contrast to the romanticized view of a carefree, rural childhood often portrayed in affluent Minority western discourses, particularly those related to childhoodnature connectedness (Munoz, 2009). The Government of India (2014) also recently recognized the harsh conditions of adolescents marginalized by "structural poverty" (2014, p. 21).

Nature as Community Life

The adolescents in the research studies identify the importance of nature in their lives through a lens of value to their family and community. This is consistent with collectivist good and interdependence as dominant cultural values observed in Majority world contexts, where the cultural imperative is for the family/community/societal greater good in contrast to the predominantly individualistic approaches in many affluent Minority western contexts (Appuhamilage, 2017; Panelli & Tipa, 2007). Culture shapes people's relationship with nature (Evernden, 1989; Mead, 1977). In Nepal plants are deeply culturally significant (Kunwar & Bussmann, 2006). A shared conservation ethos and careful consumption of natural resources are embedded in Bangladeshi culture (Islam, 2006) and

Indian traditional philosophies (Almeida & Cutter-Mackenzie, 2011; Ravindranath, 2007; Sarabhai, 2004). This ethos of nature care combined with a cultural preferencing for collectivist value is evident in the adolescents' positioning of nature as valuable in their lives.

In the villages in India, the forest areas around the village are identified by the adolescents as essential for firewood for cooking and fodder for the animals, as well as appreciated for their views, as cultural symbols and for "refreshment." The adolescents are aware that their lives depend on natural systems, identifying cultivated and wild nature around the villages as important to them. Suvo in rural Bangladesh comments that "The land of Bangladesh is very fertile. Different types of fruits and crops such as rice, jute, wheat are produced in this land. Most of the people depend on this land for food." Similarly, the adolescents in Nepal identify their connection with natural systems through the story of water in their lives. Pragya explains, "We use well water. We also get water from the stone tap in the rainy season. Well water is enough for us in summer but we face problem in winter. Then we buy water from the water supply agency but that water is expensive and it takes time to provide water." Their most common source of water in the area is underground water from wells. Most families use well water for bathing, cooking, washing, and cleaning. Scarcity of water has necessitated the use of waste (gray) water. Bijay comments, "We use waste water for watering plants and flushing toilet." Pragya demonstrates her prioritizing of family and community by commenting "First we should educate our family members and then the community people about the reuse of waste water." Bangladeshi adolescents also recognize water recycling as an essential element of their socioecological systems through schematics such as in Fig. 3.

Gustafson (2001) proposes that self-place-others factors interplay to determine meaning making in relation to place relationships. The "self" appears less visible in the adolescents' narratives of nature in their lives in Bangladesh, India, and Nepal. This reinforces for us the value of using a socioecological systems lens for framing our inquiry into adolescents' nature connectedness. Informed by Bronfenbrenner's socioecological framing (1977, 1979, 1993, 1995), we identify the overarching cultural context of the adolescents' lives, that values family and community ahead of individuals, as a factor that shapes their perceptions of nature.

Nature as Spirituality

There was also a spiritual dimension to the cultural positioning of nature in the Indian, Nepalese, and Bangladeshi adolescents' lives. Small forest shrines (such as in Lungta's photograph, Fig. 4), prayer flags disseminating prayers on the wind through the trees and via streams, and even ancestors' graves dotted over the countryside depict an integration of the land with cultural spirituality. This visible interweaving of spirituality with nature has unique meanings specific to the adolescents' cultures, while also analogous to traditional ways of being connected to the land recognized in other indigenous contexts (see, e.g., Arabena, 2015; Rose, 2013; Wheaton, 2000).

Rashed from rural Bangladesh believes that if people plant trees and enjoy fruits from the trees, it will make Allah happy and that they will be rewarded. Rashed

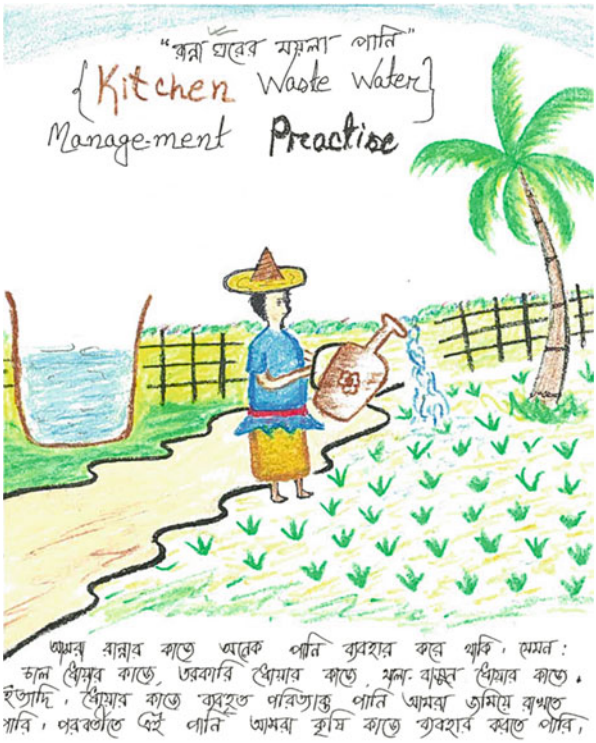

Fig. 3 Rashed's drawing about kitchen wastewater management practice in urban Bangladesh demonstrates "reuse" of wastewater. (Translation of Bangladeshi text: We use a lot of water for cooking such as washing rice, washing vegetables, washing utensils, etc. We can collect this wastewater after washing things, and we can use this water for irrigation later.)

Fig. 4 Indian adolescent Lungta's photograph of a small forest shrine – "Here the travel people use to worship – fire gods, other gods so this is one place outside of their house to worship the nature"

indicates that "In Islam, if we produce fruits and public eat that fruits without any cost then we will be rewarded." He displays a photograph of a custard apple tree in his rural community where "people enjoy fruits from this tree without any cost." Bangladeshi adolescents also talk about environmental cleanliness as an important

Fig. 5 Dia's drawing of "a polluted environment" that requires sweeping

aspect of Islam. Dia's drawing (Fig. 5) shows what she considers "a polluted environment" that a woman is cleaning with a broom made from coconut leaves.

Evernden's (1989) early classification of nature connection relationships included "nature as miracle" for relationships not bounded by scientific/pragmatic views of the world. This categorization is in addition to the more standard object and relational views of nature (see, e.g., Fawcett, 2013; Loughland et al., 2002). For the Bangladeshi, Nepalese, and Indian adolescents, nature provides for their physical needs but also generates wonder, awe, and devotion, nurturing their spirituality and their well-being. For these Muslims, Hindus, and Buddhists, "nature is a blessing" (Islam, 2006, p. 67). The comments about the grasshopper as a gift of nature by Laxmi from India at the beginning of this chapter echo this philosophy.

Ecological Literacy and Identity

The adolescents in remote India, Nepal, and rural Bangladesh live immersed in the natural world with their lives constantly connected to their natural surroundings via their subsistence lifestyle and through their spiritual connections with nature. It is obvious they have an intimate knowledge of their local nature through their detailing of the nature nooks and crannies and their expert knowledge of elements of natural systems that is only possible through highly developed ecological literacy.

This ecological literacy of the Indian adolescents was apparent through the variety and detail displays in their photographs of the sometimes astonishing natural elements of their area, for example, a huge butterfly (Fig. 6). This is just one of the many examples of ecosystem elements the adolescents in India photographed. Bangladeshi adolescents similarly demonstrate expert ecological knowledge about the natural elements and system events of their area. Himu, who lives in a rural location, said "In Bangladesh, Sundarban Mangrove forest is different to

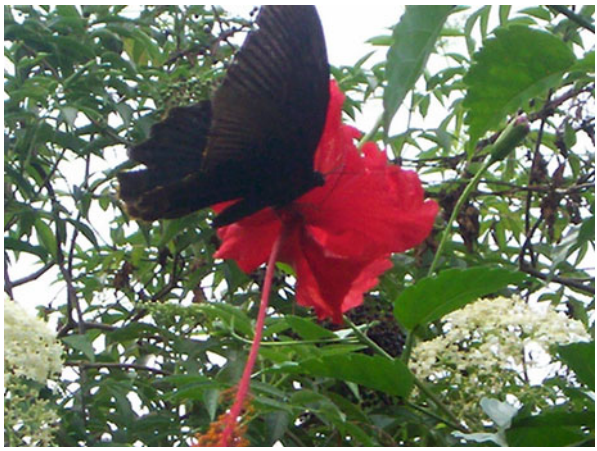

Fig. 6 Pabitra's photograph of a large, black butterfly in India

me. Different types of trees are found in Sundarban such as sundari, shal, gewa, goran etc. We can find medicinal plants in the forest too. Royal Bengal Tiger and beautiful deer are seen in Sundarban." And Bornali, also from a rural area, adds, "Seasonal variation of Bangladesh is very charming which is important to me. In summer we eat a lot of mangoes, jackfruits, berries and litchis (lychee). In the rainy season rain helps farmers and keeps cool the environment. In autumn we can see the beautiful white Kash flowers at the bank of the river. In the late-autumn we celebrate special festival with new rice." While Dipa identifies sustainability actions with the comment, "Climate change can be solved partially by planting trees. For example, neem plants keep the environment healthy and works as pesticides." Gold and Gujar (2007) and Tilbury, Stevenson, Fien, and Schreuder (2002) also note the highly developed ecological literacy of people in other remote areas of India, suggesting this is a widespread trait of the people in this region.

The urban Bangladeshi adolescents' daily lives are not as closely connected to nature through physical proximity, as has been observed with urban dwellers in other parts of the world (Orr, 2011), although the urban Bangladeshi do maintain their nature connectedness through their cultural philosophies and practices. Plants, particularly flowers, are symbolic of different cultural events and festivals. Photographs of flowers, such as the marigolds in Figs. 7 and 8, are a feature of all the adolescents' photographs.

The adolescents' highly developed ecological literacy and connections with nature indicate an opposing positon to the generally accepted Minority conceptualization of adolescence as a time of disconnection from nature (see, e.g., Kaplan & Kaplan, 1995, 2002). The adolescents in India, Nepal, and Bangladesh demonstrate that a disinterest in nature is not an inherent characteristic of this lifestage.

In addition to their appreciation of nature as integrated with their lives, the adolescents exhibit pride and a sense of identity connected with the unique nature of their area, an ecological identity, as is exemplified by Indian adolescent Hima's explanation of a particular spider that is "no ordinary spider you can't find like this in the region." Ecological or environmental identity is advanced as a self-identity

Fig. 7 One of the many images of marigold flowers taken by the adolescent in India of this medicinal and festival plant

Fig. 8 Rian's photo of marigold flowers used to mark the Language Memorial in urban Bangladesh

variant that incorporates nature as an integral element of self-identification (Clayton & Opotow, 2003; Thomashow, 1995). Enhancing this ecological aspect of the adolescents' identity construction is the sense of belonging to "country" that is recognized in indigenous people elsewhere, such as in Australia and Canada (Arabena, 2015; Parkes, 2010; Rose, 2013). As Santo comments, "Bangladesh is our motherland." Santo makes reference to a song written by Dijendrolal Roy, "*Emon deshti kothao khuje pabenako tumi, shokol desher ranee seje amar jonmovumi*" (Translation: *Created from dreams anchored by memories, nowhere else a place of such luminous glories*). Santo continues with discussion of the geography of Bangladesh saying, "These (Bangladeshi) rivers carry silty soil which makes our land very fertile. Different types of crops are produced in Bangladeshi land. Cox's Bazar sea beach is very large and Sundarban mangrove forest is biologically diverse. We have beautiful tourist places."

Socioecological Systems Thinking and Entanglements with Neoliberal Realities

The adolescents' awareness of their lives as co-created by their entwined social and ecological systems is evident through their attention to the systems impacts of change: water scarcity in Nepal (as recounted earlier), earthquakes and landslides in India, and floods in Bangladesh, in addition to general change related to globalization and tourism.

In the remote villages in Eastern Himalayan India, the regular natural occurrence of landslides associated with earthquakes has a big impact on the land and the people that all the adolescent researchers highlight. Landslide damage, such as that pictured in the background of Fig. 9, changes huge areas of the countryside and has ecological and social impacts. Pabitra explains that the landslide has cut them off from access to the food supply of the lower village "because they used to get food there – this land is not accepting them because of landslide." Lungta also comments on the impact of the landslide that forced families to relocate after being segregated from the village community when the road (Fig. 9), the only road to the other side of the ridge, became blocked by the landslide: "That no longer this is our main way for walking, there's no other route to come over here. So there is only a single way. There is no other optional way."

The regular flooding of the river delta system in Bangladesh maintains soil fertility as Santo noted earlier, but this also creates social impacts for coastal dwellers as graphically depicted in Fig. 10 of "homeless" flood victims.

Living within constraints of natural systems is just part of life for the adolescents. Reciprocal caring is part of community life as urban Bangladeshi adolescent, Adronida, describes: "We can reuse our used things. For example, after washing vegetables we can use water for watering plants to keep them healthy. We can also make composts by using fruits and vegetables peels for applying to the plants. Thus, we can improve our environment."

The expanding social ecologies of modern life have resulted in some shifting within the adolescents' socioecological systems under neoliberal pressures, with the press toward free-market tourism business practices. These "dissolving qualities of capitalism" (White et al., 2015, p. xvi) can be at odds with the Indian, Nepalese, and Bangladeshi traditional ways of interacting with nature. Tourism is now a key income source for these areas, but the presence of tourists has an impact on the very places of nature tourists come to visit. The tension between the traditional philosophies of environmental care and connectedness (e.g., Gandhi's vision of ecological care as enshrined in the Indian constitution) and the newer neoliberal realities is evident in some of the adolescents' stories. Both Indian and Bangladeshi adolescents identified the value of their unique natural environments as attractions for tourists for economic benefits to their community but also highlighted the impact of tourism activity on nature. The newer economic imperatives of the market economy experienced by the adolescents are out of alignment with their overarching traditional culture of valuing nature when mapping this to Bronfenbrenner's socioecological systems

Fig. 9 Lungta's photo of the road and the landslide in the distance that now blocks access

Fig. 10 Durijoy's drawing of homelessness of coastal people during floods in Bangladesh

(1977, 1979, 1993, 1995). This discord is evident in the adolescents' accounts that follow:

Liya enjoys the sunset and the marine environment at the iconic Cox's Bazar beach but also highlights all the tourist activity with her photograph (Fig. 11).

Fig. 11 Liya's photo of all the tourists at Cox's Bazar beach in Bangladesh

Fig. 12 Pralay proudly displays the Himalayan mountains that surround his home

In India, Pralay glories in the mountain views from his home (Fig. 12), proud that this majestic site is part of his heritage and brings many tourists to the area. He also demonstrates his concern about the modern-day litter (Fig. 13) that is unsightly

Fig. 13 Litter in the Eastern Himalayan area that disturbs Pralay

and detracts from the beauty of his home, saying that "it is very dirty and when tourist come."

A number of the adolescents in Bangladesh, particularly from urban regions, indicate concerns about the deterioration of the natural environment due to human actions, highlighting problems of pollution, deforestation (Fig. 14), pesticide use, litter, and flooding. Rajon explains, "I do not feel good about the environment. Our environment is worsening day by day because of pollution. Our lifestyle is changing. Over population and industrialisation are the causes of environmental pollution." An apprehension shared by many Bangladeshi about impacts of modernity (Islam, 2006).

Nature Knowing

How did the adolescents of India, Bangladesh, and Nepal develop their nature knowing? The ecological literacy that enabled them to recognize the turbulence in their socioecological systems due to changes in nature relationship practices has not developed through formal school learning. Schools in India, Nepal, and Bangladesh are characterized as a formal, regimented echo of colonial British approaches (Gold & Gujar, 2007; Widdop Quinton, 2015). For example, in Bangladesh, Najura describes "I have participated in an environmental cleaning program and tree plantation program through our school Girl Guides," and Adronida photographed the rose in the school garden (Fig. 15) – both are examples of nature relatedness through nonformal learning, albeit with echoes of colonial influences.

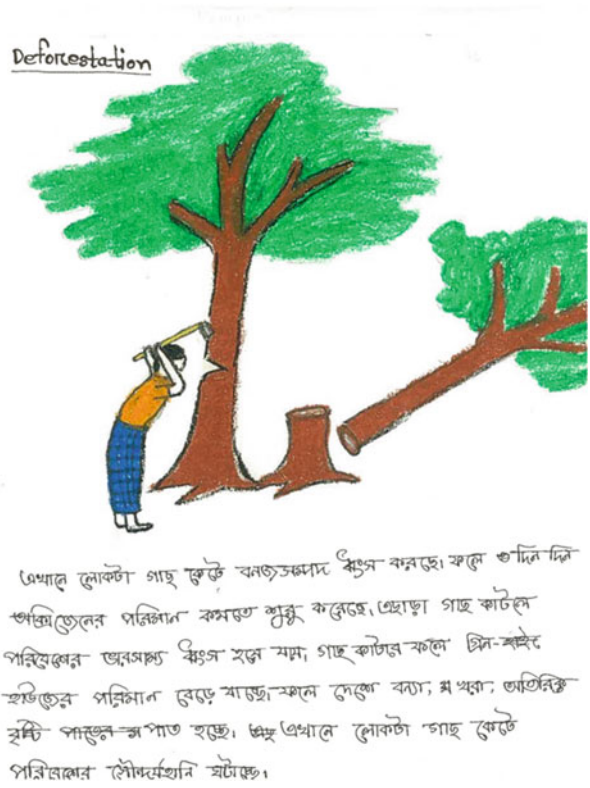

Fig. 14 Durjoy's drawing of "a man is cutting down two trees" indicates "deforestation" (Bangladeshi text translation: A man is destroying the forest by cutting down trees. As a result the amount of oxygen is decreasing day by day. Cutting down trees imbalances the environment and contributes to greenhouse gases so flood, drought and heavy rainfall occur in the country. Here, the man is interrupting the beauty of nature by cutting down trees)

Environmental and sustainability education is rare and at best marginalized in schooling in these countries (Almeida & Cutter-Mackenzie, 2011; Tilbury et al., 2002). In Bangladesh, for example, there is no environmental education as a separate subject; environmental and sustainability aspects are incorporated into other subjects (Haque, 2014). Schooling predominantly focuses on regimented, direct instruction toward high-stakes testing (Chowdhury, 2004; Hossain, 2015). Traditional or indigenous ways of learning and knowing, particularly relating to ways of knowing the land, are identified as different to formal education/school learning (Wheaton, 2000; Yunkaporta & Kirby, 2011). The adolescents develop high-level ecological literacy skills through lived experience, a socially, culturally, and family-mediated traditional way of learning and connecting with nature. Nature-knowing processes are embedded in their way of life with family, culture, and experience being the "teachers." Rural Bangladeshi adolescent Sakib explains that "Many young people learn farming from elderly people. I think culture influence young people's ecoliteracy."

The adolescents' nature connectedness through everyday experiences of nature is consistent with other context findings that proximity to nature (Cheng & Monroe, 2012), family as environmental teachers (Cheng & Monroe, 2012; Gold & Gujar, 2007; Payne, 2010), and supportive life experiences (see, e.g., Chawla, 2002a, 2007)

Fig. 15 Adronida's photo of the rose in the school garden

are implicated in mediating deep connection with nature. The Indian, Nepalese, and Bangladeshi adolescents' display of nature knowing grounded in social processes aligns with increasing recognition of social learning intertwined with ecological learning (Brody, 2005; Hart, 2007; Kyburz-Graber, 2013) and with traditional knowledge practices (Islam, 2006).The stories of nature connectedness from the adolescents in Bangladesh, India, and Nepal also illuminate the powerful influence of a collectivist, interdependent culture on enhancing child-nature relationships. Furthermore, the sacred relationship with nature through indigenous ways of knowing the land enfolds the adolescents into the weave of "country" (Griffiths, 2014). The sort of childhoodnature the adolescents describe is different to the Minority western-styled childhoodnature Louv (2005, 2009, 2011) and others describe. The Nepalese, Indian, and Bangladeshi adolescents' childhoodnature supports their ecological and cultural understandings, nourishes their self-discovery, and provides strengthening solace through spiritual connections and restorative interactions with nature. Their nature connectedness is essential for their healthy development and wellbeing. Their childhoodnature is shaped by the inter- and intra-actions of their socioecological system elements. Considering the positioning of culture as the substrate of social ecologies, it is not surprising to discover the profound impact of the adolescents' collectivist and traditional-caretaker cultural philosophies on their childhoodnature perceptions, values, and behaviors.

Child-Nature Relationship Reimagining Through Childhoodnature Alternatives

Through the Nepalese, Bangladeshi, and Indian adolescents' contextual childhoodnature described in this chapter, we are able to disrupt some of the current child-nature relationship thinking outlined in the introductory sections of this chapter and provide some Majority world childhoodnature alternatives:

1. **Childhood and nature are not disconnected in the Majority world**
   As Cutter-Mackenzie, Malone, and Barratt Hacking argue in the introduction to this Handbook, children are nature, and suggesting a disconnect between children

and nature, as Louv postulates (2005), is therefore problematic. The adolescents from Nepal, India, and Bangladesh demonstrate through their photographs and ideas that they are not disconnected from nature. Rather, nature is intrinsic to their functional, cultural, and spiritual way of being in the world. The dynamic interrelationships and interactions with the natures and cultures of their socio-ecological system shape their sense of belonging, their spirituality, and their identity. They are intimate with nature and literate in nature's ways. These Majority world children from three countries are not only connected with nature in a utilitarian and spiritual sense, but they also recognize their membership of ecological systems and their mutually defining relationship with nature.

2. **Childhoodnature is not all romance**
   Claiming a fundamental lack of a commodity in the lives of children certainly gains attention with the focus not on some abstract "other" but on our familiar and cherished vulnerable young. The language of "deficit" (Louv, 2005) and childhood as "imprisoned" (Griffiths, 2014) in relation to more than human nature experience has sparked a reaction. Interest groups and "movements" are prospering in mainly white, middle-class, affluent, Minority western contexts. However, addressing the concern of nature deficit in modern childhood through a Disney-style fantasy (Taylor, 2011) of nature (re)connections is limiting and exclusionary. A one-size-fits-all vision of nature connectedness devalues alternative realities. As the adolescents here have demonstrated, nature connectedness is not necessarily the romanticized idyll portrayed in the dominant childhoodnature discourse, of carefree, nature-savoring experiences in the wild, "about awakening to creation" (Louv, 2005, p. 333). The representations from adolescents of Bangladesh, Nepal, and India open the discourse to alternative possibilities. Yes their lives were closely connected with nature, but they were not necessarily living the "good life" of a bucolic childhood frolicking in nature. Their lives had to accommodate the often-harsh realities of Majority world subsistence living. This is not to deny the call for re(connecting) children with nature; instead it serves as a reminder that childhood does not follow a universal pattern and conclusions drawn from an affluent Minority western perspective are not necessarily generally applicable. For the adolescents here and other Majority world contexts (Appuhamilage, 2017), childhoodnature is not always a utopian, positive product or process. Sometimes childhoodnature is uncomfortable and gritty.

   This is not to say that the adolescents in Nepal, India, and Bangladesh are necessarily living a repressed, downtrodden, and negative life. The adolescents' relationship with nature is a positive and mutually supporting one, saturated with reverence and values of loyalty and care. Places that nurture young people, sometimes termed "holding environments" (Chawla, 2002b; Malone, 2004), are those that fulfill their needs and support their development. Such places do not have to be perfect, as Bannerjee and Driskell (in Chawla, 2002b) found when working with young people in a "slum" town in India; despite the material deprivations of their lives, the children from this slum were "confident, connected and happy" (p. 135) as a result of living in their socially and culturally supportive environment. Their natures and cultures were not privileged but nurturing

and cohesive, sustaining their development and wellbeing, like those of our adolescents in Bangladesh, India, and Nepal.

3. **Adolescents relate to nature**
   The adolescents of Nepal, Himalayan India, rural Bangladesh, and to a lesser extent urban Bangladesh demonstrate strong connections with nature. This is not just because they do not have the distractions of constant connectivity and shopping malls as do their counterparts in Minority western contexts; their connections to nature are embedded in their culture and their self-sufficiency way of life. This adolescent nature connectedness is highly significant. The adolescents do not evidence a disinterest in nature, disconnecting in favor of interacting with peers, as has been advanced as a characteristic of adolescence by Kaplan and Kaplan (1995, 2002) and others, thus demonstrating that a disconnect from nature during adolescence is not an inherent characteristic of this lifestage.
4. **Childhoodnature is a multiplicity**
   There are versions of "truth" about child-/person-nature relationships that have become acceptable classifications. Cautionary awareness that these are constructed labels for convenience and not reality prevails, but by the power of their existence, these classifications shape thinking. The binary of an object view or a relational view of nature is a common example (see, e.g., Loughland et al., 2002). Anthropo-, eco-, and biocentric conceptions are another group of categorizations of people's positioning of nature often found to be useful (see, e.g., Fawcett, 2013). Others from place psychology are also commonly used – place affordance, dependence, attachment, and identity (see, e.g., Gibson, 2000; Kudryavtsev, Stedman, & Krasny, 2011). Similarly the New Nature Movement's (Louv, 2011) image of the return to the "nature child" of Romanticism has shaped views of possibilities and goals for nurturing child-nature interactions – another "centric," affluent, Anglo-/Eurocentric view (Taylor, 2013a). Our use of Bronfenbrenner's socioecological systems framing enables us to focus on the basics of child-nature interactions and embrace many possibilities. We follow Taylor's (2013a) strategy of deconstructing with an eventual goal of identifying ways to reconstruct for beneficial alternative conceptualizations. Comparisons with other framings led to our position that child-nature relationships are more entangled and complex than commonly applied categorizations allow.

   The adolescents in Nepal, Bangladesh, and India simultaneously hold object and relational views of nature. Although more relationally slanted in their views, with recognition of humans as elements within the natural systems of their place, the perception of nature as a resource to support their lives and to be used for community advancement still permeates their ideas. Hegemonic neoliberal pressures for (industrialized) growth have been identified as a key contributor to the Anthropocene planetary changes (Steffen et al., 2011). The adolescents in both Bangladesh and India map tensions between their communities' economic and nature-valuing imperatives. The adolescents' research suggests they feel the seductive power of the global call for economic growth, but a harmonic incorporation of such modernity within their traditional philosophies is an unresolved issue for them. Some of the adolescents' special places of nature attract tourists

to their region, which they value for supporting local businesses and jobs. Such special places (e.g., Himalayan Mountains) are also significant within the adolescents' culture and religion, so the impact of visiting tourists (e.g., increased litter) concerns them. The adolescents' cultural influences for valuing and living with/in nature appear to prompt critical reflection on behaviors that negatively impact on nature. This suggests such socioecological influences warrant further investigation.

Layered over the functional and cultural categories of nature interactions the adolescents describe is the spiritual dimension of their childhoodnature. This "lost" category of Evernden's classification (Evernden, 1989; Fawcett, 2013), "nature as miracle," is also a vibrant child-nature interaction in the adolescents' lives. Their perspectives are simultaneously human-/social-centered and nature-/ecological-centered, challenging classification boundaries and the normalizing portrayals of romanticized nature connectedness. The Indian, Nepalese, and Bangladeshi adolescents' reality of childhoodnature is one of layers, complexity, and entanglements. The research suggests that, for these adolescents, nature is provider/carer/mother, a cultural symbol and guide, a story, identity, faith, hard work, kith and kin, a joy, and more.

We do not advance the Bangladeshi, Nepalese, and Indian adolescents' socioecological influences as the ideal to follow, not wishing to set up divisions into cultural binaries or stereotypes, as the limitations of such are clear (Appuhamilage, 2017; Smith, 2012). We also acknowledge there may be a performative aspect to the adolescents' development of their Majority world childhoodnature but contend that the adolescents were not passive recipients of their socialization. Their awareness of the impacts of new economic practices being in discord with their traditional nature-valuing ethos indicates they are active agents shaping their own childhoodnature. Our purpose then is to be guided by the adolescents' voices to illuminate possibilities of alternative ways of being and becoming, a multiplicity of childhoodnatures. Such possibilities for multiple mind-body-spirit childhoodnature interactions, following traditional ways of engaging with nature (Arabena, 2006), disrupt and add richness and possibility to the "New Nature Movement" (Louv, 2011) discourse.

Conclusion: The So What – Childhoodnature as Assemblages of "Socioecologicalization" Interactions

The alternatively constructed childhoodnatures of Majority world adolescents in India, Nepal, and Bangladesh challenge the highly visible orthodoxies of the "New Nature Movement" (Louv, 2011). We present these Majority world context versions of childhoodnature as assets to inform consideration of factors that enrich nature connectedness.

We share a deep unease with many others that humanity's damage to Earth's ecological systems is linked to concerns that modern life separates people from their fundamental connection with nature. Perceptions of children's "nature-deficit

disorder" (Louv, 2005) and "disconnection disorder" (Arabena, 2006) such that there is a "soul sickness" (Griffiths, 2014) permeating modernity, weave people's well-being with planetary wellbeing. Many scholars are calling for new imaginings of ways forward. The stories from the adolescents in India, Nepal, and Bangladesh enable us to consider alternative possibilities for thriving by being closely connected to nature. The adolescents' childhood bonding with nature supports the notion that such experiences predispose adult pro-environmental approaches (Chawla, 2007; Leopold, 1966; Orr, 2011; Sobel, 2004). The multiplicity of their sociocultural, individual, and ecological agents of co-construction of their childhoodnature opens up possibilities to attend to.

Deconstructing these alternative enactments of childhoodnature to the dominant Minority western conceptualizations identifies key sociocultural influences shaping the adolescents' development as well as their positioning of nature in their lives. Sociocultural influences are posed as shaping different expressions of childhoodnature in different contexts (Collado et al., 2016; Müller et al., 2009), strengthening our position that socialization in combination with bonding experiences of nature ("ecologization") nurtures strong nature connectedness. That is, childhoodnature develops through "socioecologicalization." The Bangladeshi, Indian, and Nepalese adolescents' "socioecologicalization," although varied locally, indicates commonalities of interdependence and traditional values shaping their childhoodnature. Their nature knowledge and relationship are not via formal learning but through an experienced, embodied, and socially mediated learning, a traditional or indigenous epistemology. The adolescents' lifeworld experiences add support to calls for considering indigenous ways as valuable to invigorate sustainability thinking (Kahn, 2010; Somerville, 2007; Wheaton, 2000; Yunkaporta & Kirby, 2011). Concerns about applying indigenous ways out of context have been raised (Nakagawa & Payne, 2011; Nakata, 2002), but indigenous scholar Kerry Arabena sweeps aside these concerns by posing everyone as indigenous to the universe. She proposes we step outside current boundaries and be guided by indigenous ways to connect and unite in thought and action for plausible people and planet-sustaining "lifeways" (2015). This is not to suggest that the indigenous and collectivist culture framing of the Indian, Nepalese, and Bangladeshi adolescents' childhoodnature is an imperative. Instead we draw attention to their ethos of collaboration and the high status of nature in their culture as potential pathways for broadening the conversation about child-nature relationships and pedagogies.

The Bangladeshi, Indian, and Nepalese adolescents' stories in this chapter add Majority world context diversity to socioecological factors implicated in supporting children's development of their nature connectedness. Such alternatives suggest possibilities for assemblages of situational and opportunistic experiences for nurturing nature connectedness in childhood, for including more collectivist and spiritual onto-epistemological negotiations of childhoodnature. The adolescents' stories invite us to take advantage of the coalescences of any storied, embodied, scientific, cultured, spiritual, mindful, contemplative, collaborative, playful, practical, community-mediated, enchanted, traditional, technological, or elder-mediated ways of being and becoming nature as strategies for enhancing

childhoodnature – not to just follow one defined pathway to childhoodnature. The Indian, Nepalese, and Bangladeshi adolescents' versions of their childhoodnature recounted here open up possibilities to more "heterogeneous, thrown together and entangled naturecultures" (Taylor, 2013b, p. 16). The Anthropocene emergency necessitates shifts in the way humans think and act to rehabilitate our social and ecological systems in crisis. Resilient childhoodnature, and human nature, will be needed. Possibilities for strengthening child-nature relationships are indicated from the Bangladeshi, Nepalese, and Indian adolescents' accounts of their childhoodnature in this chapter.

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Note: Pseudonyms are used.

Cross-References

- ▶ Closing the Gap Through Rewilding, Interacting, and Overcoming
- ▶ Exploring the Significant Life Experiences of Childhoodnature
- ▶ Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature

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"She's Only Two": Parents and Educators as Gatekeepers of Children's Opportunities for Nature-Based Risky Play

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Abstract

Exploration of the natural world begins in infancy and is a vital part of a childhood that includes rich nature-based experiences. Children need opportunities to take age-appropriate risks in natural outdoor settings. The social ecology model suggests that children's experiences are influenced by a variety of contexts in their environment. As such, adults often act as gatekeepers of children's nature-based risky play opportunities, either promoting or restricting such experiences, within cultural and regulatory contexts. Therefore, a greater understanding of

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early childhood educators' and parents' attitudes and practices in relation to nature-based risky play for children is needed. Even though there are a variety of possible dangers inherent in the exploration of nature, it is natural that children are drawn to these experiences regardless of the safety concerns of modern parents. This Chapter takes an ecological systems and cross-cultural approach to discuss the role that nature-based risky play has in children's exploration of the natural world, its importance in quality early childhood education (ECE), and its benefits. The authors draw on studies of parents and early childhood educators from Australia and the United States to explore perspectives and practices related to the provision of opportunities for children to engage in nature-based risky play. Beyond the typical discussion of implications for research and practice, further insights are given for parents and educators alike on the ways in which outdoor risky play can be promoted, with a focus on connecting children with the natural environment.

Keywords
Outdoor play · Early childhood · Risky play · Teacher beliefs · Parent beliefs · Nature play · Ecological systems

Introduction

Most young children naturally seek out and enjoy challenging outdoor, nature-based play experiences (Stephenson, 2003). Opportunities to engage in outdoor, nature-based risky play from a very early age are beneficial for children's development of a variety of skills, developmental abilities, ecological literacy, thinking and identity (Little & Wyver, 2008), including but not limited to confidence, self-esteem, concentration, problem-solving, creativity, and resilience (Faber Taylor & Kuo, 2009; Brussoni et al., 2015). Studies link nature-based outdoor play to developmental milestones such as positive motor development (Fjørtoft, 2001, 2004) and decreased risk of developing myopia (Sherwin et al., 2012). Importantly, risky play may serve an evolutionary function, whereby children learn to regulate their fear and adapt to the current environment. This time exploring the natural world uninhibited assists children in developing ecological literacy, which can protect them from ecological risk factors (Sandseter & Kennair, 2011). Ecological literacy is important as it involves understanding the interconnections between natural and human systems and consideration of how human actions can impact the natural world (Stone & Barlow, 2005).

Through their exploration of natural outdoor environments and materials, children's risky play can also support their skills and attitudes of environmental citizenship (Blanchet-Cohen & Elliot, 2011) through increased positive attitudes toward the natural world. However, opportunities to engage in nature-based risky play are often influenced by various factors in the child's life, including but not limited to, parental beliefs and practices, early education environments and pedagogical practices, cultural beliefs, and regulatory factors. Individual characteristics of the child interact

with these factors to create unique situations for each child in relation to nature-based risky play.

Risky play is defined here as an outdoor, nature-based thrilling, and exciting activity that includes some risk of injury; such as balancing, climbing, sliding, and hanging upside down (Tovey, 2010). Often, risky play provides children with opportunities to challenge themselves, test limits, explore boundaries, and learn to make decisions about injury and risk (Little & Wyver, 2008; Sandseter, 2007). There is no doubt that in today's increasingly regulated and controlled society, safety concerns have led to reduced opportunities for children to engage in risk-taking play outdoors (Tovey, 2010). Although children's risk of injury may be reduced by limiting the risks they can take, there may be long-term negative effects associated with lack of risky play opportunities, such as diminished psychological well-being (Tranter, 2005) and other detrimental effects associated with inactivity (Little & Wyver, 2008). In fact, in Minority western cultures, children today spend more time watching television and being indoors than they spend being active in outdoor environments (McCurdy, Winterbottom, Mehta, & Roberts, 2010).

There is growing recognition of the value of children's interactions with the natural environment (Warden, 2010). The recent movement of nature kindergartens and forest schools in some Nordic and European countries supports this notion of the importance of providing rich opportunities for children to connect with and explore the natural environment (Lysklett, Emilsen, & Hagen, 2003; Nilsen, 2008). In such early childhood environments, nature serves as a pedagogical environment, rich with natural resources to support children's learning (MacQuarrie, Nugent, & Warden, 2017). Early childhood connections with nature – in this case through forest schools – have been shown to increase environmental attitudes (Turtle, Convery, & Convery, 2015). Attitudes toward conservation of the natural world may depend on deepening connections between children and the outdoor environment (Gill, 2014).

Research has found that there are a variety of factors which influence children's opportunities to experience outdoor risky play (Lester & Russell, 2008). The social ecology model (Bronfenbrenner, 1979, 2001, 2005) can be applied to this topic as a framework for analyzing the ways in which different systems interact to promote or limit these opportunities for children. Indeed, children's opportunities for nature-based risky play occur in a variety of contexts, including ECE environments, at home, in the community, and within cultural, political, and environmental contexts. The outdoor natural settings that children have access to are important environmental contexts that can support children's deepening connection to nature. These different "systems" and the adults and natural barriers within them can act as filters for children's available opportunities to engage in nature-based risky play. Although research indicates that it is important for young children to develop independence, learn to manage risks, and explore the natural world, adults' desires to keep children safe can impede opportunities to develop these skills particularly within natural settings (Lester & Russell, 2008; McFarland & Laird, 2017). Therefore, it is important to examine contextual influences in relation to providing children with nature-based risky play opportunities.

When exploring the connections between sociocultural theory and the natural world, connections between these spheres can be difficult to illustrate, as research exploring the psychological links between humans and the natural world began more recently in the latter part of the twentieth century. From the commonly referenced biophilia hypothesis (Wilson, 1984) to modern psychological studies of connections with nature (Schultz, 2002; Nisbet, Zelenski, & Murphy, 2009), a plethora of research shows our inclination to explore the natural world stems from a long and deep relationship with our environment. However, although humans remain inherently connected to the natural environment, particular sociocultural factors can impede or promote opportunities for children to directly engage with nature. For example, a child who lives in an inner-city apartment complex may not have regular access to green space, or children in certain early childhood education settings may not have access to extended outdoor free play due to health and safety regulations. Such restrictions on children's exploration of nature may in turn impact their future development and possibly even later conservation behaviors and actions (Muhar et al., 2018, see Fig. 3, p. 10).

Although some research on children's outdoor, nature-based risky play do exist (Cevher-Kalburan & Ivrendi, 2016; Little, Wyver & Gibson, 2011), this chapter builds on this research in several ways. First, by examining the issue using the framework of the social ecology model, we review the literature and present new research in the context of children's contextual systems in relation to nature-based risky play. Secondly, we discuss new research findings focused on children under 3 years of age. This is important as most studies in this area have focused on older children. The findings related to children under 3 years are significant as the early years are a period of rapid development in brain growth and cognition. Finally, we review literature and include new research from a sample of early childhood educators and parents in two countries (the United States and Australia) in both rural and metropolitan areas. Though examining two different countries' findings in relation to facilitators and barriers to children's opportunities for risky outdoor play, we acknowledge that much of the research has come from a middle-class, Minority Western view. Implications of this minority world view will be discussed.

Children's Play

It is common in the early childhood sector to use the phrase "learning through play." The Early Years Learning Framework (EYLF), which is Australia's national early childhood curriculum framework, describes play-based learning as "a context for learning through which children organize and make sense of their social worlds, as they actively engage with people, objects and representations" (Department of Education, Employment Workplace Relations [DEEWR], 2009, p. 46). But what exactly constitutes play? Although there is no one definition, there are a number of generally agreed-upon characteristics of play (Barblett, 2010). Play is a pleasurable activity but can sometimes include frustrations, challenges, and fears. Play also often includes "pretend" elements and requires some sort of action, whether it be physical,

verbal, or mental engagement with materials, people, ideas, or the environment. Play is freely chosen, process-oriented, and rewarding to the player (Shipley, 2008). Play is a necessary and healthy part of childhood.

Characteristics of Risky Play

There is some variation in the literature in relation to what constitutes "risky play." Most literature suggests that risky play is a natural part of children's play and that children actively seek out opportunities to challenge themselves (Sandseter, 2007; Stephenson, 2003). There is also agreement that risky play typically involves some sense of thrill and excitement for the child (Tovey, 2010). Children report that risky play evokes positive emotions, such as fun, enjoyment, pride, and self-confidence (Coster & Gleeve, 2008). Risky play also involves some chance that injury can occur and some sense of fear (Stephenson, 2003). At times, the outcome of risky play is not positive. If the child is unable to manage the risk, unpleasant emotions, such as fear and anxiety, can be experienced. Children report that the risky play is both fun and scary at the same time (Coster & Gleeve, 2008). Most of the time, in early childhood education settings, risky play takes place in the outdoor setting during unstructured, free play time (Sandseter, 2011). The development of forest schools in Minority western view countries is relatively new but provides greater opportunities than any other school setting to engage children in outdoor, nature-based risky play (Maynard, 2007; Waters & Begley, 2007). Risky play is commonplace in forest schools and often considered a positive aspect of the children's interaction with the natural environment.

It is important to distinguish between a *risk* and a *hazard*. A *risk* is something that can be negotiated and something that may be appropriate for particular situations and children; however, a *hazard* is something that is inherently dangerous and needs to be fixed or removed (Curtis, 2010). A "safe" risk means that the potential benefits outweigh the risk of possible harm and the consequences of the risk are likely to be minor (Kennedy, 2009). Risky play has many distinct classifications (Sandseter, 2007) including, *great heights, high speed, dangerous tools, dangerous elements, rough-and-tumble, and disappear/get lost*. This last risky play category has developed over time to become a major fear of many Minority western world parents (McFarland & Laird, 2017).

Benefits of Risky Play

There is copious evidence that risky play offers benefits for children in a variety of ways (Brussoni et al., 2015; Tremblay et al., 2015). Importantly, risky play allows children opportunities to develop decision-making skills about what risks they are capable of taking. In doing so, children learn to assess risks in particular situations, extend their personal limits, and learn important life skills (Tovey, 2010). For example, a child may decide that they want to climb to the top of a tree in the

park. The child then needs to work out how to go about doing this in a way that minimizes the chance of getting hurt. On the first attempt, the child might try to hoist themselves up by clutching a branch with their hands and hook their legs around the branch. However, the child might tumble to the ground when they realize the branch is too high to get enough momentum to hoist the rest of their body onto the branch. In this case, the child has to problem solve and may realize that if they move a large rock near the tree and stands on it, they would get enough height to be able to hoist up. In particular play situations that involve risk taking, children may sometimes succeed and sometimes fail. These failures can be learning opportunities in that they allow children to work out different ways of doing things in future situations (Tovey, 2010). As a result of this trial and error, emotional development is supported in that children's sense of motivation to accomplish goals and master new challenges is further developed (Stephenson, 2003). These failure experiences can be quite positive for children over the long term. Risky play can also lead children to experience positive emotions, such as feelings of fun, excitement, pride, and achievement (Coster & Gleeve, 2008), thereby increasing overall wellbeing. O'Brien (2009) reported increases in student self-esteem and confidence as a result of their forest school experience. These educators also noted social skills were improved along with their motivation and concentration, including the inspirational moments that come from new experiences in the natural world.

Social skills also develop from risky play as children build resilience and social competence when interacting with others (Kennedy, 2009). In engaging in risky play with others, children learn to express their opinions and make decisions. In group situations, children engage in give-and-take as they negotiate and confront risks. Additionally, the large and fine motor movements that children practice in risky play contribute to the development of balance, coordination, and body awareness. Children who have limited opportunities to engage in risky play may not be confident in their own physical abilities, have poor balance, and develop a fear of movement (Greenland, 2010).

A recent review of studies related to the benefits of risky play concluded that risky play impacts positively on various physical and social health indicators and behaviors in children (Brussoni et al., 2015). In one experimental study, children aged 4–6 years were exposed to a 14-week risky play intervention in their classroom setting, including within the classroom itself, and in a gym. The intervention was linked to improved risk detection and competence, increased self-esteem, and decreased conflict sensitivity, in relation to their pre-intervention performance, and when compared to a control group (Lavrysen et al., 2015). Other research has found evidence that risk taking in early childhood is related to positive outcomes in adolescence. Thus, experience with taking risks during childhood could help develop risk management strategies. This could in turn impact adolescents' ability to negotiate decisions about substance use, relationships, and sexual behavior (Gill, 2007; Ungar, 2007).

Nature-based risky play clearly provides many benefits for children (Fig. 1). However, there are certainly individual differences in how children experience these opportunities. For example, there is some evidence that boys and girls perceive

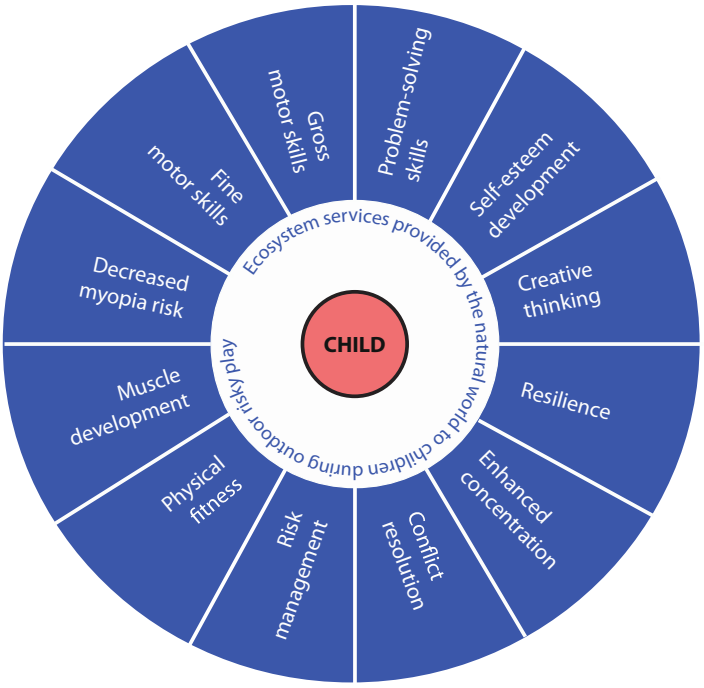

Fig. 1 Ecosystem services provided by the nature-based risky play interaction

opportunities of risky play differently – boys are more likely to assume they will not be injured, compared to girls (Morrongiello, Midgett, & Stanton, 2000; Morrongiello & Rennie, 1998). Also, different children will perceive and interpret their environments differently in relation to what they can do there and what types of play they can engage in (Sandseter, 2011). Children with particular behavioral disorders or disabilities may be less aware of how to manage certain risks in the outdoor environment (Kern & Wakeford, 2007).

Importantly, children's ages and developmental stages and their associated physical and decision-making skills need to be considered (Kennedy, 2009). Adults who care for children must be aware of general child development and have age-appropriate expectations of what children can and cannot do. However, an ages and stages approach should not be the only determining factor in the provision of opportunities for risk tasking. Thus, the assumption that a child cannot do something because he or she is too young can be restrictive. For example, it is sometimes assumed that babies and toddlers are "too young" to take risks (McFarland & Laird, 2017). However, there are endless possibilities for risk-taking opportunities for very young children. What is important is that adults consider a variety of factors related to the specific needs and skills of each individual child. As Rinaldi (2006, p. 94) states, "We need to raise our level of listening, our dialogue and attention toward children, to observe them and to stay close to them, but not to

Fig. 2 Temporal ecosystem interaction and engagement

scrutinize them, spy on them, impede them from maintaining their privacy, and above all not to inhibit their curiosity and joyous outlook on the world."

Children are naturally inclined to explore their immediate environment. Even as infants, children roam as they are able and use tactile and oral connections to explore the world around them. Though modern, some Minority western cultures have chosen to keep children in largely sterile and indoor environments, whereas exploration of soil, grass, and bush are common in many other parts of the world. These outdoor nature-based activities might be limited in scope by children's developmental level but can be designed to scaffold experiences for children based on where they fit (developmentally and spatially) into the ecosystem itself (Fig. 2). Although it is the case that all children, regardless of age and development, interact with elements and organisms in nature, very young children may be well-suited to interact with ground-level plant and animal communities, observing insects and grasses, whereas older children may participate in a more broad interaction with trees of

all heights and various larger plants and animals. As they continue to grow, the scope of children's interaction with nature can become more regional or even global in scope. Older children and teenagers are more likely to engage with a myriad of ecosystems and ecoregions through greater opportunities for travel and exploration.

A Systems Approach

Given the body of research, it is clear that many factors impact on children's access to and opportunities for outdoor risky play (Cevher-Kalburan & Ivrendi, 2016; Little et al., 2011). Two theoretical models which examine the influences of various systems in a child's life can provide useful frameworks to further examine early childhoodnature interactions, as both models consider a range of environmental and biological factors which can interact to influence uniquely and be influenced by individual children. The social ecology model (Bronfenbrenner, 1979, 2001, 2005) and Morrongiello and Lasenby-Lessard's (2007) model of psychological determinants emphasize the ways that multiple systems interact to influence children's risky play opportunities. Children exist as a part of these overarching systems and are influenced just as they themselves influence the natural world (Muhar et al., 2018, see Fig. 1, p. 2).

In order to understand the ecological models that exist in relation to children's risky play, Morrongiello and Lasenby-Lessard's (2007) model is first discussed. An ecological model focusing specifically on children's risky play, Morrongiello and Lasenby-Lessard's (2007) model emphasizes individual, parent/family factors, social/situational factors, and macro-level factors (e.g., neighborhood, economics, and culture) as determinants of children's decision-making in risky situations. In this model, children's opportunities for outdoor risky play are described as occurring in a variety of contexts, including early childhood education environments, at home, and in the community (Little et al., 2011). Therefore, the adults in these contexts act as filters or "gatekeepers" for children's available opportunities to engage in outdoor risky play.

The social ecology model takes a broader view than Morrongiello and Lasenby-Lessard's (2007) model and includes a wider variety of possible influences on the child. This model focuses on the direct and indirect impacts on the child of the "enduring environment in which he (sic) lives" (Bronfenbrenner, 1974, p. 2). This enduring environment, or ecology, consists of five nested systems of interaction: the *microsystem, mesosystem, exosystem, macrosystem,* and *chronosystem.* All of the systems influence and are influenced by the individual child. According to the social ecology model, the child is not a passive recipient of experiences within the systems. Rather, the child helps to construct these settings (Santrock, 2007). At the heart of these nested systems is the individual child and her or his characteristics, such as age, gender, health status, etc. (Fig. 3).

Although there is a strong human emphasis in the social ecology model, this model can also be used to examine interactions with ecological systems. In doing so, children's interactions with the natural world are seen as important factors in the

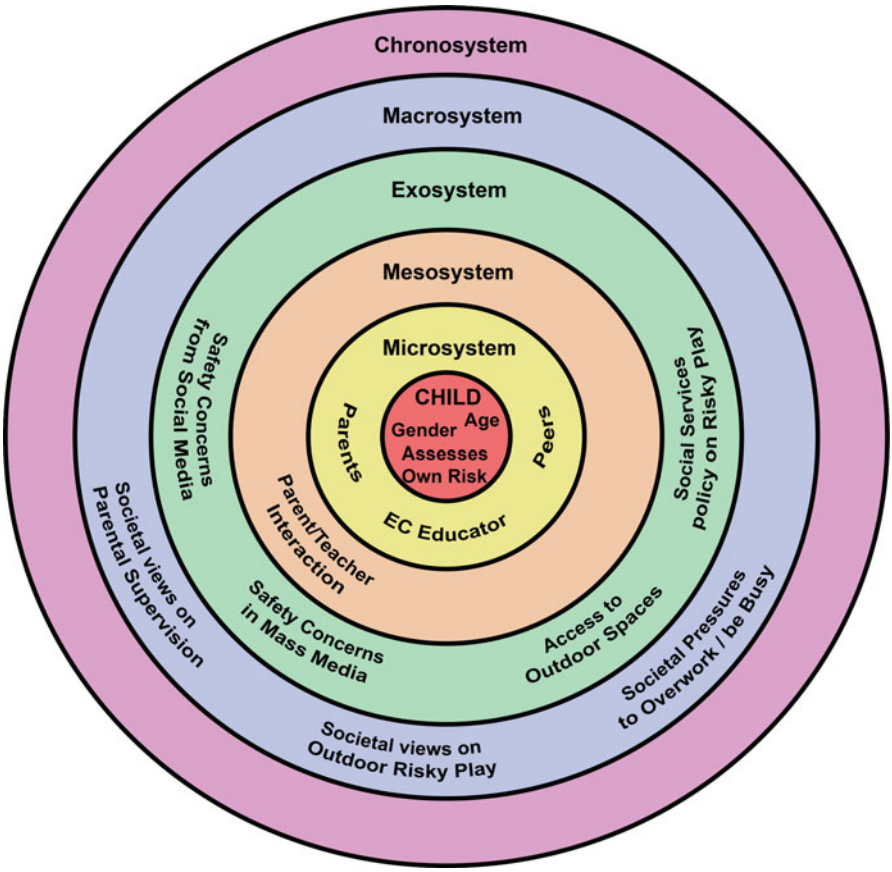

Fig. 3 A systems approach to risky play

development of ecological literacy (Stanger, 2011). Indeed, it is problematic to focus only on "human" systems when examining children's development and in particular, their opportunities for nature-based risky play. According to Stanger (2011), "if we are to use ecosystem-based language, it needs to describe the complex interrelationships that support the long-term integrity of living systems rather than the short-term singularity of human-designed marketing" (p. 167). Stanger (2011) further suggests that the true ecology that sustains and affects humans, including but not limited to, food systems, energy systems, biological systems, nutrient systems, water systems, and atmospheric systems is underrepresented in Bronfenbrenner's traditional social ecology model of human development. Thus, it is important to keep in mind the overrepresentation of the human influence when applying this model to examine children's nature-based risky play.

The *microsystem* includes the settings in which the child is immediately involved, including the interactions and activities within these settings. Bronfenbrenner also

defines the microsystem to include the "particular physical and material characteristics" of a setting (1979, p. 22). Here is where the most direct interactions with social agents occur, such as with parents, peers, and educators. The microsystem is also where the materiality of settings is important; these can include children's exposure to nature elements and/or nature-rich environments. In this chapter, the influences of several microsystems factors, such as parents and early childhood educators, on children's opportunities for risky outdoor play are examined.

The *mesosystem* involves relationships between different microsystems or connections between contexts. Important mesosystems for young children include relationships between the home setting and the early childhood setting or school, home and neighborhood, and early childhood or school and neighborhood. Indeed the early childhood setting and home setting mesosystem is particularly significant to the child's development and wellbeing (Garbarino & Plantz, 1980). Bronfenbrenner (1979) suggests that children's development is enhanced when there is frequent supportive communication between the home and early childhood settings. In relation to children's outdoor risky play, this mesosystem is important as early childhood educators and parents must work together to ensure appropriate opportunities are provided for children.

The *exosystem* includes social settings that have power over children's lives, yet in which the child does not have an active role. Exosystems can include education systems, mass media, social media, and social welfare services, to name a few. The exosystem can have an influence on children's opportunities to engage in outdoor risky play. For example, safety regulations and other regulatory factors and curriculum documents in the educational setting can support or hinder these opportunities.

The *macrosystem* includes the broad ideological and institutional patterns of a particular culture. A macrosystem is "the norms about how development proceeds and the appropriate nature and structure of microsystems, mesosystems, and exosystems" (Garbarino & Plantz, 1980, p. 12). In relation to children's opportunities for risky play, the exosystem is where a child's cultural beliefs and practices become important. Additionally, cultural beliefs of important adults in the child's life can impact the mesosystem. For example, it is possible that early childhood educators and parents will have different cultural views and practices in relation to encouraging children's risky play.

Finally, the *chronosystem* involves the patterning of environmental effects, transitions, and sociohistorical circumstances over the life course (Santrock, 2007). Essentially, the chronosystem is the "time" that passes throughout one's life. Certainly in relation to children's risky play, the chronosystem has an influence as throughout history, general attitudes, opportunities, and practices related to outdoor risky play have changed. In modern society risk taking during play has become increasingly regulated, managed, and controlled. At times, opportunities for risky play have been removed completely (Tovey, 2010). In Minority western countries in particular, there are fewer opportunities than ever before for children to engage in risky play. Today, children spend more time watching television and playing indoors than they do engaging in physically active outdoor play (McCurdy et al., 2010).

It is clear that children in Minority western societies are more sedentary and spend more time indoors than they did in past generations; this limits opportunities to engage meaningfully with nature (Louv, 2005). The reduction in children's direct exploration of nature may also impact opportunities to engage in risky outdoor play. There are various reasons why this is the case. Using the social ecology model as a framework, the impact of multiple systems in a child's life can be examined in relation to children's opportunities to engage with and connect to nature, including opportunities for risky play (see Fig. 3). As discussed, Morrongiello and Lasenby-Lessard's (2007) model can also be used to specifically apply to contextual influences on children's risky play. Given the numerous benefits of outdoor risky play, it is important to understand how these systems work together to support or hinder such opportunities for children.

Facilitators and Barriers from a Systems Perspective

Here, we examine our own (McFarland & Laird, 2017) and others' research focused specifically on the two most important microsystems and how they influence children's opportunities for nature-based risky play: the family and ECE context. In doing this, we also discuss aspects of the exosystem and macrosystem which influence these microsystems. Finally, we address how the family-early childhood education setting mesosytem can work together to support children's nature-based risky play.

Parents/ Carers. One role of the parent is to provide opportunities and time for their children to participate in a broad variety of experiences to prepare children for broader aspects of life as they grow up. Not only do parents determine the extent to which their children get to spend time outdoors in natural settings, parental figures further extend this influence through their allowing for greater opportunities for their children to engage in nature-based risky play. Parents may also act as role models for children, as they model their own engagement with nature. In our research that surveyed a sample of parents from city and rural areas of the United States and Australia, the majority of parents recognized the importance of risky outdoor play and letting their children explore their own boundaries. Risky play was considered an important part of the childhood experience by many of the parents, particularly as it related to their own childhood experiences of gardening and outdoor free play (Laird, McFarland-Piazza, & Allen, 2014). This recognition of the importance of outdoor risky play was evident across all parents, regardless of whether they lived in the city or a rural area and whether they lived in the United States or Australia.

However, despite the recognition that risky outdoor play was beneficial, parents expressed concern as they considered the increased risk of injury and harm to their child through this type of unsupervised experience. Though the parent ultimately has the greatest amount of control over how much outdoor risky play their young child can participate in, the influences from outside the immediate microsystem of parent/child are easily seen though the parents' discussions exploring barriers to providing their children with such opportunities. For example, one parent stated that her

daughter "needs supervision in the front yard because of traffic" and another parent stated, "Our home is not an ideal space. . .we live on a busy street. We have a small fenced backyard, but it has steep terraces and drop offs." Additionally, outdoor risky play for parents seemed to come in a variety of levels, from high-risk play such as allowing children to play beyond the yard unsupervised to very low-risk play, such as playing with a parent close by on the ground.

Parents did not want to be seen as "helicoptering" their children. The phrase "helicopter parent" refers to a parent who is overprotective to an excess. This concern seemed much more deeply rooted in their own insecurities as a parent, and the perception others might have of them, than it was about any detriment to the children caused by the act of helicopter parenting itself. Research has also found that parents socialize boys and girls differently in relation to risky play (Morrongiello & Dawber, 1999, 2000). This is a microsystem factor, which can be influenced by exosystem (mass media-fear tactics) and macrosystem (norms of the culture). This means that boys possibly receive more experience at risk taking at a younger age thanks to the encouragement they receive to take greater risks or even just to play outside in general (Little, 2010).

Exosystem factors play a large role in parental attitudes toward children's risky play. Popular media can often present the world as an unsafe place, thus influencing parents' attitudes and parenting practices. For example, parents are often too concerned about traffic, the threat of kidnapping, wild animals, and other perceived dangers to allow their children to play and explore freely in the natural environment. This inflated level of fear created by popular media may influence parents to restrict their children to playing in their back yards or local parks, which may fail to offer appropriate nature-based risky play opportunities (Brussoni, Olsen, Pike & Sleet, 2012; Little & Wyver, 2008; Little et al., 2011). Other exosystem factors that can play a role in parental attitudes toward children's risky play include their own neighbors, neighborhoods, and social services. In recent years, US neighbors have called police officers to check on children seen in their own yards playing unsupervised (see Roy, 2014), which can lead to an investigation by local child services departments for neglect. This fear of punishment from child protective services departments or police departments can be shocking for privileged parents but could even have more dire consequences for families that already struggle under systems that disproportionately disadvantage certain populations. The survey indicated that access to safe outdoor spaces in which to explore was a concern of the respondents in trying to provide nature-based risky play opportunities for their children. In acknowledging our primary research experience and focus here comes from our middle-class and minority world view, we can identify that these exosystem factors might be further influenced through attitudes across the broader culture. Thinking about society's expectations for parents concerning their child's participation in outdoor risky play, macrosystem influences may vary greatly.

Since its release in 2005, Richard Louv's book, *The Last Child in the Woods*, has greatly influenced many middle-class minority world parents through its reflection on a simpler time when children roamed the woods unimpeded in nature-based

outdoor risky play. This unimpeded nature-based outdoor risky play described by Louv (2005) is often the type of early play experienced and recalled by adults. In our study, many parents discussed their early outdoor play experience, consisting largely of unsupervised and unimpeded exploration of the outdoors (Laird et al., 2014). This look back toward an ideal risky play type, based in a largely middle-class context, means that parents might find other types of nature-based risky play unacceptable or not "real" or "authentic" outdoor experiences (Dickinson, 2013). Children from low-income households might undertake risky behaviors through engaging in play outdoors in open spaces or vacant lots nearby. Children from urban areas might explore a local manicured park as their only possible access to a natural-type outdoor setting. However, these spaces may not be considered as "authentic" as the wooded setting of a forest school or the rolling hills of an open grassland. These cultural biases on what constitutes "authentic" nature-based risky play have created an oversight in the literature based on the experiences most likely to have occurred in the middle class Minority western parents who are more likely to be involved in research studies. Our own research goes some way to address cultural biases by including participants in urban and rural areas in both Australia and the United States.

There was a certain level of privilege in our sample groups, both urban and rural in both Australia and the United States. One response that seemed to have a strong macrosystem level embedded cultural view from the parents was that their child, no matter how young, was too young to be participating in outdoor risky play. Parents would say, "she's only two," or "he's only five," noting that they should not be left on their own unsupervised at any moment. This idea seemed pervasive across the two countries and urban and rural parents. Certainly anyone who has spent time outside of this privileged ideal of constant parental supervision knows that many children in other countries or socioeconomic groups are allowed to explore on their own around their own yards, neighborhoods, local areas, and/or perhaps even villages or towns from quite young ages, either from necessity or due to cultural differences in child rearing practices. This idea that there is a certain age when it becomes acceptable for children to participate in outdoor risky play may be a concept based in the Minority western, middle class culture of our participating parents. Another consistent macrosystem level cultural view observed from the parents was the concept of temporal restrictions on outdoor risky play. The parents reported positive views on children engaging in outdoor risky play but then note their largest barrier is too little available time to spend engaging in that way. Barriers cited included homework and after preschool activities, along with arrival at home after dark in the evenings. Certainly, the concept of "busy-ness" is relatively constrained to Minority western, middle class cultures as well.

Early Childhood Educators. Early childhood educators are no doubt, important influences in children's lives. Increasingly, young children are spending more time in ECE settings. For example, in Australia, the majority of children between the ages of 3 and 5 years attend some form of ECE programme. Rates of children under the age of 3 in formal ECE are also increasing in Australia (Baxter, 2015). In the United States (Child Trends, 2016) and England (Department for Education, 2016), the rates of attendance in ECE

settings are similar to that of Australia. The rates of children under 3 attending formal ECE settings in Nordic countries, such as Denmark, the Netherlands, Iceland, and Norway, are well above 50%. In some European countries, such as France, Spain, Belgium, and Italy, the average enrolment rate of children between 3 and 5 years in formal preschool education is around 100% (Organisation for Economic Co-operation and Development [OECD], 2014). Clearly, for many children around the world, the early childhood setting is a microsystem that will play an important role in their lives.

In relation to nature-based risky play, Greenfield (2003) argues that ECE settings play an important role in providing young children with opportunities to safely to take a variety of risks and extend their skills and capabilities safely. Environments such as this can empower children to construct their own learning and develop confidence and resourcefulness (DEEWR, 2009). The national curriculum documents of various countries provide early childhood educators with an overarching framework for curriculum and pedagogy. The curriculum documents represent an *exosystem* influence on children's opportunities for risky play.

Directly related to risk taking, the Australian Early Years Learning Framework (EYLF) states that children can reach the outcome "Children have a strong sense of identity" by taking considered risk in their decision-making and learning to cope with the unexpected (DEEWR, 2009). Other early childhood curriculum frameworks, while not specifically referencing risky play, discuss the importance of the development of physical skills, managing their environment and asking for help when needed. For example, England's Early Years Foundation Stage Framework (EYFS) states that ECE settings should provide "opportunities for young children to be active and interactive; and to develop their co-ordination, control, and movement" (p. 8) and that children should be encouraged to "investigate and experience things, and 'have a go'" (Department for Education, 2017, p. 10). Certainly in Nordic countries, the value of children's experiences in rich, natural outdoor environment and engagement in risky play is advocated by educators and parents alike (Aasen, Grindheim, & Waters, 2009). This wide acceptance of the value of such experiences is well supported by the Framework Plan for the Content and Task of Kindergartens (Norwegian Ministry of Education and Research, 2011), which states that "(staff must) facilitate and provide inspiration for safe and challenging physical games and activities for everyone, regardless of gender and physical, psychological and social circumstances..." (pp. 35–36).

Despite the exosystem influence of national curriculum documents and their support for children being engaged in physically active and exploratory play, opportunities for this type of play vary as this is controlled by early childhood educators and determined by teacher beliefs (Little et al., 2011). For example, when educators' personal attitudes about risky play are more positive and when they enjoy being outdoors themselves, they are more likely to support children's risky play (Stephenson, 2003). Similarly, Sandseter (2007) found that when educators have a more positive view about the benefits of risky play, they are not likely to prevent risky play on grounds of possible injury alone. Additionally, Waters and Begley (2007) found that educators at a forest school, where there is a heavy focus on outdoor play, were

more likely to support children's risky play compared to educators at a traditional preschool.

Of course, even if early childhood educators hold positive beliefs about the importance of outdoor risky play, they need to balance children's safety with such play. Educators must apply mandated safety regulations to their work with children, which is another exosystem influence. For example, in Australia, ECE settings are mandated by the National Quality Standards (NQS), which is intended to maintain quality and consistency across settings (Australian Children's Education and Care Quality Authority [ACECQA], 2012). Related to provisions for outdoor risky play, Quality area 2 of the NQS "Children's Health and Safety" mandates that "Each child is protected" (Standard 2.3) and that "Every reasonable precaution is taken to protect children from harm and any hazard likely to cause injury" (Element 2.3.2) (ACECQA, 2012). Clearly, in light of safety regulations, a risk-benefit analysis needs to be undertaken where the possibility of children's injuries is weighed against the potential benefits of children's outdoor risky play (Sandseter, 2011).

Evidence suggests that due to the growing culture of litigation, early childhood educators are increasingly concerned about being held liable for injuries to children in their care (New, Mardell, & Robinson, 2005). early childhood educators do indeed have legitimate concerns over injuries and want to avoid taking the blame for accidents (Tovey, 2011). However, in an attempt to avoid injuries and liability, early childhood educators may often put restrictions on children's play based on their own perception of what is risky or dangerous, rather than assessing individual children's capabilities of managing risks (Sandseter, 2011). As such, early childhood educators may at times enforce controls on children's outdoor activities that they perceive as risky. These restrictions, in turn, may lead to children feeling disempowered (Stan & Humberstone, 2011). It is sometimes assumed that by removing all risks, children will be safer in their environment. However, this assumption fails to acknowledge that risk taking is a positive feature of children's play, learning, and development (Tovey, 2011). Sandseter (2010) suggests that this safety-obsessed society could result in children who are less physically fit and skilled and who have less ability in managing risks. Additionally, reduced opportunities for children to engage in outdoor risky play may result in an impoverished relationship with nature, as risky play provides opportunities for children to interact in meaningful ways with nature.

The mesosystem of the early childhood setting is also impacted by *macrosystem* influences related to cultural attitudes and norms around outdoor play in general. Waller, Sandseter, and Ärlemalm-Hagsér (2010) note that even between world Minority western countries, there is great variability in the culture of childrearing and what types of care are considered normal or acceptable. For example, the rise of forest schools in some Nordic countries may have emerged trhrough Nordic cultural preference for outdoor recreation and emphasis on social engagement in the ECE environment versus the more academic emphasis of more English speaking countries (Waller et al., 2010). The forest school approach facilitates student learning through immersion in the outdoor environment and even focuses on child-led experiences (Maynard, 2007; O'Brien, 2009; Turtle et al., 2015), with these experiences being increasingly important as a part of the early childhood experience (Knight, 2009, 2011). As early

childhood educators and education centers take notice of the increasing movement to get children connecting with the natural world, these cultural influences will result in more intentional outdoor learning in environments such as forest schools, increasing the possibilities of outdoor, nature-based risky play for children.

The preceding discussion has illustrated some of the challenges facing early childhood educators in managing children's opportunities for outdoor risky play. Using the social ecology model (Bronfenbrenner, 1974), we have identified a complex interplay between children's *individual* characteristics (age, developmental abilities), *microsystem* (the home, ECE setting and educator and parent beliefs), *exosystem* (national curriculum documents and mandated safety regulations), and *macrosystem* influences (cultural perspectives). Clearly, early childhood educators have a role to play in the provision of outdoor risky play for children. Importantly, however, so do parents. Educators and parents must therefore work together within cultural and regulatory systems in order to ensure appropriate opportunities for risky play are provided for children.

Implications for Childhoodnature and Early Childhood Education

There is clearly great value in children's interactions and explorations with the natural environment (Warden, 2010). Therefore, it is important to provide rich opportunities for children to explore nature in meaningful ways (Gill, 2014; Lysklett et al., 2003; Nilsen, 2008), as there are a range of physical, social, and emotional benefits (MacQuarrie et al., 2017). One way to promote and enhance children's connection to nature is to allow opportunities to engage in risky outdoor play. Through outdoor risky play, children are able to interact with nature in a hands-on way, where they not only develop their physical, social, and cognitive abilities but also an appreciation of nature.

In order to make risky outdoor play available to children in ECE settings, it is necessary to create a well-supervised and supportive environment where the benefits of risky play can be balanced by decreasing the risk of injury. In doing so, early childhood educators must recognize the benefits of risky play and use their own professional judgment to create opportunities that are appropriate for the children and families at the setting. Risky play opportunities must also be set up in a way that is age appropriate (Richardson, 2013). However, accidents do happen even in the most well-planned and supervised setting, and it is important for educators, as well as children, to learn to deal with them (Richardson, 2013). As Warden (2011, p. 13) suggests, "The adult role is to remove hazards that the children do not see, not the risks within the day." Little and Eager (2010) found that allowing children to have input into the design of playgrounds or risk-taking opportunities can encourage them to take more appropriate risks. When only low-risk opportunities were provided to the children in their play time, children were more likely to use play equipment incorrectly, increasing their risk of injury.

Importantly, potential barriers that could restrict children's opportunities for outdoor risky play, both in ECE and in relation to educating parents,

need to be addressed. Firstly, some further education may be necessary on the part of ECE training institutions to provide up-to-date information to future early childhood educators on the importance of nature-based risky play for young children and the ways that children can explore taking risks in the outdoor environment. early childhood educators also have the opportunity to influence the parent perceptions of outdoor risky play through positive talk or reports on risk-taking accomplishments of their children each week. For example, when sharing children's portfolios and documentation with parents, emphasis can be placed on the various skills children acquire through outdoor risky play. Resources and newsletters can also be distributed to families about the benefits of outdoor risky play (Wilkinson, 2015). ECE centers might consider offering parenting seminars or workshops focused on topics important to the centers, including the importance of managed risks in the development of young children. Obviously from the plethora of sources noted here, there are many ECE professionals and researchers who are promoting the importance of risky play, but this information is not reaching parents or the public in a way that is influencing their behavior. Parents need to understand that some injury may result from any activity within the early childhood setting, including activities that are not necessarily considered risky. Some parents noted a lack of time or being too busy as a barrier for their child to participate in outdoor risky play; however, these parents may already be benefitting by their children participating in an ECE center that allows children to take appropriate risk, as many of our center educators noted was valued. Some of the other barriers parents note are more difficult to address, including access, safety, and age because these influences lie at the exosystem and macrosystem level of Bronfenbrenner's social ecology model and are not as easily changed.

An understanding of developmentally appropriate risk for parents is necessary for children to receive the appropriate opportunities for outdoor risky play outside of the ECE center environment. Inclusion of nature enrichment experiences and risk accomplishments in weekly reports to parents, just as they would report for other accomplishments like learning new words or skills, could contribute to a more positive view of risk by parents and carers. Practice for the parents may help in overcoming their fear response, perhaps even with a coach on the playground or outdoor environment that could help parents understand the age-appropriate risks involved in various activities. Many parents may not know that very young children are likely to gain positive experiences from activities as simple as playing in sand, experiencing different textures of different plants or grass types, or playing near structures they may need to crawl over. Parents of young children may not be aware of how developmentally capable children are and may need clarification on how to promote particular age-appropriate developmental skills related to outdoor risky play, for example, independent climbing up a rope structure. Parental understanding of the capabilities of young children is needed to counteract the exosystem bombardment of mass media messages of safety concerns for children. The importance of the mesosystem connections between ECE professionals and parents here cannot be underestimated. This interaction has the potential to influence the child/parent relationship and ultimately help to create

more opportunities for children to engage in outdoor risky play, thus, building children's meaningful connections to nature.

Conclusion

The benefits of childhood risky play in nature are plentiful and natural. The exploration of potential barriers to and methods for encouraging risky play by children allows for a deeper understanding of the childhoodnature relationship. Through a systems approach, using the social ecology model as a guide, we reviewed the importance of an integrated approach across system dynamics in order to create more opportunities for outdoor and nature-based risky play in early childhood. Many of the barriers to children having access to outdoor risky play opportunities lie at the macrosystem and exosystem levels of this model. Such issues are more difficult to tackle with individual parents or ECE centers on a microsystem level. However, ECE centers and professionals have a great deal of opportunity to engage with parents at the mesosystem level, influencing the lives of the children through engaging their parents in meaningful discussion and even illustration of the importance of appropriate risk, especially in the form of outdoor risky play.

The interactions of early childhood educators and parents could play a vital role in overcoming the macrosystem and exosystem barriers to the provision of outdoor risky play opportunities by parents in the home environment. Parents may not fully understand the importance of outdoor risky play and therefore do not make it a priority for their children during out of school and work hours. Focusing on the views of parents that the outdoor environment is unsafe or that their children are too young to engage in outdoor risky play, early childhood educators could provide educational opportunities for parents to overcome these limiting views. Inclusion of nature enrichment experiences and risk accomplishments in weekly reports to parents, just as they would report for other accomplishments like learning new words or skills, could go a long way in providing a positive view of risk by parents and carers. ECE centers could also provide parental professional development as they often do for other parenting issues that engage parents in learning about early childhood development and the risks appropriate for each age group, as well as how to assess needs based on their own child's ability level.

Some parents also reported access as a barrier to providing opportunities for their children to engage outdoors; this issue has been relaxed recently through the movements to get children outside. Hopefully these infrastructure projects will continue, and access will no longer be a barrier for parents or children.

Though the cross-cultural variances observed in the literature are interesting, overall Many minority western countries tend to be very risk averse. Little literature exists on outdoor risky play outside of the Minority western view countries. Opportunities for children to take risks, and thus enhance their development, need to be provided purposely by adults, as children face very few risks daily in these countries. The Scandinavian countries seem to be more advanced in their prioritizing of providing outdoor risky play opportunities, particularly through their focus on

outdoor recreation and forest schools. The growing popularity of the forest school movement in many English speaking countries seems to be increasing the focus on the positive impacts of outdoor risky play in these countries as well.

Given the plentiful benefits of outdoor risky play, particularly in risk averse Minority western countries, offering these opportunities is increasingly important in ECE settings. Though they may be hesitant, ECE professionals and educators who understand and promote outdoor risky play need to engage more with the socio-ecological exosystem and macrosystem level factors that are influencing parents' hesitancy to provide outdoor risky play opportunities for their children. Writing more mass media articles or appearing on social media as a proponent of outdoor risky play is a possible way to influence these spheres that ultimately will influence parents. As the media and cultural systems begin to emphasize the importance and acceptability of outdoor risky play for young children, greater opportunities to engage in risk will advance early childhood development.

Cross-References

- ▶ Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism
- ▶ Everyday, Local, Nearby, Healthy Childhoodnature Settings as Sites for Promoting Children's Health and Well-Being
- ▶ Toward a Pedagogy for Nature-Based Play in Early Childhood Educational Settings
- ▶ Wild Pedagogies: Six Touchstones for Childhoodnature Theory and Practice

Glossary

Minority world cultures Cultures of European origin, previously referred to as Western cultures

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Ara Mai He Tetekura: Māori Knowledge Systems That Enable Ecological and Sociolinguistic Survival in Aotearoa

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Mere Skerrett and Jenny Ritchie

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Abstract

This chapter offers an in-depth exploration of Māori systems of knowledge, outlining an ecological literacy grounded in a deep interconnectedness to land, rivers, and other geographical features made available to children through their integral engagement with whenua (land) and whānau (extended family). This

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ecoliteracy was symbiotically emergent in relation with the cohabitants of these places, generating a mutually beneficial biocultural diversity. This biocultural diversity, that is, the Māori language, their lands, and the biodiversity that previously thrived upon these, has all been threatened by the onslaught of colonization, of which the ultimate result is monocultures of the mind and of the land. The complexity of Māori onto-epistemologies, their belief and knowledge systems, is illustrated with an explanation of how their complex navigation systems enabled their settlement of Aotearoa and ongoing navigation around their own islands, as well as between those of the South Pacific. These knowledges are passed on intergenerationally through children's participation in biocultural practices such as sustainable mutton-birding. Tribal sayings serve as detailed identity markers and also preserve wisdom that is thus transmitted to young children. Finally, some key Māori values that relate to biocultural sustainability are explained, along with some examples of their application within early childhood care and education settings.

Keywords

Biocultural sustainability · Ecocultural literacy · Māori · Indigenous · Early childhood

Glossary

Aotearoa	Land of the Long White Cloud
Aroha	Respectful mindfulness, love
Atua	God, deity, supernatural beings
Hapū	Sub-tribe/pregnant
Harakeke	Flax
Iwi	Tribe, people, bones
Kaitiakitanga	Guardianship, stewardship, trusteeship
Karakia	Highly ritualized ceremonies, prayers and incantations
Kaupapa Māori education	A distinctly Māori, philosophically and linguistically enriched, education system
Kōhanga Reo	Māori language nest
Kura	School
Kura Kaupapa Māori	Kaupapa Māori immersion schools
Māhutonga	Southern Cross
Mana	Prestige, authority, control, power, influence, status, spiritual power
Manaaki	To support, take care of, give hospitality to, protect
Māori	Indigenous People of New Zealand
Marae	Formal Māori gathering place
Mātauranga Māori	Māori knowledge

Mirimiri	Similar to massage/physiotherapy
Mokopuna	Grandchild
Moutere Tītī	Muttonbird Islands
Ngāi Tahu	Tribal group, South Island
Pākēhā	Non-Māori New Zealanders
Papatūānuku	Mother Earth
Pepeha	Tribal sayings
Pūrākau	Narratives and storytelling
Rangatiratanga	Chieftainship, right to exercise authority, chiefly autonomy, sovereignty, chiefly responsibility
Rāhui	Restricted access, prohibition
Rakiura Māori	Southern tribal grouping
Rangi	Sky
Ranginui	Sky Father
Ritenga	Incantations and rituals involved with healing
Rongoā	Physical remedies derived from trees, leaves, berries, fruits, bark, and moss
Tamaiti	Small child
Tamariki	Children
Tangaroa	God of the Seas
Taniwha	Powerful creature, chief, powerful leader, something or someone awesome
Tāngata whenua	People of the land
Tapu	Sacred, prohibited, under protection, restricted
Te ao Māori	Māori worldviews
Te ao Pākehā	Pākehā worldviews
Te Moana Nui a Kiwa	The Ocean of Kiwa or Pacific Ocean
Te reo	The language
Te Waipounamu	South Island
Tikanga	Custom, cultural ways of being and doing
Tino Rangatiratanga	Right to exercise authority, chiefly autonomy, self-determination
Tiriti o Waitangi	Treaty of Waitangi
Tītī	Sooty shearwater
Titiro, whakarongo, kōrero	Look and listen before you speak
Tōhunga	Reader of signs from nature, spiritual expert, and healer
Wairua	Spirit
Waka	Canoe
Whakapapa	Genealogy
Whakarongo	Listen
Whakatauākī	Proverbial saying according to someone
Whakataukī	Proverbial saying

Whānau	Family (including extended)
Whanaungatanga	Relationships, connectedness
Whare	House
Whāriki	Flax mat
Whatumanawa	Inner heart, core
Whenua	Land

Introduction

Māori, the Indigenous peoples of Aotearoa (New Zealand), have their own ecological literacies, ecological thinking, and ecological identities, grounded in their own onto-epistemological systems. Connectedness and interrelatedness with their lands, mountains, rivers, lakes, languages, and oceans is at the center of these systems. Genealogically, Māori, as descendants of Papatūānuku and Ranginui, the Earth Mother and Sky Father, are related to these ancestral landmarks, and to the trees and creatures that coinhabit with them, and are required therefore to exercise kaitiakitanga (Māori words are translated on the first appearance and also listed in the glossary section.) and rangatiratanga, that is, guardianship, care, and responsibility in relationship with all manner of beings and things. Indigenous languages are an integral part of the cosmology and onto-epistemology. They bridge the spaces between knowledge/knowing and experiential/physical domains and reflect both cosmological thought and the biocultural diversity of the land. Indigenous languages are embodied languages and grow out of the lands, seas, and skies. They exemplify critical knowledges of global ecological systems and are crucial to their sustainability. Beginning with an explanation of Māori ecological literacies as key to understanding Māori onto-epistemologies, this paper explains traditional applications of these ecological literacies in the realms of navigation and sourcing food sustainably. Key constructs such as rangatiratanga, kaitiakitanga, and rāhui (protective prohibitions) are then explained, followed by some examples of these constructs as they were applied in early childhood care and education settings. In this paper we draw upon our own research in the field of critical early childhood studies and Māori pedagogies.

Reading the World

The term "biocultural diversity" represents the interlinkages between linguistic, cultural, and biological diversity as interrelated components representing life on our planet (Skutnabb-Kangas, Maffi, & Harmon, 2003). Indigenous languages are integral to Indigenous onto-epistemologies, and therefore these must be supported if global biocultural systems are to be sustained (Skutnabb-Kangas et al., 2003). A biocultural perspective recognizes the interdependence of all living organisms, plants, animals, bacteria, and humans, living and flourishing together in networks of complex and delicate relationships. Further, it understands that damage to any part

of the network (with or among humans or the ecosystem) will result in unforeseen, perhaps unintended, and likely harmful consequences for the whole system. It is the diversity across the delicate and complex network of the ecosystem, which reflects eons of coevolutionary symbiosis, that continues to provide the potential for further adaptation and diversity (Flannery, 2010). Our human histories are characterized by increasing adaptation and diversification as we settle into new environments, adapting to new landscapes, ecosystems, and climatic conditions. Languages too diversify and adapt as they connect to new lands and the ecosystems therein. Linguistic diversity and biological diversity are, therefore, seen as inseparable. Moreover, in the language of ecology, the strongest ecosystems are those that are the most diverse. That is, diversity directly relates to stability; variety is important for long-term survival. Uniformity endangers species by providing inflexibility and inadaptability (Skutnabb-Kangas et al., 2003). Our success on this planet has been due to an ability to adapt to different kinds of environments (cosmic, atmospheric, and ecological as well as cultural-linguistic) over millennia (Flannery, 2010). Survivability and sustainability are born out of diversity and adaptability. Linguistic and cultural diversity maximizes chances of human success and adaptability; our futures are dependent on it. Creation and innovation are born out of it. Therefore, as Skutnabb-Kangas et al. (2003) assert, the diversity of life goes beyond respecting biodiversity to include cultural and linguistic diversity, which is what is meant by the term "biocultural diversity."

Māori are the tāngata whenua (Indigenous people of the land) of Aotearoa. Te reo Māori (the Māori language) is the terralingua of Aotearoa, the Indigenous language of this land. It is the first language mapped on to this land, finely tuned to the geography and ecology of this space and place, with a lexicon that was created and adapted to the biodiversity that is Aotearoa. The language and/or the land are intricately interwoven into what can be described as a "tāniko" (detailed weaving) of fine ornamentation, presenting a delicate network of personification, symbol, metaphor, aphorism, and allegory, recording tribal histories, memories, genealogies, narratives, cultural activities, beliefs, and spirituality. The language and land comes together bundled up in symbiotic relationship with, and alongside, seas, skies, and all manner of creatures. McLintock (1949) alluded to this close relationship between Māori and their deeply embedded relationship with Papatūānuku (Earth Mother) when he proclaimed Māori were simply part of the geography "set in motion" and as such indivisible from more-than-human nature. He argues:

> In the remote past the physical environment of a society was its dominant factor, and even among primitive people, such as the pre-European Māori, the human being was largely at the mercy of omnipotent nature. Natural phenomena dominated his (sic) thoughts, controlled his life and shaped his religion. In a very real sense, such history could be regarded as merely geography set in motion. (p. 7)

Traditionally, Māori children (mokopuna, tamariki, tuakana, teina) were positioned alongside adults in an inseparable pattern of relationships between the gods, ancestors, elders, and wider family members. Mokopuna (the etymology of which stems from moko meaning facial markings or ancient and puna, a sacred spring) then translates to "the ancient spring, or blueprint, of your ancestors," in today's world

commonly understood to be grandchildren. Tamariki (translated to mean "the descendents of the Gods") is commonly understood today to mean "children," tuakana (elder or senior relations to either brothers, sisters, cousins, and/or distant cousins), or teina (younger or junior relations to either brothers, sisters, cousins, and/or distant cousins). The networks or patterns of relationships were a fine-tuned one. The way these terms were used explained the nature of the relationship, whether close or distant, past or future. The "modern" constructs of childhood, child, and grandchild did not exist traditionally but are often transposed today onto Māori society, as is the construct of the nuclear family for "whānau" which, traditionally, also had a much wider compass, not the confined, self-contained entity of "family" in the English language sense. Traditionally children were born into much more dynamic systems of whakapapa (kinship and genealogical ties) and were positioned as representative of all their whakapapa ties, in all facets of their lives in traditional Māori society. Salmond (2017a) argues that it is the relationship itself and its relationality (not its quality or the parties involved) that is ontologically prior. She recalls one of the very first missionaries, the Reverend Samuel Marsden from the Church Missionary Society, commenting on the role of children in the early 1800s. He said

> The Chiefs are in general very sensible men, and wish for information upon all subjects. They are accustomed to public discussions from their infancy. The Chiefs take their Children from their Mothers breast, to all their public Assemblies. They hear all that is said upon Politics, Religion, War &c by the oldest men. Children will frequently ask questions in public Conversation, and are answered by the Chiefs. I have often been surprised, to see the Sons of the Chiefs at the age of 4 or 5 years sitting amongst the Chiefs, and paying such close attention to what was said… There can be no finer children than [those of] the New Zealanders in any part of the world. Their parents are very indulgent, and they appear always happy and playful, and very active. (cited at p. 114)

Salmond argues that Marsden "…failed to connect their happiness, however, with the absence of contemporary British child-rearing practices which included harsh physical punishment" (p. 114). The biblical notions of "spare the rod, spoil the child" and "children are meant to be seen, not heard" imposed through British colonialism were foreign concepts to Māori of the 1800s. The imposition of these British values and attitudes had a dire impact on both traditional and contemporary Māori child-rearing practices, colonizing the relationships between adults and children as well as their relationships with nature.

Drawing on reading the world through nature and natural phenomena, the following provides an exploration of the intimate relationships and interconnectedness across the delicate networking of the bioculture, across the sociolinguistic spaces and ecological diversities.

Interconnectivity Across the Bioculture

The concept of natural phenomena dominating Māori thought, life, behavior, and spirituality is inextricably entangled in our expressive Māori language, which reflects this coexistence. The colonization of the province of Otago provides an

example of how Indigenous peoples coexisted with Papatūānuku rather than seeking to conquer and control nature. In *The History of Otago*, McLintock (1949) raises what he considers to be the age-old "historical problem" of dualism of the actions of "Nature on Man" (sic) or "Man on Nature." Lack of understanding of Māori onto-epistemologies leads McLintock to hypothesize the nature of the relationship as being one of nature dominating human life, rather than coexisting, and thus the invader deciding the necessary reaction to be one of promoting human determination to control and subdue nature. He argues that the colonization of Otago provides the scope for an effective study of these two phenomena, so effective was that colonization process. The Nature on Man environment is argued as being stark and unsympathetic, where the people (Māori), merely part of the geography, must also be living stark and unsympathetic lives. In the colonial mind-set, that arrangement needed to change, to make way for "progress." McLintock writes:

> It is difficult to-day. . .to envisage the Otago landscape as it appeared to the pioneers, and—perhaps more difficult-to recapture the wonder it must have aroused within their minds. For those who assembled on the decks of the John Wickliffe and the Philip Laing to gaze with anxious eyes upon the land destined to be their home were greeted with a vista of what must have seemed an endless sweep of that sub-tropical rain forest, not the least among New Zealand's glories. .. Even to land-hungry immigrants, the virgin beauty of the scene must have made a strong appeal until the soon familiar sound of axe and saw shattered the brooding spell of centuries. (p. 15)

Southern Māori had cohabited with Papatūānuku for over a thousand years – had lived according to the principles of "rangatiratanga" and "kaitiakitanga" (responsibility and the protocol of giving and taking only what was needed) and manaakitanga (extreme care). But all too soon Papatūānuku became "it," an apparatus for western colonialist and capitalist expansion and exploitation, something now distanced from the closely respected inter-relationality of a Māori worldview. The mahinga kai (food gathering places) were commodified, cleared, and drained for farming or polluted by excrement by the invader state politics. Such encroachment led to the corresponding disappearance of the forests and birds;

> But the unique experiences [of the settler pioneers] were all too fleeting and soon, very soon, a solitary bird-note became the echo of a once lovelier song. For it was a tragedy, little understood or heeded in those early decades, that the native birds were fated to disappear at a rate corresponding to the destruction of the forest. (McLintock, 1949, p. 22)

Indigenous people either died of introduced diseases, were killed, or forced into a new (hierarchical) modality of life. Lands were carved up; Indigenous peoples lives decimated in terms of the destruction of whānau (extended family), hapū (sub-tribe), and iwi (tribal) structure of Māori. When the invader colonizers arrived, they did not see, understand, respect, or even heed, as McLintock alluded to, the beauty of Aotearoa and her resources. They quickly set about establishing deeds of ownership to turn the majesty of Te Waipounamu (the Greenstone Waters) into Her Majesty's commodity, essentially farms. As the native birds were fated to disappear at the rate of the destruction of their native habitats, so too were the languages and knowledges which were the voices of those habitats fated to disappear.

Māori Ecological Literacy: Navigation

Drawing on the navigation tradition of Māori people provides a closer example of reading the world through nature and natural phenomena. Prior to discovering the southernmost Pacific Islands that they were to name "Aotearoa," the ancestors of Māori already knew there was a large southern land mass because of the migratory pathways of varieties of birds, whales, and other marine life. They navigated by the signs of Tangaroa (God of the Seas) and Papatūānuku (Earth Mother) and Ranginui (the Sky Father) including stars, clouds, land, and sea swells. The migratory pathways of birds around the entire Pacific Rim provide many signposts.

The tītī (sooty shearwater) is one such bird. The flight of the tītī is spectacular, powerful, and direct, with wingspans giving the impression of an albatross, yet enabling them to plunge the oceans to depths of 16 m and to swim to depths of over 60 m. During migration, tītī travel on average a remarkable 74,000 km around the Pacific Ocean, which is the longest animal migration ever recorded electronically (Moller, Charleton, Knight, & Lyver, 2009). The flight takes them as far across the Pacific as Chile, Alaska, the coast of California, across to Japan, and back to the nesting grounds in the deep south of New Zealand, known to Rakiura Māori (the Southern tribal grouping) as the Moutere Tītī (Muttonbird Islands). Tītī survive and depend on the natural balance and harmony that nature provides while at sea and on land and are an integral part of the ecosystem in Aotearoa/New Zealand. Any disruption to this natural balance such as pollution, the annihilation of fish stock such as the krill, illegal commercial fishing, and the disasters like the deepwater horizon oil spill in the Gulf of Mexico and the Fukushima Daiichi nuclear meltdown disaster have profound repercussions for our wildlife in the South. The saying "He manawa tītī" refers to the fortitude and sheer power of flight possessed by the *tītī*, and so a person who is resilient and of strong spirit may be described as a possessing a "manawa tītī," the heart and substance of the tītī.

Māori Ecological Literacy: Food Gathering – Rapu Tītī (Mutton-Birding)

Every year some Rakiura Māori families migrate south with the birds to the Muttonbird Islands to gather a bioculturally controlled harvest. Ecological signs guide the migration and provide clues as to the nature of the breeding season that is coming. For several months before heading south, the moon is studied intensely, along with the flowering of the harakeke (flax) plants around Christmas and the feeding patterns of native birds in summer. The way the adult tītī birds sit in the water provides a sign, as well as the color of the ocean plentiful with krill. Māori traditional ecological knowledge of natural systems over time adds valuable ecological data to more conventional scientific studies, which are more of a snapshot at a particular point in time (Wehi, Whaanga, & Roa, 2009). It has been shown that the traditional "take" has little to no impact on total tītī population, but its significance for those families in terms of the intergenerational transmission of knowledge is

invaluable to Rakiura Māori, to Ngāi Tahu (wider tribal group of the South Island). It is a time to gather, rekindle whakapapa (genealogical links), practice tikanga (specific Rakiura Māori ways of doing things), remember those who have passed on, share stories, forge new relationships, renew old relationships, and participate in, and adapt, a tradition that has been fine-tuned over a thousand years. However, this tradition is currently threatened by dangerous "consumer-driven" wasteful and polluting lifestyles.

A recent study provides an example of how our western consumerism is having long-term devastating impacts on wildlife (Wilcox, Van Sebille, & Hardesty, 2015). It reports that plastics could taint 99% of seabird species by 2050 and that the impact of biodiversity loss on ocean ecosystems has unknown consequences. Seabirds have ingested bottle caps, children's toys, and other debris that they mistake for food. Then they die of starvation – if they do not succumb to the toxicity of the plastics first (Wilcox et al., 2015). Rakiura Māori are deeply concerned as a tribe and have been involved in ongoing scientific studies incorporating Māori traditional ecological knowledge based on a collective base of understanding our Earth Mother ancestor, Papatūānuku, and her descendants. The collective base is founded on how the people and environment live together in complete awareness of each other and diversify together through time.

Ancient Māori navigators also followed the whales and other marine life whose rate of travel is slow and easily within the cruising speed of Māori double-hulled canoes or "waka hourua." Ngāi Tahu Māori descend from Kahutia-te-rangi (also known as Paikea), who came ashore to Aotearoa on a whale. The time that the whales migrate south coincides with the appearance of the stars and planets most useful for navigating – particularly Māhutonga (the Southern Cross). The night sky was a map, and the sea was also a source of vast information, especially in terms of the relationship between lands and seas as navigation indicators. Changes in cloud color, sea color, fish species, ocean currents, and night skies are all important markers. There was no need for lighthouses or radar, so intimate was the relationship between people and the environment.

In Hawaii they say "Nana i ke Kumu" (Look to the Source), a saying often used by Hawaiian ancestors as a means of educating young people to seek answers from the elderly people. It also meant that one must study nature itself with all its wisdom in the forest and streams, the oceans and the skies, with all their life forms and the air that keeps them alive. In Ngāi Tahu we say "Mō ka uri e whai ake nei," emphasizing the importance of bringing the relationship between our ancestral knowledges and future generations together. But when the relationships are disrupted, so too is the delicate network between the people and the environment and their ability to read one another. They all begin to suffer. Wehi et al. (2009) argue that oral traditions offer a wealth of information that is frequently overlooked, in part because of the language shift that occurs with colonization. This shift gives rise to the lack of knowledge of the language, which in the context of Aotearoa is the Māori language. The relationships between what happens to the lands then have a close impact on the languages of those lands and the way those languages are transmitted to following generations.

Learning from Elders

Māori, having navigated their way down across Te Moana Nui a Kiwa (the Ocean of Kiwa or Pacific Ocean) to settle on the islands of Aotearoa, were faced with a very different, temperate climate along with a different set of flora and fauna. Many of the plants they had brought with them from their tropical homelands failed to thrive in the colder climates of Aotearoa. However, through their attunement with forests, wetlands, oceans, and rivers, Māori were able to develop an extensive, in-depth understanding of how to sustain their wellbeing in their new lands. Integral to Māori wellbeing were spiritual beliefs and practices that linked them on a regular daily basis with the Atua (departmental Gods) from whom they sought guidance. Māori children were thus inculcated into a range of wellbeing modalities which included the use of "ritenga and karakia (incantations and rituals involved with healing), rongoā (physical remedies derived from trees, leaves, berries, fruits, bark and moss), mirimiri (similar to massage/physiotherapy), [and] wai (use of water to heal)" (Ahuriri-Driscoll et al., 2008, p. 15). The particular practices were integrally related to the specific places in which each tribe (iwi), sub-tribe (hapū), and extended family (whānau) cohabited with local flora and fauna and imbued with spiritual interconnectedness (wairua) (Penetito, 2009). Whaea Rangimārie Rose Pere, who was born in the early 1930s, describes her childhood raised in the traditional way by her grandparents in the remote Urewera forest region:

> When the children of the Urewera got involved with aspects of mahi [work] alongside the adults on their daily pursuits they learnt the disciplines associated with each task they were expected to perform. The gathering of berries and vegetation such as pikopiko shoots, within a selected location, involved ritual and consideration for the patupaiarehe (supernatural folk) and other supernatural influences. The children quickly became accustomed to and respectful towards the bush and its inhabitants. The learnt how to lure or trap birds and could imitate their calls and sound patterns to perfection. . .. It was obvious from the expertise that Te Au [Whaea Rose's great-grandmother] and others of her generation had in regard to bush-lore, that Tuhoe-Potiki [her tribe] had a thorough practical training course for their young. There is no doubt that the way for children to learn is through first hand experiences involving the sense, alongside knowledgable, skilful people. (Pere, 1983, pp. 58–59)

As has been shown, Māori had a particular affinity with the many birds of their forests, wetlands, foreshores, and islands (Keane, 2010). Much tribal wisdom was encapsulated within tribal sayings, which reflected the respect for and knowledge gleaned from close observation of indigenous birds and their ecologies. The intergenerational disruption of those tribal sayings being handed on to successive generations through colonization meant not only were the sayings lost, but the tribal wisdom and knowledges that those sayings reflected were also lost.

Tribal Sayings

Māori, like other Indigenous peoples, many of whom had resided in their lands for thousands of years, had developed not only extensive pharmacological knowledge

systems but also had proactively developed sustainable plant production systems and protection protocols for local fauna (Wehi & Lord, 2017). Long periods of cohabitation enabled coevolutionary reciprocity that sustained biocultural well-being in which the Indigenous people positioned themselves in service to their cohabitants, their more-than-human kin which include the land, rivers, mountains, oceans, and all creatures residing in these spaces. Indigenous knowledge systems are, therefore, of the land and interdependent with it. Māori metaphorical understandings and wisdom are transmitted in whakataukī (proverbial sayings), such as "He pā tīkapu e takahia e au, he pā harakeke e kore e takahia, he tapu, he tapu, he tapu." This is translated by Pou Temara as: "A flax [Phormium] cultivation is sacred and not to be treated as if it were a grove of tī trees" (as cited in Wehi, 2009, p. 270). According to Māori elders such encapsulated statements of wisdom "provide a blueprint for human behavior, thus emphasizing the older–younger sibling relationship of plants and humans that is accepted in Māori philosophy" (Wehi, 2009, p. 269).

Our ecological spaces continue to be destroyed by settler-colonial exploitation of lands, rivers, forests, and fisheries, in breach of the 1840 Tiriti o Waitangi/Treaty of Waitangi, which is now considered to be New Zealand's founding document and which had explicitly protected these. Not only is the unique biodiversity increasingly severely endangered (Parliamentary Commissioner for the Environment, 2017), but Māori face the challenge of maintaining the language specificities and cultural knowledges that emanate from those powerful connections and long histories of cohabitant reciprocity (Wehi & Lord, 2017). Elders today may likewise struggle to pass on their knowledges to their mokopuna (grandchildren) as children are often no longer in their care; in urban settings Māori families lack access to traditional ecosystems (Wehi & Wehi, 2010).

Embodied (Land and Language) Knowledge

Māori knowledge melded Māori ancestors to the lands in Aotearoa and the surrounding oceans for over a thousand years (Walker, 2004). Elders embodied knowledge and a strong desire to perpetuate certain forms of knowledge through their close relationships with young children, the mokopuna (Best, 1924). It has been argued that Māori knowledge is also inscribed on the landscape and language-scape in a variety of forms: through naming people, places, phenomena and things, waiata (songs), karakia (highly ritualized ceremonies, prayers, and incantations), whakapapa (genealogy), pūrākau (narratives and storytelling), through tikanga (cultural ways of being and doing), spirituality, and beliefs, passed on by the elders. According to Jackson (2011), Māori knowledge systems allow us to know who we are, our environment, and all aspects of the ecosystem and thus enable us to face challenges through broadening thinking, providing pathways into the future. Metge (2015) discusses the two sides of Māori knowledge systems, the sacred aspects (those that are "tapu") that are not always readily available to everyone and the knowledge that is available to all (the "noa") that is needed for daily living and well-being. These knowledge systems related correspondingly to each other. So too does

the notion of "ako," teaching and learning. Māori language (intimately related to the environment) both forms the fundamental basis of "ako," which in turn shapes thinking and Māori worldviews. Māori patterns of thinking and relating which shape Māori worldviews and identity are bound up with one's mountains, rivers, lakes, streams, marae (formal gathering places), and other landmarks. When Māori meet and introduce themselves, it is generally prefaced by words which may follow the format of the pepeha (statement of identity) outlined here:

Ko Te Arawa te waka – Arawa is the tribal canoe.
Ko Matawhaura te maunga – Matawhaura is the mountain.
Ko Te Rotoiti te Moana – Rotoiti is the lake.
Ko Taurua Pā te Marae – Taurua Pā is the gathering place.
Ko Ngāti Pikiao te Iwi – Pikiao is the tribal grouping.
Ko Ngāti Te Rangiunuora te Hapū – Ngāti Te Rangiunuora is the sub-tribe.

These cosmological and biocultural identity shapers and markers not only demarcate the tribal landmarks, waterways, ancestral groupings but weave and entangle people, places, and practices in an intricate network of relationships. Such biocultural identity markers are embedded in the lands, elements, creatures, and bodies that inhabit those lands and waterways. They are also the focus of young children's learning in early childhood centers dedicated to Māori language and tikanga (cosmo-biocultural practices) regeneration. This gives children a secure tūrangawaewae (a place to stand, sense of belonging) or connection with those identity markers enabling them to remain profoundly linked to their histories, their genealogical roots, their language, and their ontologies in important and enduring ways.

Karakia (Māori ancient traditional spiritual rituals) also play an important role in the intergenerational transmission of language and knowledge. Karakia serve as a guide in the present and into the future. The following karakia was recited daily in our Kōhanga Reo (Māori language nest) and is an example of contemporary Kōhanga Reo pedagogy:

Tēnei au, tēnei au, ko te hōkai nei o taku tapuwae
Ko te hōkai nuku, ko te hōkai rangi, ko te hōkai o tōku tīpuna a Tānenuiārangi
I pikitia ai ki ngā rangitūhāhā ki te tiho o Manono
I rokohina atu rā, ko Io-Matua-Kore anake
I riri iho ai ngā kete o te wānanga, ko te kete Tuauri, ko te kete Tuatea, ko te kete Aronui.
Ka tiritiria, ka poupoua, ki a Papatūānuku. Ka puta te ira tangata ki te wheiao, ko te ao marama.
Haumi e, hui e, tāiki e!

This karakia is about a journey:

It is I who is here, on a sacred journey, the range and breadth of which is vast, spanning the earth and the heavens; in the way that my ancestor Tānenuiārangi journeyed into the beyond; to the limits of the outermost layers of Manono, to come upon a pure parentless source; there

> to acquire the baskets of knowledge known as Tūāuri, Tūātea and Aronui; the baskets of sacred knowledge, ancient knowledge, knowledge pertaining to all life. These were then cultivated and nourished by Papatūānuku, our Earth Mother, to unfold the essence of all human beings into the realm of light and enlightenment. So let us unite and progress the reason why we are here. So be it!

The karakia not only provides the impetus for the pursuit of knowledge but it speaks to the interconnectedness of all things ancient and new, past, present, and future. It provides the blueprint for respecting the sacred, seeking the ancient understandings to help us to understand the present and to provide the unity and purpose in working together, across boundaries, for our common well-being and human enlightenment. The means by which Tanenuiārangi ascended through the outer layers, into the heavens, was by way of a vine called "Te Aka Matua." The ancient and the present are interconnected in the same way that the ecosystems and terralinguistics are entwined. Harm to any aspect of the bioculture is harmful to the whole system. Everything and everyone needs to be valued and treated with the utmost respect.

Ontological Values: Rangatiratanga

The Māori word "Rangatira" means something (or someone) of high rank, of high esteem, and to be revered. The suffix "tanga" at the end is a noun-forming suffix so that rangatiratanga is often translated to mean sovereignty, or something which stands in high esteem, in its own right, that is, self-determining. The 1840 Tiriti o Waitangi/Treaty of Waitangi explicitly protected the rangatiratanga of the sovereign chiefs and all their lands, rivers, forests, fisheries, and "taonga" (all things treasured) from exploitation (Orange, 1987).

It is interesting to note that the prelude to Te Tiriti o Waitangi was a Declaration of Independence called *He Whakaputanga o te Rangatiratanga o Nu Tireni*, A Declaration of the Independence of New Zealand, drafted in 1835, with signatures being collected up until the time of the signing of Te Tiriti o Waitangi in 1840 (Walker, 2004). The first clause of the Declaration of Independence designated Nū Tireni (New Zealand) to be an independent country, and the United Tribes (Te Wakaminenga) also declared that the lands were indeed "he Wenua Rangatira," or lands to be revered, chiefly lands. There has, however, been a long-standing historical struggle between Māori and Pākehā (non-Māori) over the Māori concept of rangatiratanga (rights to sovereignty), exacerbated in the proclamation by Judge Prendergast in 1877 that the Treaty was a "simple nullity" (King, 2003, p. 325). While both documents guaranteed Māori their rangatiratanga (sovereignty), Prendergast contested it. There has been a struggle over whether Māori were a sovereign people, and what exactly was ceded, ever since. Smith (2012) argues that notions of struggle "in the margins" is that, when attached to a political idea such as rangatiratanga, not just the margins but all space in New Zealand can be regarded as Māori space. Rangatiratanga then is akin to a call for the sovereignty of space

(with all lands, resources, and chiefs being sovereign). Both the Declaration of the Independence (1835) and Te Tiriti o Waitangi (1840) were signed by Māori chiefs with that in mind.

A rangatiratanga theoretical frame can be considered to be political and to address issues of sociopolitical and biocultural subjugation. In education, it contests the positioning of Māori knowledge, language, and Māori children as subservient to assimilatory interests, and it challenges the notion of masterful teachers in control of young children's lives. It also resists the idea of linguicism, rejecting the construct of linguistic hierarchies. All languages are powerful. All children have the right to move beyond the master/servant relationships of colonization. "Te rangatiratanga o te whenua" (translated here as the sovereignty of land) then is not just about resistance to injustice and the inversion of colonial rule but the assertion of Māori sovereignty over Māori lands and language in "our place," all of it and everywhere. It is the right to assert Indigenous worldviews over Indigenous lands through Indigenous languages and power by breaking the illogic and harm of coloniality. From that view, rangatiratanga is a metaphor for Indigenous rights, as made explicit in the United Nations' (2007) *Declaration of the Rights of Indigenous Peoples*.

Te Awa Tupua: Landmarks Are Ancestors

Māori identify strongly with their traditional tribal landmarks, viewing these as ancestors deserving of great respect and protection. These ancestral landmarks are frequently cited in pepeha, identity statements of tribal and land affiliation. As mentioned previously, water is key to many Māori healing rituals. They have understandably been extremely distressed by settler-colonial practices, which continue to this day, of dumping sewerage and other waste into rivers. The irony of the New Zealand government's tourism promotion of our country as "100% pure" has recently been challenged by both Dame Anne Salmond, a prominent New Zealand anthropologist and public scholar, and a recent newspaper editorial by the Christchurch Press (Christchurch Press, 2017; Salmond, 2017b). The reality is in fact far from this with not only sewerage but farm and forestry runoff contributing to a very dire situation for the country's rivers (Joy, 2015).

The people of the Whanganui River, Te Ati Haunui-a-Pāpārangi, have a pepeha:

> E rere kau mai te awa nui nei
> Mai te kahui maunga ki Tangaroa
> Ko au te Awa
> Ko te Awa ko au
> The river flows from the mountain to the sea
> I am the river
> The river is me. (Waitangi Tribunal, 1999, p. 79)

During the hearing for the claim made by the Atihaunui about government breaches of the Tiriti o Waitangi in relation to their river, an elder made the statement: "If I am the river and the river is me - then emphatically, I am dying"

(as cited in Salmond, 2016). Iwi (tribes), such as Atihaunui and Waikato, have sought to regain the right to exercise kaitiakitanga (active guardianship) over their rivers, given the despoliation that has occurred under settler/colonial governance. After very many years of struggle, in 2017 the New Zealand Parliament passed legislation that affirms the ancestral status of the Whanganui River, Te Awa Tupua (New Zealand Parliament, 2017). It is to be hoped that the reaffirmation of ancestral relationships and knowledge, occurring through the succession of settlements of historical grievances that have been achieved by long-standing Māori commitment struggle and sacrifice, will enable current and future generations of children to be deeply connected via their whakapapa (genealogy) to their ancestral lands, rivers, forests, wetlands, foreshores, islands, and oceans and the knowledges these uphold.

Tribal Rāhui

The function of "rāhui" or prohibition is to place a sanction on something, either a resource, a place, or a thing. It is form of "tapu" which means the place of the rāhui, for the duration of the rāhui, is sacred or absolutely restricted. Any breach of the rāhui, especially if placed by a chief or tōhunga (reader of signs from nature, spiritual expert, and healer), could have dire implications, even death. Quite often a rāhui would be placed in an area where there had been a significant event, for example, a lake where there had been a drowning. A rāhui would be put in place so that there would be no activity in that place until the body had been recovered and for a significant period of time after the drowning. Other forms of rāhui would establish a certain place, for example, a lake, the bush, or rivers, to be off-limits for fishing or the harvesting of food, to allow those places to be restored. This would enable the resources to be protected. A modern-day example of the way rāhui is exercised at the tribal level is through the establishment of the Mātaitai reserves which are areas in which the local tribal members manage all noncommercial fishing by making bylaws. These bylaws apply equally to all individuals, not just the tāngata whenua (people of that place). These are effective restrictions to prevent the overfishing of marine reserves.

Rāhui in and Early Childhood Care and Education Setting

An example of rāhui being applied in an early childhood center occurred in a research project focussed on "caring for ourselves, others and the environment" (Ritchie, Duhn, Rau, & Craw, 2010). At Richard Hudson Kindergarten in Dunedin, the teachers determined their teaching and research focus to seek answers to their research question: "By learning about Rakinui/Ranginui [Sky Father] and Papatūānuku [Earth Mother] can we inspire our children and whānau to consider making ecologically sustainable choices?"

After researching the concept, the teachers added "rāhui" to their focus on caring for the environment through "Reducing, Reusing, and Recycling." One of these

teachers wrote this description of the problem to be addressed through application of a rāhui:

> We have some flower troughs on the entrance steps at kindergarten. They are blooming beautifully with pansies at present – and that's the problem. Some of the children have been picking the flowers. When other children notice, they pick them too. That is why a rāhui has been placed on the picking of these flowers. It has afforded an opportunity for us to introduce the concept of conservation through rāhui. If everyone picked a pansy or two today, there would be none left for tomorrow. So we are admiring them without picking them.

The teachers integrated Māori knowledges alongside western ones, engendering respect for Tāne Mahuta, the Atua (Spiritual Guardian) of forests, birds, and insects, and for Ranginui and Papatūānuku, the original parents of all beings. They described how:

> These concepts have been reinforced through teaching about the food chain, photosynthesis, growing bean seeds, planting a lemon tree that was given to us, conservation through rāhui and respect for Tāne's children, and references to Papatūānuku and Rakinui/Ranginui.

Kaitiakitanga

The meanings underpinning the Māori concept of kaitiakitanga are also deep and enduring, reflecting relationships across time and space. Tiaki means to look after, to conserve, or to protect. Combined with the prefix "kai" and the noun-forming suffix "tanga," it reflects people valuing or having a deep respect for and guardianship of Papatūānuku. The New Zealand early childhood care and education curriculum, *Te Whāriki: He whāriki mātauranga mō ngā mokopuna o Aotearoa early childhood curriculum* (Ministry of Education, 2017), discusses the notions of kaitiakitanga: "Kaiako [teachers] support mokopuna [children] to engage respectfully with and to have aroha (respectful mindfulness, love) for Papatūānuku. They encourage an understanding of kaitiakitanga and the responsibilities of being a kaitiaki by, for example, caring for rivers, native forest and birds" (p. 33). They do this "...by providing children with regular opportunities to connect with the wider natural environment and materials drawn from nature" (p. 35) and that kaitiakitanga is integral to children expressing "...their respect for the natural world in terms of respect for Papatūānuku, Ranginui and atua Māori" (p. 46).

Kaitiakitanga in Early Childhood Care and Education Setting

In the same project, the teachers from another kindergarten chose to focus on the notion of kaitiakitanga as the focus for their teaching and research. Prior to participating in the project, the kindergarten had already had a strong focus on education for sustainability. Their engagement with the project enabled them to bring te ao Māori conceptualizations into their philosophy and practice. This was particularly

relevant since the kindergarten is located in a small, rural, predominately Māori community. The teachers wrote that:

> We began to think about how Maori values, practices and culture tie in with the principles we wanted to promote. The concept of kaitiakitanga (being guardians over the well-being of the environment and the creatures in it – including us) gives a holistic view of what we are doing.

As with Richard Hudson Kindergarten, the Koromiko teachers began introducing the concept of kaitiakitanga along with the Māori cosmology of Ranginui and Papatūānuku and of Tāne Mahuta and the other Atua:

> Talking about the Earth as an entity (Papatūānuku – the Earth Mother) and the Gods who are guardians of various areas, such as the forest and sea – Tāne and Tangaroa – gives the children a concrete focus for caring for the environment and all living things in it. We can read books about this, see pictures of the living things in the forest or the sea and begin to see that we have a part in caring for them too. The things that the Earth provides, whether shells and driftwood at the beach or any other items, especially living things, are gifts from Papatūānuku and, therefore, need to be treated with respect.

The teachers reported how the mother of one of the kindergarten children described her son's practices of kaitiakitanga:

> T. enjoys whitebaiting with his Dad. Last time they only caught a few. When it was time to go, and they didn't have enough whitebait for a meal, he decided to put the ones he had caught back into the water. He didn't want them to die without being eaten. He also said that he might catch them again and a few more next time so that he had enough to eat.
>
> T., on numerous occasions, will walk past rubbish left at the beach or on the footpath and pick it up to put into the rubbish bin. He talks about 'these naughty people leaving their rubbish on the ground' and 'why don't they just put in into the rubbish bin?' I have never seen T. litter himself – he always puts things in bins or, if he can't see one, he asks me to hold it or asks where he can put it.

Children's empathy for Papatūānuku and Ranginui, the Atua, and for the creatures who are the offspring of the Atua was featured strongly in the data gathered in this project. It is such dispositions that will engender concern and respect for our planet in the future. They offer a different positioning from the exploitative paradigm of colonization and current capitalism that dominates many societies.

Concluding Thoughts

This Chapter argues that the whole ecosystem including humans live and flourish together in networks of complex and delicate relationships. It is the diversity across those complex and delicate networks that provide the potential for adaptation and further diversity. That is, diversity maintains diversity. Diversity also maintains robust ecosystems and strong biocultures and increases the chances of long-term planetary survival. Our future on this planet relies on the bioculture's ability to

preserve and continue its diversity. Human beings, and the languages we speak, are an integral part of the complex and delicate networking. Linguistic diversity and ecological diversity are inseparable. They come together in what has been termed as biocultural diversity (Skutnabb-Kangas et al., 2003). However, it has been argued that Māori face the challenge of maintaining the language specificities and cultural knowledges that emanate from the deeply embedded interconnectivity and long histories of cohabitant reciprocity (Wehi & Lord, 2017).

In this Chapter examples have been provided through an Indigenous lens of the intimate relationships and interconnectedness across the delicate networking of the bioculture, for millenia. But with colonization, Indigenous people either died, were killed, or forced into a new (hierarchical) modality of life. Lands were carved up; Indigenous people's lives decimated in terms of the destruction of whānau, hapū, and iwi structure of Māori. Drawing on Indigenous onto-epistemological lives, Māori ecological literacies of mutton-birding, learning from the elders, tribal sayings, and the nature of Māori knowledges being embodied in both the lands and languages, and being interwoven, have been examined. Some of the values that underpinned those onto-epistemologies included rangatiratanga which provides a theoretical frame to address issues of sociopolitical and biocultural subjugation. That frame is transferred into an educational context to signify children as agents of their own thinking, learning, and lives. It also resists the idea of linguistic hierarchies based on racist philosophical frames in which Indigenous languages are regarded as having no value. The reverse is promulgated – te rangatiratanga o te reo (or the sovereignty of language) along with te rangatiratanga o te whenua *(*the sovereignty of Papatūānuku).

Drawing on recent political events, the people of the Whanganui River exercised their rangatiratanga in their claim made about government breaches of the Tiriti o Waitangi in relation to their ancestral river. They sought to regain their right to exercise kaitiakitanga (active guardianship) over their river and have recently won the battle to affirm the river with the ancestral status of a person. This right presents a challenge for many New Zealanders who fail to understand the interconnectedness of Indigenous peoples to the bioculture. However, it is argued here that a pedagogy of hope (Freire, 1994) can be infused throughout early childhood care and education to enable current and future generations of children to be deeply connected via their whakapapa (genealogy) to their ancestral lands, rivers, forests, wetlands, foreshores, islands, and oceans, through their Indigenous languages and the knowledges that these uphold. It is also hoped that the values of rāhui and kaitiakitanga, as shown in the research in early childhood settings, will continue to cultivate the dispositions that will stimulate concern and respect for our planet in the future for all children present. They offer a different positioning from the exploitative paradigm of colonization and current neoliberalism that permeates Minority western capitalism and its institutions. Our long-term survival is dependent on it.

> E kore au e ngaro; he kākano i ruia mai i Rangiātea.

This whakatauki [proverb] refers to the original seed from Rangiatea, the spiritual homeland for Māori, stating that this seed will not be lost. It thus asserts both

continuity and resilience and implies that for Māori, their language and culture are the sustenance of this resilience (Grace & Grace, 2003, p. 29).

Cross-References

- ▶ Childhoodnature Alternatives: Adolescents in India, Nepal, and Bangladesh Explore Their Nature Connectedness
- ▶ Children Becoming Emotionally Attuned to "Nature" Through Diverse Place-Responsive Pedagogies
- ▶ Fostering an Ecological Worldview in Children: Rethinking Children and Nature in Early Childhood Education from a Japanese Perspective
- ▶ Situating Indigenous and Black Childhoods in the Anthropocene

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Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism

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Abstract

A significant theorist in the early childhood education field is Urie Bronfenbrenner who, in 1979, proposed his "ecological systems theory," sometimes referred to as the "ecological framework for human development." This theory offers a multidimensional systems model for understanding the influence of family through to economic and political structures; thus, it presents a way of understanding the human life course from early childhood through to adulthood. In this theory, the ecological framework enables the mapping of information about individuals and their contexts over time in order to understand their diverse systemic interconnections. A critique of this model, however, from a childhoodnature stance, is that it ignores consideration of human-nature interconnections. Thus, it is a deeply anthropocentric model of human development that is at odds with emergent posthumanist thinking that seeks to de-center the human condition. In this Chapter, we argue that the pervasiveness of this human-centered systems approach works against sustainability, in that it reinforces the sociocultural, political, and economic dimensions of being human at the expense of environmental interconnections. Drawing on systems theory, posthumanist theory, new materialism, a critical lens to pedagogy, and new sociology of childhood, we propose alternative ways of approaching Bronfenbrenner's work that, both, facilitates human connections and strengthens children and nature connections that have implications for early childhood education philosophy and pedagogy.

Keywords

Bronfenbrenner · Systems theory · Post-humanist theory · Critical theory · New materialism · Sustainability · Early childhood education · Anthropocentricism

Introduction

> The most telling criterion for evaluating the health of a society is "the concern of one generation for the next." (p. 1) (Bronfenbrenner, p. xii cited in Pence, 1988)

In 1979, Urie Bronfenbrenner proposed his "ecological systems theory," sometimes referred to as the "ecological framework for human development." This theory is a multidimensional systems model for understanding human development within sociopolitical and cultural contexts and has significantly impacted the early childhood education field over almost four decades. Bronfenbrenner's model (1979) is often foregrounded as core to understandings of young children's development both in research (Ballam, 2013; Dillon-Wallace, 2011; Rodgers, 2009) and early

childhood education practice (Arthur, Beecher, Death, Dockett, & Farmer, 2015; Bowes, Grace & Hodge, 2012; Sims & Hutchins, 2012). In particular, the child is perceived as both influenced and influential within the nested social systems they inhabit in this ecological model. The mapping of the dynamic interconnections between individuals and their contexts over time has invited a deepening of educators' understandings about each child's human-centered ecologies and trajectories in life.

As a psychologist, Bronfenbrenner was embedded in a significant period of change in the 1970s when shifts from developmental to sociological approaches first emerged, from describing and explaining human development to promoting the best for human development through examining individual-context relations (Lerner, 2005). He advocated the linking of human development to questions of social policy, in other words creating a theory-application bond. Bronfenbrenner's (1979) model was recognized as groundbreaking and transformative at the time. It must also be acknowledged that Bronfenbrenner's model (1979) signaled a revision of the images of children, from children as objects of developmental study to their positioning as socially active participants in the world and investigated in context. This revision was subsequently strengthened by the United Nations Convention on the Rights of the Child (UNCRC) (UNICEF, 1989), theories of new sociology (Corsaro, 2005), and images of children as agentic (Jones, 2009; James, Jenks, & Prout, 1998). As co-authors, we are not the first to call for revisions to Bronfenbrenner's model. For example, Christensen (2010) has proposed her own enhancement of his model based on her critique of the place of the individual's role in relation to other actors, while Stanger (2011) has questioned the absence of ecological influencers in this human-centric model and argued for eco-sociological models. However, our examination focuses on nonhuman interrelationships. While much has been achieved with Bronfenbrenner's model (1979) based on human-human interconnections, now, four decades later in the new global epoch of the Anthropocene (Steffen, Crutzen, & McNeill, 2007), we can no longer ignore human-nature interconnections as imperatives when considering young children's development and well-being.

Bronfenbrenner's model (1979) stands as an anthropocentric model of human development; thus, it is not conducive to understanding or underpinning matters concerned with global issues and global futures in the current epoch that is defined by the now dire and detrimental impacts of humans on the Earth. The continuing prioritization of human needs, wants, and relations is untenable when the strongest evidence is that humans are continuing to support lifestyles, systems, and structures that are destroying the life-giving capacities of the planet. Because we humans seem to need constant reminding, humanity's ecological footprint has already exceeded the Earth's capacity to regenerate and risen to the point where 1.6 planets are needed to provide resources sustainability. Further, the biodiversity index has fallen by more than 50% (World Wildlife Fund (WWF), 2016) as populations of nonhuman species continue to decline, greenhouse gas emissions have almost doubled, and diverse climate change impacts have become increasingly apparent (Howes, 2017; Oppenheimer & Anttila-Hughes, 2016).

Allied with ecological footprint impacts, there is clear evidence of rising inequalities on a number of indexes within and between countries and regions, with strong evidence of increasing gaps between generations (Currie & Deschenes, 2016; Olshansky et al., 2005). This final point makes a clear link between our concerns about sustainability and the ideas of Urie Bronfenbrenner who, as illustrated in the opening quotation to this chapter, himself, comments that the concern of one generation for the next is the true measure of societal health. Thus, we have taken the liberty of drawing on Bronfenbrenner's own words as our starting point for this critique of his ecological model for human development, in the belief that he would have some measure of understanding of our concerns about its shortcomings in the era of (un)sustainability. This affords us the opportunity to think further about Bronfenbrenner's concept of the chronosystem, as a way of thinking more critically and expansively about the time dimension in human development.

Further, Bronfenbrenner's model is counter to emergent posthumanist thinking that has arisen in the humanities and in education in recent times that seeks to de-center the human condition (Taylor & Hughes, 2016). We argue that Bronfenbrenner's (1979) more human-centered systems model works against sustainability – and, by extension, the development and wellbeing of children – in that it reinforces the sociocultural, political, and economic dimensions of being human at the expense of human-environmental interconnections. As outlined in the UNESCO (2010) dimensions of sustainable development framework, all dimensions are integral to achieving global sustainability, clearly identified as one of the "wicked problems" (Rittel & Weber, 1973) that impacts us all, but more so on children and future generations who will be around the longest bearing the brunt of (un)sustainable ways of living. This necessitates radical solutions – both in thinking, actions, and relationships to promote childhoodnature.

Lerner (2005) describes the reciprocity of relations fundamental to Bronfenbrenner's model as "exchanges between the person and his or her ecology that function to benefit both" (p. xix). In this phrasing, "ecology" refers to a person's social context; we note this may be feasible or optimal in the social worlds of humans, but humans have overstepped the mark in their relational reciprocity with the Earth. This incomplete appreciation of reciprocity within a human-centered idea of ecology is a point of interest for us and is reflected in solid rather than broken lines depicted in the concentric circles of Bronfenbrenner's (1979) hierarchical systems (Rogoff, 2003). Similarly, Stanger (2011) has argued for a recasting of the model stating "if we are to use ecosystem-based language, it needs to describe the complex interrelationships that support the long-term integrity of living systems rather than the short term singularity of human-designed marketing" (p. 167). He advocates the inclusion of humans and the physical/natural environment at each system level and also introduces a nanosystem level to denote the ecological systems beyond the naked eye. These points have caused us to think further about Bronfenbrenner's use of the language of ecology.

"Ecology" was coined in the mid-1860s by German Scientist Ernst Haeckel, with connections to ancient Greek philosophers such as Hippocrates and Aristotle and their studies in natural history. Modern ecology became a more rigorous science in

the late nineteenth century, with a surge in interest in 1960s commensurate with the rise of the environmental movement (Dritschilo, 2004). There are now strong historical and scientific ties between ecology, environmental management, and protection. The scope of ecology is organized into a nested hierarchy from the micro (genes and cells) to species, populations, communities, and ecosystems, through to the planetary (biosphere).

The idea of an "ecological niche" dates to 1917 with advances in the concept attributed to Hutchinson (1957) who defined the ecological niche as the relational position of a species or population in an ecosystem. The physical environment is seen as an integral part of the niche because it influences how populations of organism's affect, and are affected by, resources and competitors. Use of the term "ecological niche" is prevalent in Bronfenbrenner's theory and models and used extensively within child development literature. Berthelsen (2009), for example, writes "Bronfenbrenner argued that every child's ecological niche is unique because each child experiences and takes part in different relationships and processes of interactions across proximal contexts" (p. 4). Further, in the context of new sociology theory, children are identified as "co-constructors, active creative social agents who produce their own unique children's cultures while simultaneously contributing to the production of adult societies" (Corsaro, 2005, p. 3). Given such widespread usage to explain the uniqueness of children's experiences, however, it is perhaps surprising that interactions with physical or natural environments in shaping children's experiences is mostly absent from his model of human development.

Ecology is as much a human science as it is about the nonhuman and has led to the parallel/intersecting field of human ecology. Rachel Carson, for example, in her 1962 seminal book *Silent Spring* was one of the first biologists/ecologists to raise awareness of the power of humans to alter the world significantly. Similarly, at the time Ehrlich (1968) was the first to question population growth and the capacity of the Earth to sustain exponential human population growth. Human ecology is viewed by many as a truly interdisciplinary science that attracts psychologists, sociologists, anthropologists, geographers, and epidemiologists, for example, whose interests lie in human relations and natural systems. In the seminal work of human ecologist Gerald Young written in 1974, human ecology commonly has three ways of thinking about human-nature relationships: (1) the study of humans as the ecological dominant in plant and animal communities and systems; (2) humans as simply another animal being affected by and affecting the physical environment; and, (3) humans as different from animal life in general with interactions with the physical environment in a distinctive and creative way (Young, 1974). A truly interdisciplinary human ecology most likely addresses all three perspectives. The human and ecological transformations of the so-called Anthropocene has ushered in a new science referred to as "coupled human and natural systems" (Liu et al., 2007) reflecting a somewhat earlier systems theory notion of structural coupling (Maturana & Varela, 1987). This is described as two-way interactive relationships whereby the organism and the context change, recognizing that each impacts the other over time as in coevolution. Critically, the context is not inert or passive as viewed from a position of human dominance over nature, and in the epoch of the Anthropocene,

this contextual view is blatantly untenable. Thus, the field of human ecology must seek to generate new integrated knowledges aimed at understanding the complexities of human-nature interactions as central to the quest for both human well-being and global sustainability.

It is interesting, however, that Bronfenbrenner's use of terminology including "ecology," ecological systems, and niches is unrelated to ecology's predominant links with nature and natural systems. Of interest is that while the study of ecology is not treated as separate or distinct from humans by ecologists, Bronfenbrenner's use of ecological terms as a psychologist was not inclusive of nature and natural systems, although he does make reference to "particular physical and material characteristics" of a microsystem setting (1979, p. 22). This oversight, we presume, is because the field of ecology was only becoming popularized at the time of his writing (Dritschilo, 2004). However, contemporaries of Bronfenbrenner were theorists with an interest in human-nature relationships including systems theorist Bateson (1979), deep ecologist Berry (1988), and, most notably, Lovelock (1979) and his Gaia hypothesis. Further, Berry (p. 240) explicitly stated "the natural world is the larger sacred community to which we belong. To be alienated from this community is to become destitute in all that makes us human. To damage this community is to diminish our own existence." Undoubtedly, there are systemic impacts for human development to be recognized here. We can only surmise that while Bronfenbrenner was obviously aware of the field, he was not able or prepared to incorporate key ideas about human-nature interactions into his thinking and model of human development at the time.

Pivotal Career Moments from Our Professional Narratives

In further articulating this critique of one of early childhood educations' "holy men," both authors recognize pivotal career moments when we – quite separately – had reasons to question or found shortfalls in Bronfenbrenner's ecological systems model (1979). Davis was co-lecturing in an early childhood education course conducted in Papua New Guinea (PNG) with local early education "trainers" who were adding to their qualifications and experiences as elementary teacher educators. The unit of study combined families and community studies with a focus on Bronfenbrenner's model (1979), sustainability aspects employing the UNESCO four-dimensional model of sustainable development (2010), and health promotion education – using both an ecological health-promoting schools model and Hancock's mandala of health model of the human ecosystem (Hancock 1985). While the combined content fitted well together, Davis questioned the lack of recognition of the physical/natural environment in discussions about Bronfenbrenner's work especially when this was so much a part of the livelihoods and knowledge systems of many PNG families and communities (Department of National Planning and Monitoring (DNPM), 2010). Recognition of their dependence on market gardens and subsistence farming that nurtures family and community health and well-being was unrepresented when using Bronfenbrenner's model (1979) yet was clearly evident in the sustainability and health models being

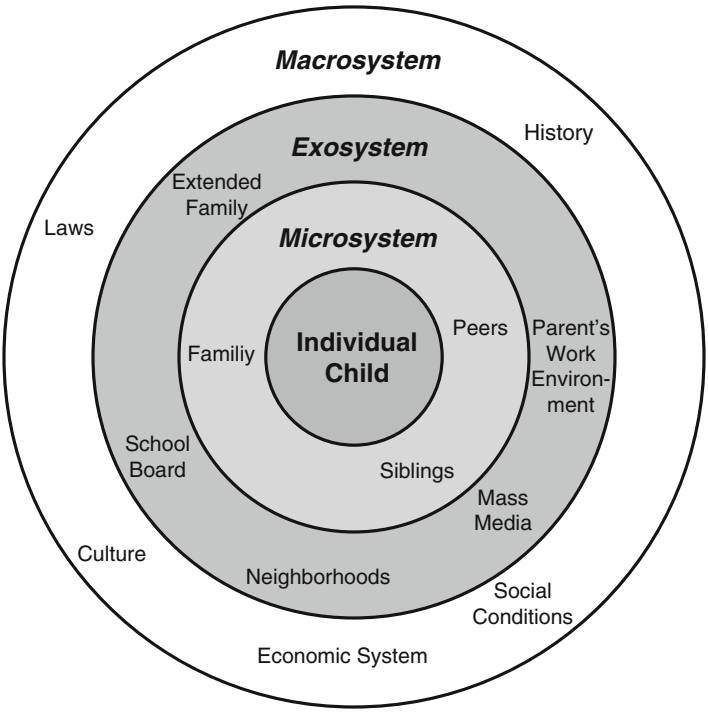

Fig. 1 Bronfenbrenner's ecological model of human development (1979). Retrieved from https://openi.nlm.nih.gov/detailedresult.php?img=PMC2676270_1471-2458-9-94-1&req=4

considered. Similarly, Elliott who led the establishment of early childhood environmental education in Australia during the mid-1980s (Elliott & Emmett, 1991) can recall many attempts to seek appropriate literature to support practitioners in the field to think about environmental and sustainability issues as having pedagogical relevance with young children. She was captured by the title "ecological" in Bronfenbrenner's work only to be disappointed that the model did not include any aspects of the physical or natural environment. Sharing these past career moments cemented our resolve to offer this critique, and potentially, new ways forward in thinking about how the theories and practices of early childhood education and education for sustainability can be brought together to better fit with the challenges and opportunities of the twenty-first century (Figs. 1 and 2).

Thus, in this chapter, we draw on our academic, professional, and research experiences as well as our theoretical leanings toward systems theory, post-humanist theory, new materialism, critical theory, and new sociology of childhood to challenge Bronfenbrenner's model (1979). We begin by offering an overview of his ecological systems model. Next, we outline the relevant theoretical underpinnings to our critique then offer specific critiques from our axiological and ontological stance. We attempt to offer some resolution to our concerns with vignettes from current early childhood education practice that challenge ways of facilitating children and

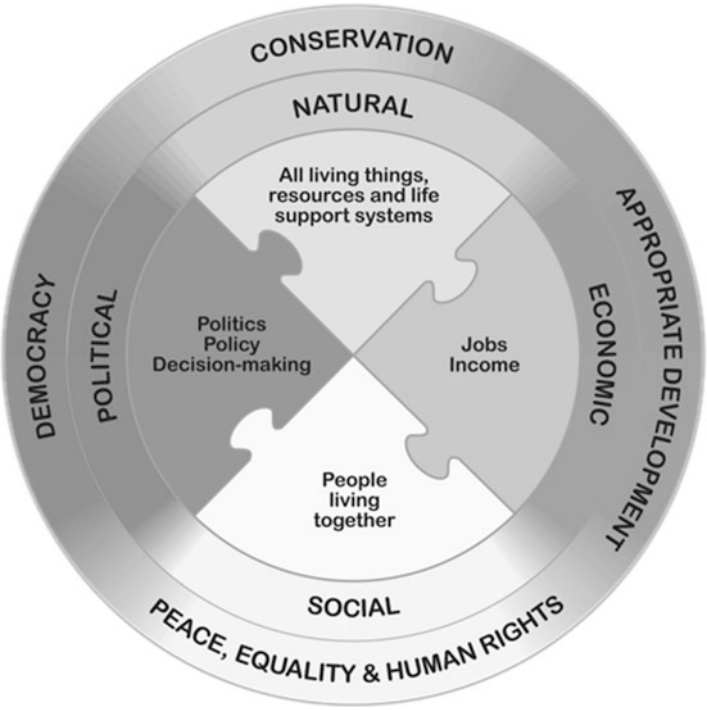

Fig. 2 UNESCO (2010) four dimensions of sustainability model Retrieved from http://www.unesco.org/education/tlsf/mods/theme_gs/mod0a.html © UNESCO, 2010. All Rights Reserved

nature connections with implications for early childhood education philosophy and pedagogy.

Bronfenbrenner: An Ecological Model for Human Development

In examining Bronfenbrenner's (1979) ecological model, we firstly contextualize his model within the theoretical and discipline milieu of the time and then offer an overview of the model's iterations with links to sustainability. We further provide some examples identifying how this model has been variously employed within the early childhood education sphere.

A Theoretical and Discipline Milieu

We acknowledge that there has been some literature investigating Bronfenbrenner's theory and model(s). For example, Tudge, Mokrova, Hatfield and Karnik (2009) discussed the uses and abuses of his theory, but there appears to be a lack of rigorous academic critique (Taylor, 2016). We are aware of the work of Boon, Cottrell, King,

Stevenson, and Millar (2012) who found value in applying his theory in a field allied with sustainability – natural disasters and community resilience. However, we argue that our discussion is the first to critique his work from the perspective of early childhood education and sustainability.

As previously acknowledged, although his initial model was recognized to be groundbreaking and transformative at the time of publication – perhaps even a theoretical disruption – we recognize that it occurred when shifts toward sociocultural theorizing were underway within the field of human development (Vygotsky, 1978). Perhaps Bronfenbrenner can be seen as a pioneer in breaking down the disciplinary silos of the time. Vygotsky's theories of social constructivism and social constructionism, first translated in 1978, had instigated a movement away from earlier developmental theorizing (Gesell, 1950; Piaget & Inhelder, 1962). The field of human development was evolving at this time as demonstrated by Berthelsen, Lunn, and Johansson (2009, p. 184), and this strengthens our argument for an urgent reevaluation now, four decades later, when anthropocentric models are ill-equipped to foster sustainable futures for all. As has been already commented upon, "Bronfenbrenner moved the field from being an area of scholarship that described what 'is' in human development to a science that, through its collaborations with policy makers, practitioners, and other social change agents, envisioned what 'could be' about human development" (Lerner, 2005, pp. xii–xiii). Similarly, we question what "could be" and what "must be" envisioned about human development in the global epoch of the Anthropocene (Steffen et al., 2007).

In essence, the point we make here is that Bronfenbrenner's (1979) ecological model was framed within the human-centered sociopolitical-environmental context of its time. Concerns about the state of the environment were only beginning to be understood, for example, Rachel Carson's *Silent Spring* (1962) had just been released, and Erhlich's (1968) population predictions were alarmingly dire. However, concerns as a global issue and connections between human health and well-being were yet to be widely recognized. The United Nations Conference on the Human Environment (Stockholm Conference) in 1972 was the UN's first major conference on international environmental issues and marked a turning point in the development of international environmental politics. Also, pertinent to this milieu are the then-contemporary environmental education initiatives such as *The Brundtland Report* (WCED, 1987) and *Agenda 21* (UNCED, 1992) which demonstrated a shift in thinking toward sustainability as comprising multiple dimensions, namely, economic, social, and environmental; and this prompted longer-term human thinking and action for the intergenerational equity of all species. Concurrently in the field of health promotion was the World Health Organization's Ottawa Charter for Health Promotion (1986) that emphasized that "Good health is a major resource for social, economic and personal development and an important dimension of quality of life. Political, economic, social, cultural, environmental, behavioural and biological factors can all favour health or be harmful to it" (p. 1). We question, was Bronfenbrenner (1999, 2001) aware of these shifts as he continued to reframe his original ecological model, through the 1990s, to become the bioecological model of 2001? We see our reevaluation of his model as being in the same vein.

Iterations on the Model

In referring to Bronfenbrenner's ecological model, it is important to recognize that the first iteration published in 1979, and most often referred to in the literature, was not the only version. This initial model is frequently described as contextually focused acknowledging the diverse social contexts influencing human development. Bronfenbrenner depicted these social contexts as concentric nested circles comprising the *microsystem*, *mesosystem*, *exosystem*, and *macrosystem*. The *microsystem* alerts us to the child's immediate settings, those settings that a child participates in on a daily basis including his/her home, school, or early childhood center. The *mesosystem* is about interactions and interrelationships between the microsystems, and in our tertiary teaching experience this is a somewhat perplexing system level given the lack of specific settings or entities. The *exosystems* are those social structures or settings both formal and informal where a child is not directly involved but may have indirect impacts for a child such as a parent's workplace or extended family. The most outer system is the *macrosystem* that comprises the broader level policies, political institutions, and cultural beliefs that have import for all systems. These system-level contexts and interactions were initially reflected as given points in time, but Bronfenbrenner subsequently added the *chronosystem* to denote dynamic system changes over the human life span. Also, although he aligned the model with nested Russian babushka dolls (Bronfenbrenner, 1979, p. 3), the various systems or structural levels are not discrete, but integrated throughout the course of human development. Bronfenbrenner (1999, 2001) engaged in an ongoing reassessment and critique of his original model leading to various iterations over time. Here we highlight key aspects of these iterations relevant to our critique.

A focus in Bronfenbrenner's later 1990s theorizing is the person-process-context-time (PPCT) model where the interrelationships between these four concepts come to the fore (Lerner, p. xv), overriding the contextual-only focus of his original model (1979). In this later iteration, interrelationships were framed as proximal processes – reciprocal, enduring, and increasingly complex (Bronfenbrenner, 1995, 1999) – such descriptors resonate well today.

However, we raise concerns when such interrelationships most often allude to everyday anthropocentric objects and symbols such as toys and hobbies (Bronfenbrenner, 1999) when it is obvious that people also interact intimately on a moment-by-moment basis with the physical environment, for example, daily weather ranging from the inconvenience of rain or wind to extreme weather events impact human lives. Only now with climate change modeling are the impacts of changing weather patterns on human life courses, particularly children's, evident and the reciprocity of these interrelationships with the physical environment being recognized (Zivin & Shrader, 2016). In addition, while the PPCT model acknowledges the personal or dispositional characteristics that any individual brings to their active interactions in social contexts (Bronfenbrenner, 1995), he describes such active interactional focus as "proclivities to set in motion, sustain and enhance processes of interaction between the organism and particular features of persons, objects and, symbols in its environment" (Bronfenbrenner, 1995, p. 634). We hold

no argument with such proclivities and view them as core to transformative processes for sustainability. We consider that these dispositional characteristics do not go far enough. Our main argument is that a deeper and broader interpretation of environment needs to be part of systems where these tendencies are enacted. In the context of our critique, might we now include sustainable worldviews, ethics, and values held by the individual?

Considering Time

In support of his theorizing, Bronfenbrenner (1999) also offered four guiding life course principles that highlight change over time. He acknowledges each individual's life course is shaped by conditions and events during their historical life period, and the timing of biological and social transitions throughout this period is key. In Bronfenbrenner's (1917–2005) own lifetime, the challenges of human-centered social and economic change ranging from world wars to industrialization and evolving family dynamics were at the fore as evidenced by his examples (Bronfenbrenner, 1999). As we have indicated previously, the current global historical period of the Anthropocene (Steffen et al., 2007) and the now ongoing transitions in human lives attributed to climate change (Currie & Deschenes, 2016) offer a compelling rationale for rethinking Bronfenbrenner's model and its various iterations (1979, 1999, 2001). Bronfenbrenner (p. 22) reminds us in Life Course Principle 4, for example, that "within the limits and opportunities afforded by the historical, cultural and socioeconomic conditions in which they live, human beings themselves influence their own development – for better or for worse -through their own choices and acts." The inherent sentiments are clear; our argument is to also include nonhuman environmental conditions and to consider all "choices and acts" as having consequences beyond those of current individuals, i.e., to consider the intergenerational legacy of our choices and acts.

Furthermore, in reviewing his original model, Bronfenbrenner (1979) recognized the role of biological determinants of the individual, and a bioecological model was proposed (Bronfenbrenner, 2001), thus, bringing together human social ecologies and individual human biological determinants into a more comprehensive whole. However, we argue that this development is still not comprehensive enough for those advocating for childhoodnature aligned worldviews that integrate humans and nature and who have concerns for long-term intergenerational sustainable futures. Stanger (2011) has previously stated that the chronosystem must be extended to include evolutionary time scales. Further, we might provoke, is the nonhuman and/or physical environment potentially framed beyond these nested human systems and all encompassing, or situated within and impacted by human social systems, or integral and across all nested systems. Reframing these intersections over more than a human lifetime offers a unique challenge that we return to in later pages of this chapter.

Lastly, we do not purport to offer a comprehensive overview of Bronfenbrenner's theorizing and iterations here but have targeted those aspects that most invite critique alongside offering support from our global sustainability and eco-centric stance. We

acknowledge the challenges inherent in this approach as others have cautioned about the overly simplistic interpretations of Bronfenbrenner's work which abound in both research and practitioner literature (Tudge et al., 2013). Nevertheless, we are inspired by Bronfenbrenner to proceed when he states "the possibilities of ecologies as yet untried . . . hold a potential for human natures yet unseen, perhaps possessed of a wiser blend of power and compassion than has thus far been manifested" (1979, p. xiii).

Bronfenbrenner's Model and Early Childhood Education

Along with the theories of Vygotsky (1978), Bronfenbrenner's theory (1979) has been significant in shaping early childhood education worldwide (Härkönen, 2003; Sims & Hutchins, 2012; Penn, 2005) including in early childhood teacher education, as a theoretical basis for early childhood education curriculum and pedagogy and in research. The following diverse examples offer insights into the range and depth of impacts.

In the early 1960s, for example, Bronfenbrenner was specifically engaged with the early childhood education field through the American government-funded Head Start program (American Psychologist's Association, 2004). At a time of national social justice concern, the program aimed to address the deficits experienced by young children living in poverty through early intervention. The program involved coordinated efforts by professionals, communities, and parents (Hinitz, 2014), and the intent was to offer a more holistic approach to promoting young children's development through early childhood education. The Head Start program has been sustained over decades now and facilitated interventions with some 32 million children (Head Start Office, n.d.). Multiple research studies have identified benefits, but questions are still raised about the longer-term outcomes for children (Hinitz, 2014). Bronfenbrenner's (1979) approach to human development as occurring within multiple interactive social systems continues to underpin the Head Start programs today, but rethinking is needed given continuing social inequities and especially those being exacerbated with climate change (Currie & Deschenes, 2016).

More recently, Krishnan (2010) described a Canadian provincial early childhood development-mapping project that utilized an Early Development Index (EDI) instrument based on Bronfenbrenner's model (Janus & Offord, 2007). The overall EDI aim was to offer estimates of child development at the time of school entry with a focus on the multilevel systems and interactions that accounted for each child's development. Implementation of the mapping project led to development of a conceptual ecological model taking into consideration individual and environmental factors, again with a focus on addressing social inequalities. In reporting this project, Krishan (2010) recognized the "physical environment" as a variable within the broad scope of neighborhoods and community, proffering examples including urbanization, nonprofit organizations, and transportation resources, thus retaining an anthropocentric lens. However, Krishan (2010, p. 14) notes as a concluding limitation to the conceptual ecological model "Among other things, an aspect not addressed in the

proposed model but critical to children's development is that of physical environment, including exposure to toxins and pesticides in a variety of contexts." This limitation offers a glimpse into a less anthropocentric lens, akin to the health models previously noted, but from our stance much more is feasible.

Further, we highlight an early childhood education tertiary text, one of a number citing Bronfenbrenner's model (1979) as foundational to the publication (Arthur et al., 2015; Bowes et al., 2012; Page & Tayler, 2016). The text by Sims and Hutchins (2012) focuses on program planning for infants and toddlers supporting a holistic approach to embracing the multiplicity of systems and interactions that critically impact on early development. Advocacy for infant and toddler programs to best support their learning and development is applauded; however, these authors only refer to the physical environment for the establishment of appropriate indoor and outdoor playspaces. This is not the global physical environment related to environmental and sustainability crises that we identify as a "blind spot" (Wagner, 1993) for many early childhood education authors. We argue that continued reference to Bronfenbrenner's (1979) anthropocentric model fails to fully convey the impacts of the physical environment in the Anthropocene (Steffen et al., 2007). For example, Zivin and Shrader (2016) state that higher global temperatures are linked to increasing global rates of childhood disease, plus water and food scarcity with potential to seriously impede early development leading to lifelong consequences. This is not to deny the complexity of human social, economic, and political system factors impacting very young children but to argue for a more inclusive and eco-centrically informed consideration of all local and global factors.

In these examples, we note how Bronfenbrenner's model has contributed to shaping early childhood education as anthropocentric, and its use continues almost without question to create explicitly human-centered approaches when examining children's learning and development. One exception is McCrea and Littledyke's (2015) adaptation of Bronfenbrenner's (1979) model that offers practical guidance for educators seeking to link his model to education for sustainability and the pillars of sustainability with a focus on children's health and well-being. While this adaptation offers much potential, our intent here is to theorize more deeply our concerns for the early education more broadly, particularly with reference to posthumanist thinking. Overall, the exemplars above give little or no place for more eco-centric and holistic views of human/child interests as shaped both by and with the physical environment. The world has changed since the 1970s, and Bronfenbrenner's work needs reconceptualizing or disrupting to account for the contemporary challenges of the Anthropocene (Steffen et al., 2007).

Theories Driving Our Reevaluation of Bronfenbrenner's Models in Early Childhood Education

In this section, we discuss five theoretical perspectives that have influenced our critique of Bronfenbrenner's (1979) model and offer a way forward for addressing the dilemmas that have become evident through this critique. We believe these offer

new insights into thinking about and enacting early childhood education in light of the sustainability challenges and complexities of lived experiences and relationships in the twenty-first century.

Systems Theory Perspective

Systems theory is core to the discussions here, and we recognize the contemporary systems theorists who built interdisciplinary bridges by examining mathematical systems, biological systems, and human social systems. In particular, Bateson (1979), and Maturana and Varela (1987) identified the primacy of relationships over objects in the interweaving of social and ecological systems in a holistic manner. "A system may be defined as a set of elements standing in interrelation among themselves and with the environment" (Von Bertalanffy, 1972, p. 417). A key tenet of systems is that they self-regulate to maintain stability through a constant messaging and responsive recalibration to promote ongoing stability and adaptiveness. If humans and nature are considered as a dualism, as was the case in the 1970s and still is for many, we can posit humans as unable to perceive, respond, and adaptively recalibrate. The resulting disequilibrium now has a name, the Anthropocene (Steffen et al., 2007). The current disequilibrium reflects dynamic systems theory (Thelen & Smith, 1994), which emphasizes the ongoing fluctuations of systems over an extended time frame from simplicity to complexity and back again.

Further, the persistence of dualism can be linked to the conceptualization of systems as open or closed proposed by Von Bertalanffy (Weckowicz, 2000). An open system is characterized by ongoing exchanges between internal elements of the system and the environment, whereas closed systems are discrete or removed. Perhaps for too long, humans have perceived their existence within closed "human-centric systems" like Bronfenbrenner's model (1979), removed from the physical environment and without responsibilities for ongoing reciprocal exchanges. Bateson doubted we could survive as a species if humans persisted in viewing the world in terms of dualisms. He asserted (Bateson, 1979) that mind and nature were one organism and the influential interrelationships between mind and nature promoted stability as in one whole organism akin to Lovelock's (1979) Gaia hypothesis. Humans are only part of the Earth's systems and can never control them; hence, the dynamics and reciprocity of interrelationships between humans and nature must be recognized in any theorizing about human development.

Posthumanism

As previously noted posthumanist thinking seeks to de-center the human condition and challenge entrenched human-nature dualisms. posthumanism is not one distinct paradigm with a readily traceable lineage, but "a constellation of different theories,

approaches, concepts and practices" (Taylor, 2016, p. 6). Links are evident to ecofeminism, queer theory, Indigenous theories, deep ecology, systems theory, new materialism, and eco-centrism. In essence posthumanism invites an exploration of different ontologies about being in the world with a relational and ethical focus to others, both human and more-than-human. In moving beyond dualisms, Latour (2004) proposed "common worlds" as collective and relational spaces with shared agencies. Common worlds are "full of entangled and uneven historical and geographical relations, political tensions, ethical dilemmas and unending possibilities" (Taylor, 2013, p. 62). Bronfenbrenner's model (1979) does suggest an entanglement of human interrelationships over time, but we echo posthumanist Braidotti (2013) in seeing the "potential to contest the arrogance of anthropocentrism and the exceptionalism of the humans" (p. 66). The implications of posthuman theorizing are now being acknowledged in the education field (Taylor & Hughes, 2016). Common world pedagogies aim to avoid children-as-subjects learning about nature-as-object; it is about learning with or becoming worldly with the others in the human and more-than-human collective (Taylor, 2013). Further, Rooney (2016) describes "common worlding" as a pedagogical approach to exploring these messy, shared, and enmeshed worlds with generative potential for thinking differently about ethics and relations. Post-humanist thinking brings a unique ethical lens to how humans perceive themselves in the world with others and challenges the anthropocentric foundations of Bronfenbrenner's model (1979).

New Materialism

Closely aligned with posthumanist thinking, "new materialism" – also sometimes referred to as socio-materialism – is a term applied to a series of theoretical movements across several fields including philosophy, biology, and the human sciences that critiques anthropocentrism and links social and material conditions (social relations, other species, physical context, objects) to human consciousness and learning (McKenzie & Bieler, 2016). Such a critique challenges the long-held idea of human exceptionality over other entities (Weldemariam, 2017). It emphasizes the self-organizing powers of many nonhuman processes, explores dissonant relations between such processes and human/cultural practices, rethinks the sources of ethics beyond the human, and commends the folding of a planetary dimension more overtly and regularly into studies of global, international, and national and state governance (Connelly, 2013). A new materialist perspective, rather than promoting nature/environment as something to be saved, controlled, or mastered, emphasizes the mutually constitutive and entangled relationships between humans within a "common world" (Latour, 2004; Taylor, 2013). Exploration of relations from a new materialism framework does dramatically portray the fragility of "materials" and relationships today. As a theoretical tool, it forces us to problematize anthropocentric thinking and invites us to rethink human relationships with the physical world/environment.

Critical Theory

Critical theory is a social theory oriented toward critiquing and changing society as a whole, in contrast to theories oriented only to understanding or explaining how societies and social structures work or do not work. Critical theory provides a basis for investigating power relationships, and, as a result, it has a strong focus on the marginalization of some social groups (Freire, 1999 first published 1972; Habermas, 1971). Historically, these groups have included the poor, women, people of color, and gays and lesbians. Critical theories aim to dig beneath the surface of social life and uncover the assumptions that keep us from a full and true understanding of how the world works. Critical theory can be recognized today in many feminist theories and feminist approaches to conducting social science, critical race theory, cultural theory, gender and queer theory, and in media theory and media studies. It has also infiltrated the ways that scholars do research with, for example, critical action research and critical discourse analysis (CDA) being just two approaches derived from applying a critical orientation to research problems.

As it relates to environmental and sustainability matters, marginalized groups include children, future generations, as well as nonhuman species (Borkfelt, 2011), places, and even natural elements, such as water, soil, and air. There is a significant body of work that investigates and theorizes, specifically, issues of the environment from a critical theoretical lens, for example, Luke (2003).

Critical theory also assists in understanding how education systems have played their part in this marginalization (Stevenson, 2007). In particular, Stevenson (2007) argues that there is a fundamental contradiction in purpose and practice between what schools do, i.e., primarily construct a workforce to build and maintain capitalism perceived by many as the root cause of the problems, and issues confronting the globe; thus, growing inequalities and environmental/climate disruptions are evident. The goals of a critical education are to seek to empower learners to identify the social and cultural issues that lead to such exploitation and to change things for the better. The application of Freirean ideas of emancipation – with a focus on giving voice, engaging in dialogue and transformation – has been embraced by several educationalists (Apple, 1996; Giroux, 1992; McLaren, 1989) and is known as critical pedagogy with application across a broad range of schooling subjects (Haque, 2007). These principles are also deeply embedded in approaches to environmental and sustainability education. In McLaren's recent work (2015), he has updated his discussions linking environmentalism and critical pedagogy and now uses the term "critical ecopedagogy" that is discussed later in this chapter.

New Sociology of Childhood

Lastly, we refer to the new sociology of childhood (Corsaro, 2005) and perceive this theoretical lens as firmly aligned to the empowerment of learners and change for the better as described above. Childhood is most often recognized as a predetermined biological stage, but James et al. (1998) have long-argued childhood is constructed,

culturally determined, and changes over time. Emerging in the 1980s alongside the UNCRC (1989), the new sociology of childhood departed from traditional images of childhood where children were seen as incomplete individuals disconnected from society at large, or as a universal cohort passively enculturated by adults (Corsaro, 2005). New sociology positions children as active contributors to and interpreters of their social worlds; they are social actors in globally diverse social systems with individual accounts and voices to be valued, respected, and responded to by others (James et al., 1998). These accounts largely resonate with Bronfenbrenner's model (1979), but across the spheres of early childhood education and education for sustainability, such images strongly impact educators' pedagogical approaches and offer potential for researching *with* children. Christensen and James (2000) initially promoted a shift toward authentically recognizing young children as research participants and experts about their experiences; and, this approach often underpins early childhood education for sustainability research (Davis & Elliott, 2014). In these contexts, children are perceived as more than participatory individuals across multiple social systems; they are active social change agents with potentially far reaching impacts (Mackey, 2014).

In summary, we argue – through the alternative theoretical perspectives introduced above – that continued reliance on Bronfenbrenner's theory of child development in early childhood education works against ideas embedded in sustainability and education for sustainability (EfS). These include ideas about humans as interrelated with nature and the more-than-human world rather than as separate from; humans as critical thinkers and ethical social beings with collective potential for change rather than as disempowered individuals; and, humans as integral to the dynamics of interactive global systems beyond human life times. We postulate that reliance on human-centric systems is both outdated and deeply inadequate in the twenty-first century and serves to alienate and disempower children in dealing with contemporary lives and challenges as much as it has served to support and nurture their development in positive ways. However, as stated earlier, we consider that Bronfenbrenner's idea of the chronosystem offers a bridge between human-centric ideas of growth and development and our contemporary concerns with sustainability because of the reference to time, the future, and intergenerational connections.

What Might New Ecological Models of Human Development Look Like?

As we have researched for, and authored, this Chapter, we have played with several models of our own about how to represent Bronfenbrenner's ideas within the contemporary milieu of sustainability. In our reconceptualization of new ways of looking at the work of Bronfenbrenner (1979), we have engaged in a playful dialogic of models. Here we share our initial possibilities for (re)presenting his work. We have not come up with a "best" model. Indeed, we have three models – each using Bronfenbrenner's more recent bioecological model (2001) as a starting point.

Model 1: Overlay Bronfenbrenner's Model with UNESCO's 4 Dimensions

Initially struck by the circularity of both the UNESCO (2010) model of sustainability incorporating four dimensions and Bronfenbrenner's (2001) model, can we simply superimpose one on the other? If so, *all* dimensions of sustainability are overtly seen to overlay and impact all the hierarchical systems levels of Bronfenbrenner's social model (2001), adding significant depth and relational complexity. For example, the natural/conservation dimension which comprises "all living things resources and life support systems" (UNESCO, 2010) intersects and can be mapped to the individual, the microsystem, mesosystem, exosystem, and macrosystem at any point in time and over time as the hierarchical human systems and natural world evolve and change enmeshed together (Fig. 3).

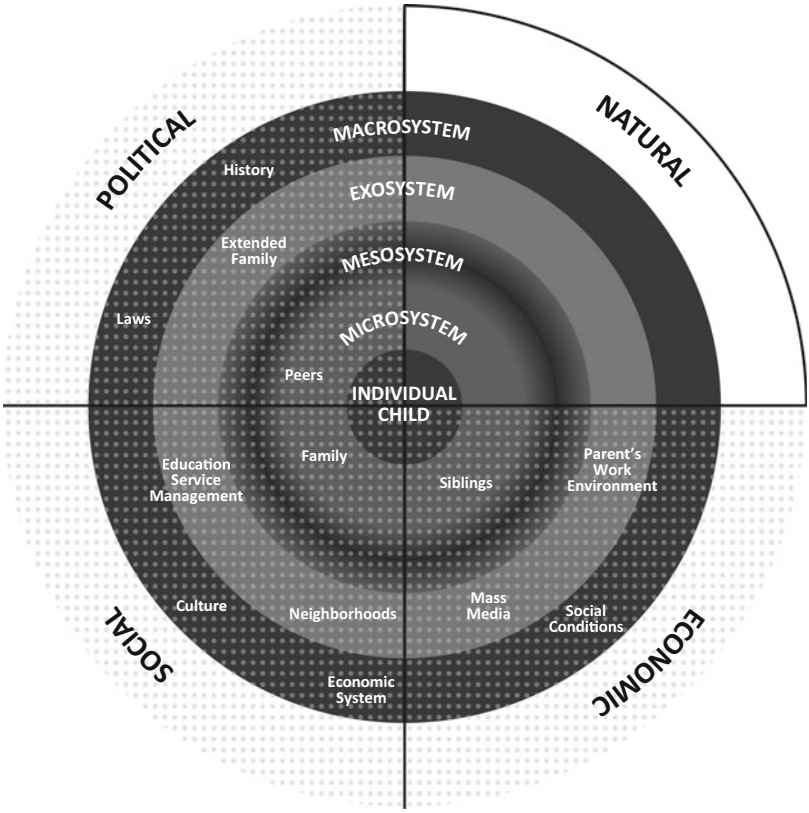

Fig. 3 Model 1: Overlay Bronfenbrenner's model with UNESCO's 4 dimensions

Model 2: Add a Biosystems Level as All Encompassing Around Bronfenbrenner's Macrosystem

Another possibility is to recognize biosystems (physical and nonhuman elements) as an additional hierarchical level for Bronfenbrenner's bioecological model (2001), depicted as an additional outer concentric circle. Hence, biosystems become all encompassing beyond the *macrosystem* of human-centric policies, values, and cultural beliefs. The outer biosystems level has impacts at all levels in the human-centered hierarchy of systems, and, equally, humans are impacting the biosystems as realized in global climate change. We move beyond broken lines to depict the permeability of the hierarchical systems (McCrea & Littledyke, 2015; Rogoff, 2003) to a shaded model depicting systemic embeddedness. These changes acknowledge that the dynamics of biosystems ultimately determine human development and global sustainability as a whole (Fig. 4).

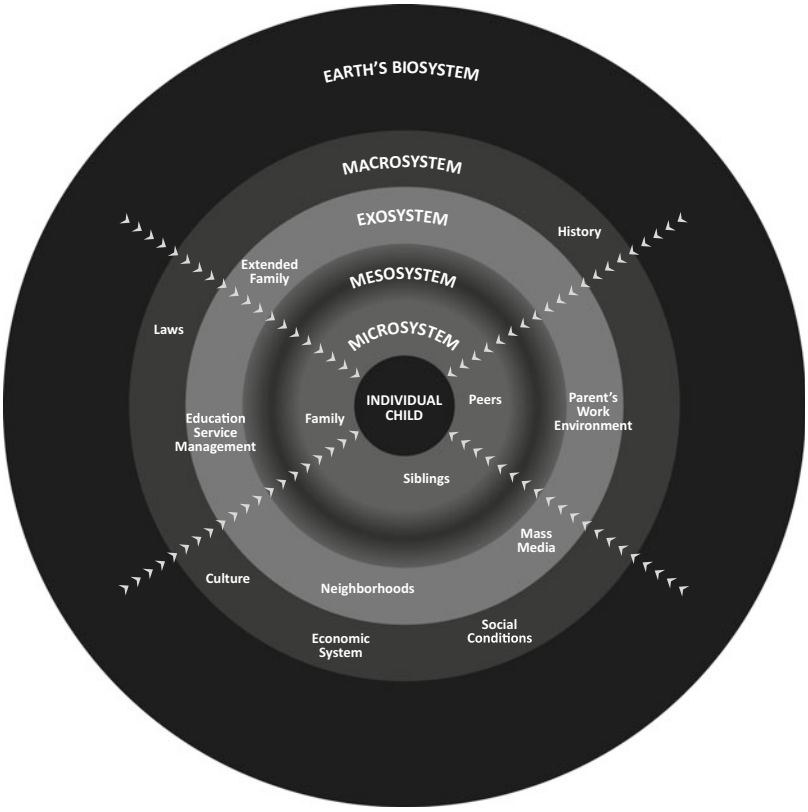

Fig. 4 Model 2: Add a biosystems level as all-encompassing around Bronfenbrenner's macrosystem

Model 3: Add a Biosystems Level Both Centrally and Outside Bronfenbrenner's Macrosystem

There may also be merit in strengthening human interrelationships with biosystems by recognizing biosystems centrally in Bronfenbrenner's model (2001) as well as beyond the macrosystem as in Model 2. The individual at the center is intimately and daily actively interacting with local biosystems, whether or not humans are aware of this relationship – with capacities to drive agentic change that may ripple outward. This combined model reflects the "act local, think global" maxim of the environmental movement and identifies individuals and the microsystems they inhabit with capacities for action and change across the hierarchies of social systems and complexities of global interrelationships over time (Fig. 5).

We have no one preferred model or response at this time, but are keen to continue playing with Bronfenbrenner's model to give it relevance for today in early childhood education.

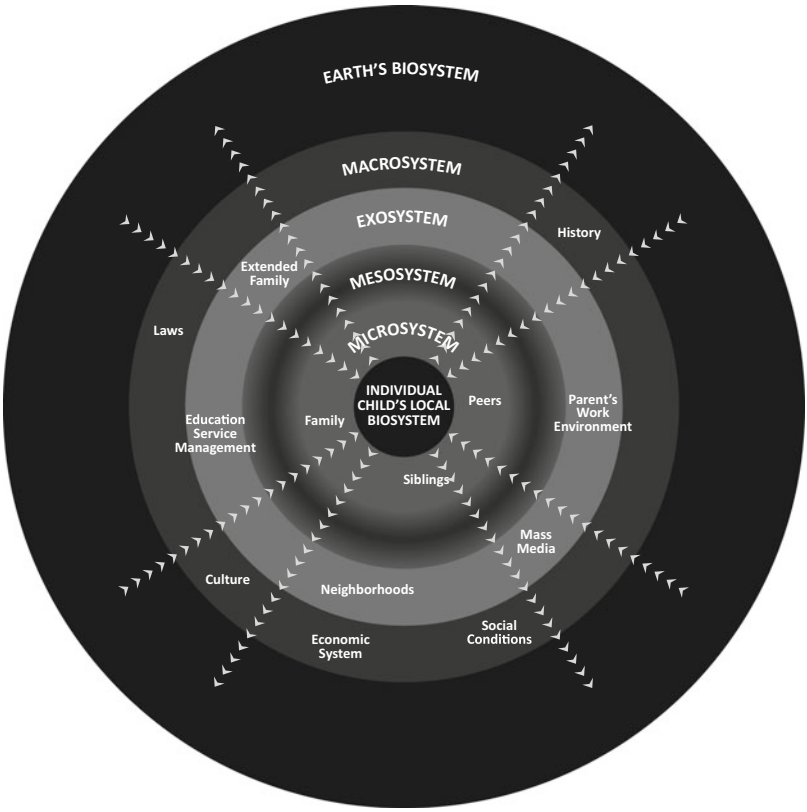

Fig. 5 Model 3: Add a biosystems level both centrally and outside Bronfenbrenner's macrosystem

Some Resolutions to Addressing the Shortcomings of Bronfenbrenner's Theory in Contemporary Early Childhood Education

From our positions as specialists and researchers in early childhood education for sustainability over the past 25 years, we know that there is a small but growing number of educators who have engaged with newer frames of early childhood education with sustainability in mind. In this section, three vignettes contributed by leading educators in early childhood pedagogical practice demonstrate how reimagined Bronfenbrenner (1979, 2001) models that account for a sustainability paradigm might look in practice. Following the vignettes, we offer a tabulated analysis of links between the approaches described in the vignettes and our critiques and theorizing. For the time being, we collectively call such approaches "critical eco-pedagogies for early childhood education," after the work of McLaren (2015).

Vignette 1: Bubup Wilam Aboriginal Child and Family Centre, Victoria Lisa G. Thorpe, Gunditjmara, Gunnai woman CEO and Angie Zerella, Education and Training Manager

Bubup Wilam is a self-determined Aboriginal Child and Family Centre catering for the education, health, and well-being needs of Aboriginal children aged 6 months to 6 years and their families. The purpose and the philosophy of the Centre was developed by the local Aboriginal community for Aboriginal people. Underpinned by Aboriginal, social justice and rights-based pedagogies, we aim to support children in collaboration with their families to build strong and proud Aboriginal identities as their foundation for lifelong learning health and well-being.

With the inequities in health, well-being, and educational outcomes for Aboriginal people in Australia, Bubup Wilam strives to provide children and their families with the support they need to be self-determining in their own lives enhancing their opportunity to reach their full human potential. This requires a holistic pedagogical approach which is underpinned by an Aboriginal perspective. This is inclusive of children's spiritual connection to country, connection to kin, and connection to where they are from and who they are. This incorporates ways of the past, present, and future and respects those that have walked this land before them, those that walk with them now, and those that will walk this land in the future.

Our connection to country program supports children's spiritual connection to their world and respects the interdependence between human, animal, and nature. It challenges them to critically reflect on their custodianship rights and responsibilities. Our children respect the spirit of the land and are taught not take anything off country as you remove the spirit and disrupt the space. We only use what we need while on country and leave as little damage behind as is possible. The hierarchy of human as dominant is challenged as the life and spirit of all things is acknowledged, and respect and equity for everything in our space is embedded in the way interactions occur within it.

Modern-day tools are not used due to the damage they would inflict on whatever they come into contact with. When relationships are formed with land, life is given to the two parties and the interactions are respectful and considerate. Our children learn about all living things that they share their space with, and they research habitats, respect potential dangers, and learn to live respectfully and in unison with all aspects of their world and all who share it with them. They learn to appreciate the complexities of life and their responsibility in keeping their world healthy, well, clean, and nourished.

Our children know the country they are from and the extra responsibility they have as traditional owners of that land. This gives them strength and connects them strongly to their identity as young Aboriginal children. They know that when on other people's country, they have responsibility to respect their country to look after it and ensure it is cared for. For our children, we are on Wurundjeri country and we acknowledge this every day. This naturally ensures a world for sustainability is embraced; this is through a relationship of historical connections, respect, and equity.

The challenge for our center in embracing this pedagogy is the cost of taking our children out on country in local bushlands, but this is far outweighed by the outcomes for our children and their families. Many of our families participate in the program which brings a richness of knowledge that is shared with the children. Being on country enables our children to connect to nature in a much richer way than in the yard at our service as they have a much deeper respect for the way they interact with their world and are activists for social change in sustainability as there is so much to protect. Connecting with country so richly has changed the way both children and educators interact with country back at our service where we extend on the richness of learning provided to us.

Urie Bronfenbrenner's ecological model focuses on the impact of human connections and relationships on the lives of children. This is also inclusive of the political context and the time, era, and place that the child grows up. However, it silences the importance of the natural world and the impact this has on children's lives. For our children this is central to their healthy life outcomes and to their identity. Family connections and ancestry is vital in developing strong identities, but this is never in isolation to knowing the land one is from and the stories of that land over time. Protecting land through an Aboriginal lens is central to health and well-being. A true ecological systems theory cannot silence the importance of this (Fig. 6).

Vignette 2: Bunyaville Environmental Education Centre, Queensland Noeleen Rowntree, Principal

Bunyaville Environmental Education Centre (EEC) sits in the middle of the forest. To enter this forest, you rumble along a dirt road with car wheels crunching on gravel. As you step out from your vehicle onto the earth, you are surrounded and immediately dwarfed by very tall gum trees. The many bird sounds chatter around you. You have arrived in the "classroom" of the Bunyaville EEC – the forest and the

Fig. 6 Bubup Wilam Aboriginal Child and Family Centre, Victoria

bush. Bunyaville EEC is a Department of Education and Training of Queensland facility. Bunyaville EEC accommodates all ages from birth to adult, formal school years P-Year 12, kindergarten, and early childhood from birth to 5 years.

At Bunyaville EEC we value a world where people care for themselves, others, and place (connecting to country), taking learning outside through experiencing, connecting, and enabling everybody to be part of sustainable futures. For us, it is about learning naturally and relationships matter, both to others and the Earth (country). Bunyaville as a place is very important, and it is the place that shapes our pedagogy across all age groups. As all of us from birth onward live more and more urban lives, connection and/or reconnection to natural places needs to be scaffolded. Across the years perceived fears of the bush have shaped our program design particularly in the early years. Most children are with us for the whole day with children from birth to 5 years spending 2 h with us outside. Whatever the age, it is important for the experience to be positive and joyous. For our visitors, time becomes irrelevant once we have entered the forest. Time doesn't seem to matter as we explore, play, discover, learn, tell stories, feel, smell, and touch the natural world with each person immersed totally in the moment of being in the natural world. It is this total immersion that suspends time. We believe this full immersion provides the experiences and helps connect individuals to the natural world.

What does it look like when place is at the center of your pedagogy? Purposeful program design and teacher pedagogy scaffold the learning for everyone. The learner, no matter what their age, is placed at the center of the learning seen as a component and capable problem-solver. Purposeful program design moves the learner from the familiar into the less familiar forest experience. Every learner spends time in the forest. So, if I am 2, 3, or 4 years of age, I arrive to see some

familiar things that I can do. Maybe there is a cardboard box, storybooks, wooden blocks, paint brushes, and water that I can use immediately. This invites young children to engage in readily recognizable opportunities for play. Remembering that this may be my first time as a child to have been in a forest, the familiar provides an easy place to start. Meanwhile, the forest sits and waits, going nowhere while I play with the familiar. Ever present the forest waits, and in a very short time we all eagerly transition seamlessly into the forest.

When in the forest, it is the many different places that drive the learning. Every place in the forest provides different opportunities. The natural materials, the special animal homes, the fallen log, and giant tree become the places for learning. Being attentive to the many parts, developing stories, adopting an inquiry approach, being in naive fellow, or empowering children to look, touch, feel, and see and encouraging children to ask questions, by answering with a question such as "I wonder . . .," can deepen the engagement, the experience, and ultimately, the connection.

Knowledge of the place matters here also. This is knowledge of what works best in what part of the forest. For example, knowledge of where to sit children comfortably to tell a story, where to invite children to explore freely, and how to set boundaries with children when there are no walls. Knowledge of where conversations are best had and where might the wallaby sleep on a hot day? Where will we need extra equipment to add to the captured moment? How to help children to see the micro in the vastness of the forest? Also, knowing the coolest route to walk after a hot morning. The teacher needs to understand and to have experienced the place. The place drives what you do. As the teacher, the place speaks to you about the relevant pedagogy as you flow through the natural area. It is when you are outside in the forest that humans begin to see that they are part of the whole, and not the whole itself.

From being in the forest human-nature interconnections develop and deepen. The teacher extends the learning by being in, doing, resting, reflecting, and questioning. Children may arrive wondering what "monsters lurk in the corners of the ponds" and depart telling you that they want to stay forever as they want to be a plant to help the forest. In a very short space of time, fears about the forest melt. Children understand the interconnections of the natural world, understand ecological issues, understand the environmental issues and problems and, most importantly, understand their role and how they can make a difference. It is not a case of waiting until I am grown up to do something. It is about right now; and, this is what I can do.

This approach works; however, the biggest challenges are adult perceptions about learning outside. Many adults perceive that no learning happens outside of four walls, and in the formal school years, teachers can be told to stay inside to learn. In the before school years, adults and caregivers may feel afraid of being outside, and it is the adult fears that become the barriers. When teaching a pedagogy of place, the teacher trusts the learner as being competent and capable. The teacher is a co-learner and model with each child. If the teacher is content-focused only, the human-nature interconnections is diminished as naming and labeling moves learning into the head and away from the heart and hands – the experience and

Fig. 7 Bunyaville Environmental Education Centre, Queensland

connection. The program design and pedagogy slows time for the learner. Two hours is but a moment (Fig. 7).

Vignette 3: Quirindi Preschool Kindergarten, New South Wales Director Alison Thompson

Quirindi Preschool Kindergarten is a rural community-based not-for-profit preschool with a commitment to EfS, community connections, arts in nature, and bush programs. Our learning framework values play-based learning, sensory integration, and learning-style groups organized around how each child learns. When considering these groups, educators observe children at play and reflect on how much space each child needs and how actively engaged they need to be to learn. Each educator's intentional teaching practices scaffold children's learning to promote an inclusive learning environment where each child's play skills and communication are extended. Our pedagogy includes a commitment to indoor/outdoor learning where the spaces invite the groups to move through the preschool environment designed to absorb the activity of the children.

Our preschool has also made a commitment to being active within the community to make the children's learning visible with the aim of strengthening community connections. Together educators, children, and their families are developing a growing awareness of our community, the community in which we live, and seeing our community landscape as being our broader family. Our definition of community landscape is what makes up our community the bush, the urban, and the social; collectively this is our natural environment. Thus, we are exploring the notion that a natural environment is not only related to our bushland program but makes up our

community, for example, farming, transport, employment, buildings, bushland, community groups, businesses, and government initiatives at a local, state, and federal level. Also, using different art forms, for example, ephemeral nature-based art incorporating all our senses, promotes children's sharing of their stories while looking beyond the surface of the community landscape. Our "Collaborations with Children" 2015 and 2016 project with artist Shona Wilson was successful in holistically promoting children's senses and stronger dispositions for learning, critical thinking, while also building the foundations for environmentally engaged adults.

Our service philosophy is our recipe. A traditional recipe offers a strong foundation of ingredients and methods but also strength for change. Our recipe ingredients are educators who value children's ability to play plus their wonder and curiosity, take time to listen and value children's perspectives, and also value families' traditions and community connections. Blended together, these are the basis for challenging and promoting educational change.

Further, collaboration between educators, children, and families promotes educators' strengths to step outside our space and to view the world beyond what we see on top but to look beneath and above. The aim is to view our learning community and our broader local community as all part of a community ecosystem, and each one of these parts is interconnected. Our small community is also part of a larger global community. If you take away one part of the many parts of the world that interconnect, there is a chance it will perish. We need to explore, imagine, reflect, and evaluate with separate views, but if EfS is to be strong, we need to bring these views together to merge as a community of thinkers striving for the connections between EfS and larger social change.

We draw on pedagogical sources (Carter & Curtis, 2008; Edwards, Gandini, & Forman, 1998) that promote connectedness to community and a belief that educators are in a strong position to foster relationships with children, families, and people of our community, urban, commercial, and natural worlds. Educators are in a strong position through positive engagement and listening to children. They are able to understand individual children and feel empowered to challenge children and themselves with provocations. Provoking conversations encourages shared thoughts, questioning, and interests that can strengthen our thinking, creativity, and ideas, so that together we strive to see the interconnections between education and larger social change. Teaching intentionally from observing and actively being with children and collaboratively with community, thus, give our teaching energy to learn together and to want to learn more. To critically engage with children around EfS, educators need to use their imagination, act with ethical ingredients and challenge themselves to step outside their spaces, just as we ask the children to challenge and extend their thinking.

First and foremost, we are a community preschool which is strongly reflected in our philosophy and practices and links our preschool to the Bronfenbrenner model. The community system connections flow through our work and support children to understand what makes up their unique community landscape. Our educational team is learning that EfS is a growing journey for children, families, and educators.

Fig. 8 Quirindi Preschool Kindergarten, NSW

Services whose early childhood settings are situated in the city, on top of buildings, or in metropolitan areas have to create their own journeys in EfS. Our educational team feel strongly that if you value community and explore and document your community, you will find there are many possibilities to share the exciting, challenging, and risk taking journey of "EfS" (Fig. 8).

Our Analysis Linking Practice to Our Reconceptualized Bronfenbrenner Model

In Table 1, we offer our analysis of these three vignettes of contemporary early childhood educational practice using the theoretical frames outlined earlier; this takes us beyond the anthropocentrism inherent in Bronfenbrenner's models (1979, 2001) of human development.

Conclusion: Rethinking the Theoretical Tenets in Early Childhood Education

Peter McLaren, one of the architects of critical theory and critical pedagogy, argued persuasively in 2015 about the need for a dramatic shift in how we think about education and has called for a new emphasis and shift from pedagogy to ecopedagogy (p. 307). He commented that, while progressive education's emphasis on identity politics as a solution to creating a more vibrant, inclusive, and critical

Table 1 Linking critiques with theories and critical ecopedagogies for early childhood education

Critique	Theory	Key ideas	Practice implications	Vignette examples
Language	Critical theory as linked to critical discourse analysis	Contextualizing language and the dynamics of changing meanings	Interrogating language and making meanings with children	*QP – our definition of community landscape is what makes up our community the bush, the urban, and the social; collectively this is our natural environment*
	New sociology of childhood	Children recognized as active social participants and their perceptions valued	Positioning children as skilled and knowledgeable social learning participants	*QP – educators who value children's ability to play plus their wonder and curiosity, take time to listen, and value children's perspectives*
				BEEC – the learner, no matter what their age, is placed at the center of the learning seen as a competent and capable problem-solver
Contexts and relationships	posthumanism	Encompass more-than-human relationships	Examining what defines ethical relationships with the human and more-than-human world with children through pedagogical practices for sustainability	*BW – when relationships are formed with land, life is given to the two parties, and the interactions are respectful and considerate*
	New materialism			*BEEC – relationships matter, both to others and the Earth (country)*
		Ethical relationships	Inviting immersion in natural contexts to facilitate relationships	*QP – educators are in a strong position to foster relationships with children, families, and people of our community, urban, commercial, and natural worlds*
				BEEC – we believe this full immersion provides the experiences and helps connect individuals to the natural world

Systems	Systems theory	Systems as interactional at all levels and not entity focused	Acknowledging and/or mapping all relationships with children	*BW – children's spiritual connection to country, connection to kin, and connection to where they are from and who they are*
	posthumanism			*BW – respects the interdependence between human, animal, and nature*
	New materialism	Systems as comprising human and nonhuman entities and interrelationships	Recognizing the reciprocity and responsiveness of interrelationships as integral to the functioning of open systems	*BEEC – it is when you are outside in the forest that humans begin to see that they are part of the whole, and not the whole itself*
		Systems as open and not closed or human-centric only		*QP – the aim is to view our learning community and our broader local community as all part of a community ecosystem, and each one of these parts is interconnected. Our small community is also part of a larger global community*
Time dimensions	posthumanism	More-than-human life histories, global time frames	Discussing equity issues now and for future generations both human and nonhuman	*BW – this incorporates ways of the past, present, and future and respects those that have walked this land before them, those that walk with them now, and those that will walk this land in the future*
	Dynamic systems theory	Dynamics of change over time		
			Acknowledging both human and nonhuman change over time	*BW – family connections and ancestry is vital in developing strong identities, but this is never in isolation to knowing the land one is from and the stories of that land over time*
				BEEC – meanwhile the forest sits and waits, going nowhere

(*continued*)

Table 1 (continued)

Critique	Theory	Key ideas	Practice implications	Vignette examples
The individual	Systems theory	Systems are collective with impacts from one entity influencing all parts of the system	Contextualizing with children about the impacts each individual sustainability action has for collective well-being of others both human and nonhuman	*QP – together educators, children, and their families are developing a growing awareness of our community, the community in which we live, and seeing our community landscape as being our broader family*
			Developing skills for sharing perspectives and working collectively in and with the community for change	*QP – collaboration between educators, children, and families promotes educators' strengths to step outside our space*
				QP – we need to explore, imagine, reflect, and evaluate with separate views, but if EfS is to be strong, we need to bring these views together to merge as a community of thinkers striving for the connections between EfS and larger social change
				QP – together striving to see the interconnections between education and larger social change

Children's agency	Critical theory	Children as empowered and global change agents through active social participation	Practicing advocacy and action for sustainability with children in relation to meaningful issues	*BW – critically reflect on their custodianship rights and responsibilities*
	New sociology of childhood		Questioning sustainable practice norms, ethics, and interrogating dilemmas and conflicts	*BW – they know that when on other people's country, they have responsibility to respect their country to look after it and ensure it is cared for*
				BW – activists for social change in sustainability as there is so much to protect
			Recognizing and listening to children's voices	*BEEC – encouraging children to ask questions but by answering with a question such as an "I wonder . . ." can deepen the engagement, the experience, and, ultimately, the connection*
			Inviting and promoting children's active participation in social change	*BEEC – children understand the interconnections of the natural world, understand ecological issues, understand the environmental issues and problems and most importantly, and understand their role and how they can make a difference*
				QP – to critically engage with children around EfS, educators need to use their imagination, to act with ethical ingredients and challenge themselves to step outside their spaces. Just as we ask the children to also challenge and extend their thinking

BW bubup wilam, *BEEC* bunyaville EEC, *QP* quirindi preschool

public sphere has met with some success, "issues of environmental sustainability [have] maintained but a lifeless presence, including within critical pedagogy" (McLaren, 2015, p. 308). He suggests that now is the time – emboldened by the activities of various global social movements and motivated by deepening planetary crises – when critical ecopedagogies have "arrived" and can offer powerful arguments for how to respond to the Anthropocene crisis. Further, he argues for a "revolutionary critical ecopedagogy" as a reconfiguring force. Drawing on its Marxian roots, this has the potential to re-center on essentials, suggesting a reining in of unsustainable, exploitative practices with a shift away from materialism to the expression of natural and acquired talents and the promise of improved ecological stewardship.

Further, McLaren (2015, p. 316) reemphasizes the necessity for linking ecopedagogy with praxis, but not any kind of praxis. Drawing on the liberatory tenets of Freire, this should be praxis that is philosophically founded in ethics and recognizes the languages and discourses of the oppressed and marginalized. He recognizes that ecopedagogy must join up with existing decolonizing struggles of all kinds as natural allies in the battles against unsustainable world capitalism.

Drawing on McLaren's views, we argue that a radical ecopedagogy must inform, and reshape, early childhood education as much as education generally. Moss and Petrie (2002, p. 136) would agree; pedagogy cannot be neutral; it is "a political and ethical minefield in which choices are to be made." One way to move to a transformative pedagogical stance is to continue shifting the theoretical underpinnings of early childhood education – of which Bronfenbrenner himself was once a revolutionary pioneer – toward critical ecopedagogies for early childhood education. We further argue that the vignettes presented in this chapter offer ways that such critical ecopedagogies might be enacted. As Mackenzie and Bieler (2016) emphasize, operationalizing critical education approaches must go "beyond critique and deconstruction to encompass the production and practice of alternatives" (p. 6).

In this chapter, we have presented arguments for rethinking the theories and models of Bronfenbrenner (1979, 1999, 2001), who for the last 40 years or so has been a key figure in directing how the early childhood education field thinks about children's development and well-being and how this is enacted in practice. We have offered critiques based on the changing times and pressing issues of the twenty-first century with particular reference to sustainability in the Anthropocene. We have proposed new ways of representing/updating Bronfenbrenner's (1979) work and have presented vignettes where educators are exploring ecopedagogical approaches that go beyond the anthropocentrism of Bronfenbrenner's theorizing (1979). We do not pretend to be putting forward a replacement of Bronfenbrenner's (1979) theories/models, though in the future there may well be models that have not yet been thought of and that better fit contemporary circumstances. What we hope to do, though, is instigate a conversation about Bronfenbrenner's (1979) work and its dominance within early childhood education. Therefore, we invite others to critique his theories and models, and our ideas as presented in this Chapter, and to propose new and/or better ways of reconstructing early childhood education, childhood, environment, and childhoodnature, for a flourishing twenty-first century.

Cross-Reference

- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Children in the Anthropocene: How Are They Implicated?
- ▶ Moving Beyond Innocence: Educating Children in a Post-nature World
- ▶ Toward a Pedagogy for Nature-Based Play in Early Childhood Educational Settings

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Everyday, Local, Nearby, Healthy Childhoodnature Settings as Sites for Promoting Children's Health and Well-Being

50

Janet Dyment and Monica Green

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Abstract

In this chapter, we highlight the central role that healthy, vibrant, and functioning "everyday, local, and nearby" childhoodnature ecosystems can play in both

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keeping children healthy and in helping them to understand the relationship between ecosystem health and their own health. By understanding these interconnections, children can learn that they are not separate from or superior to nature. Rather, these settings become sites where children can refresh and reimagine understandings of nature and their relationships *as, within, of, and to* nature. Healthy settings are, we believe, a foundation for healthy children. A focus on health is particularly timely for two reasons. First, there are mounting international concerns about children' health – be it around issues of physical activity, mental illness, social resiliency and belonging, overweight and obesity, and spiritual grounding. But it is not only children's health that is of concern: there are deep and mounting international concerns about the health of ecological systems, be it around issues of global warming, acid rain, species loss, air pollution, urban sprawl, waste disposal, ozone layer depletion, and water pollution. This Chapter is framed around the World Health Organization's definition of health and explores the ways in which local nearby natural childhoodnature settings can promote physical, mental, social, and spiritual health and well-being of children. To illustrate these concepts in action, we profile a case study from our research in Australia. This chapter concludes with a discussion on the ways that healthy childhoodnature settings can unite, inform, and support the interests of educators, environmentalists, and children's health advocates who have an interest in the health of children and ecosystems.

Keywords
Settings · Health promotion · Local/nearby/everyday places · Children · Health

Introduction

This Chapter explores the ways in which healthy "everyday, local, nearby" green/natural settings in urban spaces, such as school grounds, playgrounds, backyards, and community settings, can play powerful and enabling roles in promoting health for children.

A focus on health is particularly timely for two reasons. First, there are mounting international concerns about children's health (World Health Organization, 2016) – be it around issues of physical activity, mental illness, social resiliency and belonging, overweight and obesity, and spiritual grounding. In response to these health concerns for children, it is widely recognized that health promotion must extend beyond interventions that target individual behavior to a more comprehensive and ecological "settings approach" model that addresses the wider contexts where people live, work, and play. From this perspective, "everyday, local, nearby" places where children spend time, and which are the focus of this chapter, are important "settings" for understanding and promoting the multiple dimensions of health (Maller, Townsend, Pryor, Brown, & St Leger, 2006).

But it is not only children's health that is of concern: there are deep and mounting international concerns about the health of ecological systems, be it around issues of

global warming, acid rain, species loss, air pollution, urban sprawl, waste disposal, ozone layer depletion, and water pollution (Barnosky et al., 2011; Pimm et al., 2014). It has been argued that the human-induced change is so significant and dramatic that it should constitute a new geological epoch, which has been informally called the Anthropocene (Crutzen, 2002). The interrelationship between ecosystem and human activity is central to this new epoch. On one hand, there is despair at the pace of change, while others argue that this time can be generative and productive and call to action for changes for both ecosystem and human wellbeing (Braidotti, 2013; Latour, 2014).

The links between children's health and the health of ecosystems are both obvious yet complex. By way of examples, densely populated urban spaces present health challenges to ecosystems in terms of habitat loss for birds and animals; they also present health challenges for children who find it difficult to walk or bicycle around their local communities. School grounds, local parks, and backyards that use pesticides to eliminate "weeds" contaminate soil, water, and other vegetation and are toxic to a host of other organisms including birds, fish, insects, and nontarget plants; children who are exposed to these pesticides can suffer from a range of serious illnesses and diseases, ranging from respiratory problems to cancer (Gilden, Huffling, & Sattler, 2010).

In this Chapter, we highlight the central role that we believe that healthy, vibrant, and functioning "everyday, local, and nearby" childhoodnature ecosystems can/should play in both keeping children healthy and in helping them to understand the relationship between ecosystem health and their own health. By understanding these interconnections, children can learn that they are not separate from or superior to nature. Rather, these settings become sites where children can refresh and reimagine understandings of nature and their relationships *as, within, of, and to* nature. Healthy settings are, we believe, a foundation for healthy children.

We begin this Chapter with an overview of the "greening" movement that is transforming urban childhoodnature settings where children spent time. We then briefly introduce the concept of a "settings approach" to health promotion and also examine the relationship between healthy, vibrant, and functioning ecological systems and the health and wellbeing of children. The majority of the Chapter is framed around the World Health Organization's definition of health and explores the ways in which local, nearby, natural play spaces can promote physical, mental, social, and spiritual health and wellbeing of children. By adopting a broad interpretation of "health," we seek to expand the children's health and wellbeing discourse beyond the "physical," and we disrupt the notion that playgrounds are exclusive places to "burn up steam." We also disrupt the notion that children are separate from nature but are instead connected to and part of nature. We point to the powerful and diverse ways that healthy local settings can support children's health and wellbeing. To conclude our Chapter, we illustrate these concepts in action by profiling a case study from Monica's (second author) research on the ecological, pedagogical, and health benefits of school and community settings in Australia. The case study shows how children work to create and support healthy ecosystems and, in doing so, create spaces that promote their own health and well-being. Our Chapter concludes with the contention that healthy local childhoodnature settings are places that can unite,

inform, and support the interests of educators, children's health advocates, and environmentalists who are concerned about the health of ecosystems.

Green Everyday, Local, Nearby Childhoodnature Settings

Around the world, children's everyday, local, nearby settings, such as school grounds, public playgrounds, and backyards, are changing. Homogenous environments comprised primarily of asphalt and/or grass that are noted for being hot, hard, and barren (Fig. 1) are being transformed or "greened" into places designed to include a variety of natural elements such as vegetable gardens, wetlands, trees, frog ponds, murals, and butterfly gardens (Figs. 2, 3, and 4).

For the purposes of this Chapter, we use the term "green" to describe the changes that settings have experienced. We recognize, however, that some changes to settings, particularly in the southern hemisphere, like Australia, where our case study takes place, may actually result in the setting become more "brown," but for the purposes of this chapter, we have chosen to use the term "green" as it reflects an international movement dedicated to transforming children's settings.

Children's everyday, nearby, local outdoor settings are ideal sites that serve to decenter humans and where interactions with the more-than-human world provide possibilities for challenging the "ontological position of separateness combined with the colonizing politics of anthropocentrism and human exceptionalism" (Blenkinsop, Jickling, Morse, & Jensen, in press; ▶ Chap. 22, "Wild Pedagogies: Six Touchstones for Childhoodnature Theory and Practice"). While informal settings, such as backyards and some urban parks, might be left to speak for themselves through informal education, additional powerful learning can occur in more formal settings, such as school grounds. In these formal green settings, learning can be enhanced by "brave, insightful and rebel teachers," who are keen to wild their pedagogy and can help "bring voices of the voiceless to their students, and to

Fig. 1 Homogenous urban settings, such as this school ground which is comprised primarily of asphalt, are hot, barren, and hard

Fig. 2 A "green" school ground setting for children with a vibrant and healthy food garden

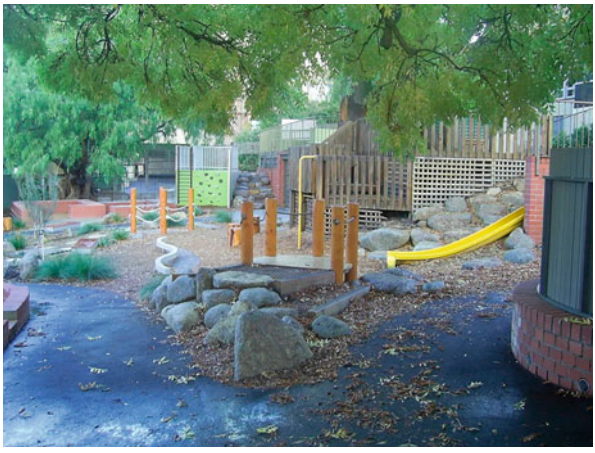

Fig. 3 A "green" early childcare setting for children with a diversity of natural play spaces and lovely shade

Fig. 4 A "green" community playground with art-enriched spaces for meeting and gathering. Mature trees provide healthy habitats for animals and birds as well as shade for children

enact pedagogies that are less objectively oriented and more co-constructed, less expertly known and more spontaneous, less universal and testable and more place responsive" (ibid, p. y).

Given the mounting evidence base pointing to the powerful role healthy local settings can play in the lives of children (Dooris, 2009; Dooris et al., 2007), it is internationally recognized and supported as evidenced by the large number of not-for-profit organizations that support the process of greening children's local outdoor settings. Organizations and programs such as *Evergreen* in Canada, the *Centre for Ecoliteracy* in the United States, *Learnscapes* in Australia, *Movium* in Sweden, *Ecoschools* programs in South Africa, and *Learning through Landscapes* in the United Kingdom continue to grow in their profile and scope. These organizations provide guidance, funding, and resources to administrators, community members, teachers, and parents who are interested in beginning the process of greening.

Settings Approach to Health Promotion

The prospect of seeing "settings" as possible sites for promoting health has a long international history. It was first advocated in 1986, with the Ottawa Charter, which stated that "health is created and lived by people within the settings of their everyday life; where they learn, work, play and love" (World Health Organization, 1986). It subsequently has been promoted in the Sundsvall Statement (World Health Organization, 1991) which called for the creation of supportive environments with a focus on settings for health. Finally, the Jakarta Declaration (World Health Organization, 1997) noted the value of settings in their role in implementing far-reaching strategies and providing a framework for health promotion.

A settings approach locates health action in the "everyday life" with a recognition of the social, cultural, and physical spaces in which people live, learn, and play. In the settings approach, health promotion is reoriented from developing personal competencies toward creating healthy policies, reshaping environments to support health, and building partnerships and creating sustainable change through participation, empowerment, and ownership of change throughout the setting (Whitelaw et al., 2001).

Since its inception, a variety of "settings" have adopted the approach – such as universities, hospitals, prisons, workplaces, and schools (Dooris, 2009). What is consistent across these various settings is that they are all seen to be "systems." The settings approach adopts a socio-ecological perspective, which explicitly recognizes the contextual and environmental factors that influence health. Interventions therefore target the physical, organizational, and social contexts in which people are found, not just the people contained in or defined by that setting (Poland, Krupa, & McCall, 2009). While we find great merit in the socio-ecological approach to health promotion, we are somewhat troubled by what we see to be the privileging of human (socio) health over the environmental (ecological) health. We wish to disrupt this privileging in this chapter – specifically human health over ecosystem health.

We hope this brief theoretical overview of settings approaches will help the reader understand why healthy "everyday, local, nearby" green childhoodnature settings, such as school grounds, backyards, community grounds, and playgrounds, can be seen as settings that can promote health of children. These are places where children engage in regular formal and informal activities. In these spaces, environmental, organizational, and personal factors can all interact to influence health and wellbeing. By their design, these settings can support children in developing healthy behaviors and help children understand their relationship to and with more-than-human world. As children learn to care for these local spaces and to nurture the health of these ecosystems, they become decentered from a position of privilege over more-than-human nature, and they are encouraged to participate in different kinds of physical activity; they are provided with opportunities for social inclusion and mental wellness; and they are gifted with opportunities for spiritual understanding.

Childhoodnature Turn On the Dimensions of Health

The next section of this chapter profiles the ways in which everyday, local, nearby green places are examples of a settings-based approach and explores the ways in which these healthy childhoodnature settings can promote children's health across a range of dimensions – including physical, social, mental, and spiritual.

Childhoodnature and Physical Health

Green outdoor settings can result in many physical health benefits for children, some of which are relatively straightforward. When pesticides are eliminated and shade is increased in family yards, school grounds, or childcare playgrounds, for example, there are benefits to both the ecosystem and children. Healthier ecosystems are created, and there is a reduction in children's exposure to harmful chemicals and ultraviolet radiation. With respect to both issues (pesticide use and shade provision), environmental research points to the damaging effects for surrounding flora and fauna (Goulson, Nicholls, Botías, & Rotheray, 2015; Potts et al., 2010), and medical research indicates that children are a particularly vulnerable population (Francesca, Elliott, & Crighton, 2014). By way of another example, the provision of shade is an important structural change to outdoor environments that makes it a healthier place for both the ecosystem and the children. For example, shade trees provide habitat and food sources for birds, squirrels, and butterflies in temperate ecosystems (Seamans, 2013); they also provide cool spaces for children to protect themselves from the damaging impacts of ultraviolet radiation (Shanahan et al., 2015).

In addition to these obvious benefits, greening can also enhance physical health in more subtle ways. However, to appreciate these, we must address two common misconceptions about the design of outdoor settings. The first is the belief that the uniform, wide-open spaces of conventional outdoor environments minimize physical risk and maximize children's safety because there is little that children can fall

down from and little to block the sight lines of the adults on playground duty. From this perspective, it may be feared that green outdoor settings increase the risk of injury – for example, by having children fall from rocks or trees, slip into ponds, or get stung by insects attracted to the vegetation or compost. In addition, there may be concern that bushes, trees, and other natural features will impair supervision.

While concerns about these risks are very real (often becoming barriers for encouraging children's play in outdoor settings), research into the contributions of children's outdoor interactions helps to correct the imbalance in this perspective. For example, a study of 45 schools in Toronto, Canada, indicates that green outdoor settings can actually calm the movement patterns of children and soften play surfaces so that there are, in fact, fewer "knock-and-bump" injuries (Dyment, 2005). With proper planning, furthermore, vegetation can be placed and pruned so that adequate sight lines are maintained.

Other studies have helped reframe "risk" in play settings arguing that the sterile landscapes of conventional children's outdoor settings present a much greater health risk than rocks and trees – the risk of depriving children of the quality and variety of experiences that are crucial to their healthy development (Little & Wyver, 2008; Sandseter, 2007, 2009; Stephenson, 2003). This risk is greatest for the growing numbers of children who have little access to the natural environment. Green local outdoor places provide regular opportunities for children to interact with the more-than-human world and be with and in and part of the natural world.

A second misconception about the design of outdoor settings pertaining to physical health is the belief that flat turf and asphalt provide ideal surfaces for burning off excess energy and are therefore best suited to promoting physical activity. Again, recent studies offer a more balanced perspective. They indicate that physical activity is best supported in outdoor settings comprised of a diversity of landscape features that respond to a wide variety of children's interests and capabilities (Bell & Dyment, 2006; Boldemann et al., 2006; Coe, Flynn, Wolff, Scott, & Durham, 2014; Dyment, Bell, & Lucas, 2009; Fjortoft, 2004; Moore & Cosco, 2014). A Canada-wide survey of 59 elementary schools suggests that greening school ground diversifies children's play repertoire and creates opportunities for boys and girls of all ages, interests, and abilities to be more physically active (Bell & Dyment, 2006). Complementing the rule-bound, competitive games supported by asphalt and turf playing fields, greened areas in children's outdoor settings invite children to jump, climb, dig, lift, rake, build, role-play, and generally get moving in ways that nurture all aspects of their health and development. Of particular significance is the potential to encourage moderate and light levels of physical activity by increasing the range of enjoyable, noncompetitive, imagination-based, open-ended forms of play in green outdoor settings. In these spaces, children can make discoveries and have experiences that challenge what they think they know. When children embrace the unknown, learn to deal with complexity, and be open to the spontaneous (Blenkinsop et al., in press), they can "step back from the centre. . .in order to allow other ideas, possibilities, spaces, beings and imaginations to emerge" (p. x).

Another physical health benefit offered by green local outdoor settings is the opportunity to promote better nutrition through children's participation in food gardening. Rates of obesity are rising among children in Australia, Canada, the United States, and other industrialized nations, with significant physical, mental, and social health impacts (World Health Organization, 2016). Health officials are therefore striving to improve dietary behaviors and are calling upon schools and childcare centers to support healthy eating choices. While attention is focused on the food choices offered in school cafeterias and childcare centers, food gardening offers a complementary means of supporting nutrition programs through the design and use of the outdoor settings. By planting, tending, harvesting, and eating a variety of vegetables and fruits, children can gain hands-on knowledge about nutritious food and its production (Bell & Dyment, 2006; Evergreen, 2006; Gottlieb & Azuma, n.d.). Incorporating a vegetable garden into health programing can thus have a positive effect on children's eating preferences, habits, and nutrition knowledge (Gibbs et al., 2013). The interrelationship between healthy soil and healthy children is critical here: food gardening with an organic focus also promotes a healthier ecosystem, allowing for rich soil generation and the growth of pesticide-free food that in turn sustains healthy children.

Childhoodnature and Social Health

Local nearby green outdoor settings are an important setting for social learning and development (Evans, 1995, 1997). By their design and culture, they influence social behaviors and relationships (Horning, Liden, & McMorris, 2017; Robinson & Zajicek, 2005; Titman, 1994; Waliczek, Bradley, & Zajicek, 2001). Green outdoor settings can play an important role in enhancing social health by providing a more diverse environment that better responds to the needs and interests of more children and by creating opportunities for children, communities, parents, and families to work together toward shared goals. In so doing, green outdoor environments promote social inclusion and equality and can foster greater civility, cooperation, and communication among children and between children and adults.

In her influential work on children and school ground design, Wendy Titman (1994) found a positive correlation between the conditions of the school ground and the behaviors and attitudes of children. She revealed how school grounds, in themselves, function as a "hidden curriculum" and a "form of mass communication" with a "vocabulary and grammar" of their own (pp. 16–17). Children in her study considered school grounds to be inextricably connected to the school buildings and believed that those who were responsible for the design of the school ground "made it like that" for a reason (p. 57). Thus, when school grounds failed to meet the needs of children, thereby making time in the school ground unenjoyable, they believed that this was a conscious decision by people in positions of authority who did not care.

Building on the work of Titman, others have examined the relationships between the design of outdoor settings, play opportunities, and social hierarchies and

interactions (Barbour, 1999; Cheskey, 2001a; Moore & Wong, 1997). American researcher Ann Barbour (1999) compared play behaviors on two school grounds: one that primarily provided opportunities for physical play and another that provided for a diversity of play opportunities. At schools that only provided opportunities for active and physical play, social hierarchies were established through these means, and children with low physical competence or desires were often socially excluded. Conversely, at schools where a diversity of play opportunities was afforded, students who were less physically competent could still engage in types of play that were more in line with their abilities and interests.

Conventional outdoor settings, by their design, provide a limited range of play opportunities that privilege certain individuals. Expanses of pavement and manicured grass offer opportunities primarily for large group, competitive, rule-bound games. They satisfy some children but provide few choices for those who prefer to play in smaller groups, who do not wish or are not able to compete, or who prefer more open-ended or creative kinds of games. Research suggests, for example, that conventional playgrounds cater to only a portion of the population – primarily boys, older students, and students with high physical competence who tend to dominate large open spaces and play equipment (Cunningham & Jones, 1996; Dyment, 2005; Nabhan & Trimble, 1994; Ridgers, Stratton, Curley, & White, 2005).

In contrast, green outdoor settings present the possibility of alternative, less oppressive approaches to dealing with these issues, in large part by satisfying the desires and needs of a wider variety of children. In their study of a green school ground in Berkeley California, for example, Robin Moore and Tony Wong (1997) found that children were able to "expand the play repertoire" (p. 91), engaging in less organized play and more unorganized or "free" play. On the green school ground, they observed an increase in active play, creative play, pretend play, exploratory play, constructive play, and social play, compared to the original school ground. They noted:

> This was a far cry from the old school ground, where girls hung around admiring the boys' prowess at playing ball or felt excluded because they were not attracted by the crowded play equipment; and where nonathletic children were ridiculed for not participating in the unchanging routines of ball courts, game lines, and metal bars. (Moore & Wong, 1997, p. 91)

A diversity of play opportunities is key for the facilitation of social skills. Citing an Australian study of over 4000 children in 21 primary schools, Evans (1998) notes that "the most active playgrounds with the happiest children were those containing the greatest variety of play areas" (p. 15).

Gardening activities in particular seem to provide ongoing opportunities to build positive relationships among students, staff, and parents, a key element in establishing a healthy school culture (Chawla, Keena, Pevec, & Stanley, 2014; Horning et al., 2017; Maller, 2005; Robinson & Zajicek, 2005). Some have argued that these benefits can be even more dramatic if children are involved in the full process of greening, from planning and design to implementation and maintenance (Green, 2014). In such cases, children typically have opportunities to work with a

range of individuals from both within and outside the school or childcare center. They are able to share interests, values, and time with other students, teachers, parents, and community members as they work toward common goals. They also learn important social life skills, such as teamwork, cooperation, and persistence (Alexander, Wales North, & Hendren, 1995; Horning et al., 2017).

Because greening projects tend to encourage broad community involvement, the social benefits can extend beyond the immediate school or early years setting, affecting the social health of the broader community (Barker, 1994; Herrington, 1999; Maller, 2005; Maller & Townsend, 2005). Greening outdoor environments provides a process and a place where people can meet, make friends, and build a sense of community and purpose (Dyment, 2005; Horning et al., 2017; Lewis, 1992). As projects evolve, and outdoor spaces become greener and more inviting, they embody the effort, care, and vision of those involved, sending a powerful message to the broader community. (Of course, if projects are untended or abandoned, the opposite is also true.) According to an Australian study, students who were involved in greening initiatives felt a greater sense of commitment to and from the broader school community as well as more links with other schools, parents, and the local community (Maller, 2005).

Childhoodnature and Mental Health

It has been long acknowledged across a range of cultures that plants, gardens, and gardening can have positive impacts on the mental health and wellbeing of humans (Ulrich, 1999). The tradition of using landscapes as a therapeutic healing tool has endured since ancient Egypt, when court physicians would prescribe walks in palace gardens for royalty who were mentally unwell (Davis, 1998). Likewise today outdoor spaces around some facilities, such as hospitals and prisons, are being consciously designed with a view to promoting mental wellness (Kellert, 2002; Lewis, 1992).

A growing body of literature points to the therapeutic role of more-than-human environment, particularly as this relates to mental health (Kaplan, 2001; Olds, 1989; Ulrich, 1984, 1999; Ulrich & Parsons, 1992; Ulrich et al., 1991). A basic premise is that contact with the natural world can provide relief from stress. Much of this research has been conducted with adults, although there is evidence of similar benefits for children. For example, Wells and Evans (2003) found that the presence of natural elements moderated the impacts of stressful life events on children aged 6 through 12 years who lived in a rural context. The authors discuss the policy and design implications of their findings, noting that "natural areas closer to housing and schools are essential features in an effort to foster resilience of children and perhaps to promote their healthy development" (p. 327). This assertion is particularly relevant for health-promoting schools and the green outdoor environment movement. Stressful events negatively influence children's disposition for learning, rendering them less able to

concentrate, overly anxious, and lacking in self-esteem. If nature can play a restorative role, then potentially it can also enhance children's ability to learn.

Indeed, research indicates that contact with nature supports attentional functioning (Faber-Taylor, Kuo, & Sullivan, 2001; Kuo & Taylor, 2004; Wells, 2000) and can enhance human effectiveness and make life's demands seem manageable (Kuo, 2001). A study focusing on children with attention deficit disorder (ADD) examined the relationship between children's exposure to nature through leisure activities and their attentional functioning (Faber-Taylor et al., 2001). Parents were surveyed regarding their child's attentional functioning after activities in several settings. Results indicate that children with ADD function better than usual after activities in green settings. Further, the "greener" a child's play area, the less severe his or her attention deficit symptoms tend to be. Thus, contact with nature may benefit a population of children who desperately need attentional support.

Other studies also point to the ways that green outdoor settings support mental health of children. A recent American study demonstrated that green school grounds were seen as "havens" for children that allowed them to escape stress, focus, and build competence (Chawla et al., 2014). Another American study also lends support to the relationship between green outdoor settings and mental health of children by specifically exploring how natural environments promote self-determination (Kochanowski & Carr, 2014). The authors found that play in more-than-human natural environments encouraged children to demonstrate choice making, problem-solving, self-regulation, and engagement.

Finally, on green outdoor settings, participation in gardening and greening activities has tangible results, creating opportunities for students to feel good about their accomplishments and to gain a sense of pride, responsibility, and self-confidence (Dyment, 2005; Maller, 2005; Moore & Wong, 1997). The broader body of horticultural therapy literature supports this contention and identifies a number of health benefits for children from working with plants. These include improved interpersonal relationships, constructive channelling of energy, heightened sense of productivity, improved self-esteem, and an improved disposition for learning (Pentz & Strauss, 1998; Relf, 1998).

Childhoodnature and Spiritual Health

Although spiritual health is recognized within the health-promoting settings movement, it is not easily defined or discussed. For our purposes here, we turn to a recent conceptualization of spiritual health offered by Schein (2014) who defines spiritual wellbeing/health for children as:

> A system of children's deep connections leading first to self-awareness, and later to the nurturing of basic and complex dispositions ignited by moments of wonderment, awe, joy, and inner peace that develops into the prosocial personality traits of caring, kindness, empathy, and reverence. The system requires love and attachment. . . (p. 78)

In light of this definition, it makes sense to consider how healthy green childhoodnature settings can foster wonder, awe, and joy which in turn might generate caring, kind, and empathetic traits in children. To begin, a common purpose of green outdoor settings is to create a place for other more-than-human life where children will have regular, ongoing opportunities for interaction with plants and animals and for understanding and experiencing themselves as interconnected with the whole (Bell, 2001; Cheskey, 2001b). As they listen or watch for birds, follow animal tracks, or explore for caterpillars or ladybugs, children can become attuned to the comings and goings of other beings and to their purposeful existence. As children are provided regular (possibly even daily) opportunities to encounter in these spaces, there is opportunity for powerful decentering of the taken for granted human voice and a re-centering of more-than-human voices (Blenkinsop et al., in press).

As they plant seeds, fill bird feeders, or mulch trees, children assume a nurturing role and develop a sense of relationship and intimacy with a living world in which they can actively participate (Bell, 2001; Pivnick, 2001). Gardening in particular can provide an opportunity to deal with losses and failures and to experience the responsiveness of plants to care and nurturing. As Charles Lewis (1992) explains: "from a human perspective, the strength of gardening lies in nurturing. Caring for another living entity is a basic quality of being human" (p. 58).

The Toronto study cited above indicates that these potential benefits are being widely realized on green outdoor settings. Questionnaire respondents indicated that students were more likely to explore widely (90%), to learn about their local environment (91%), and to have a greater sense of wonder and curiosity (92%) after their school ground had been greened. Over 90% of respondents also indicated that student environmental awareness and stewardship had increased on the green school ground.

As environmental awareness increases, there is reason to believe that children's sense of hope and commitment to their local environment and to the living world around them is also enhanced (of course it could be also argued that stewardship might serve to promote the nature-culture binary which has been critiqued through a posthumanist perspective in this Chapter). Through hands-on involvement with the human and natural communities of which they are a part, children learn that barren patches of pavement and manicured grass can be successfully transformed into diverse and welcoming places that better respond to their own needs as well as those of other living beings. Depending on their level of involvement in the greening project, they can also learn that they have a right to participate in decisions that affect their quality of life (Dyment, 2004; Hart, 1997). Research shows that children, when given the opportunity, are able to critically evaluate their play spaces, identify alternatives, and evaluate the outcomes (Hart, 1997; Jensen, 2002). When fully involved in the greening process, children can acquire skills related to democracy, participation, and citizenship that they can potentially carry forward into adulthood (Dyment, 2004; Hart, 1997).

Ultimately, green outdoor settings can help to nurture a deeper sense of purpose and meaning. As Robin Moore (1999) contends, gardening, working, and playing

with plants allow children to "participate in the processes of life" (p. 326) and to foster a sense of identity and belonging. Through personal, ongoing, and caring engagement, they can develop a stronger sense of place attachment, a benefit described in the horticultural therapy literature and associated with public involvement, altruistic behaviors, stress reduction, reduced crime, and a sense of coherence and health (Hill & Vigo, 1992).

Childhoodnature Healthy Settings Case Study: The Waterford Landcare Program

Introduction to Case Study

In this section of the Chapter, we apply some of the highlighted theoretical aspects to a specific case study as a way of illustrating how green childhoodnature settings can be seen as health promoting settings. We do this by drawing on Australian-based empirical research that investigated the impact of school ground pedagogies on children's health and the health of the ecosystem. Central to the research were emergent findings that stressed the benefits of children's health and wellbeing through active participation in school ground and community-based projects. Another central finding was the interrelationship between the ecosystem health and the health of the children. Many of the projects involved children working to make the local ecosystem healthier, more vibrant, and more functioning. This occurs as the children help in designing and maintaining gardens, working in conservation- and art-based projects alongside community people as part of everyday learning in everyday places. One of the key features of the case study is the way in which the school's physical spaces and its wider community are understood, utilized, and valued for children's health, learning, and relationship with/to/as nature.

Background Context to Case Study

Waterford school (not its real name) is located on the banks of the D'Entrecasteaux Channel, which is a major coastal waterway between the Tasmanian mainland and Bruny Island in southern Tasmania, approximately one hour's drive from the capital city of Hobart. Historically an old working farm, the school is set on 10-hectares and has a unique school ground ecology that features a wetland, tree woodlot, local foreshore, grasslands, and small food gardens (Fig. 5). The sites are pedagogically integral to a whole-school Landcare (The term "Landcare" refers to place-based ecological activities including tree planting, organic food gardening, recycling, and waste and biodiversity projects) curriculum that encompasses site-specific projects across the school population.

The Landcare curriculum was developed over a decade ago by a motivated environmental education teacher. Its key aim was to promote children's participation in nearby everyday places through engaging with local knowledge, history, heritage,

Fig. 5 A classroom without walls: promoting children's health and well-being

geography, and ecology via the framework of education for sustainability. Student immersion in the coastal school ground was informed by the teacher's belief that children's interactions with local ecologies have significant social and emotional value, anchoring them in place and revealing much about themselves and the world they inhabit. In Landcare learning, children's capacity to comprehend and connect with landscape ecologies, including the systemic and cyclical patterns, coastal waters and marine life, vegetation and fauna, soil, and the numerous other more-than-human life forms and the ongoing exchanges with those life forms, is highly prioritized, as evidenced by the Landcare teacher:

> I think it's really important for kids to know where they live and there's such a rich resource in outside the classroom, outside the school. . .[it] is often neglected. . .it's important to really foster that sense of wonder about their place. . .to get to know it, identify with it, be the expert and caretaker of that patch, and develop an awareness of the changes that occur in that place.

In what follows, children and teacher testimonials accentuate the four pillars of health – physical, social, mental, and spiritual – that are enacted, supported, and advanced within the Landcare program as part of a whole-school approach to student wellbeing.

Physical Health

Waterford's place-based Landcare program is undertaken across the broader school ground landscape and utilizes diverse features appropriate to students' interests and capabilities. As with most schools, the central grounds constitute a combination of conventional hard surfaces, netball and basketball courts, manufactured playing equipment, and sandpits, which are complemented with accessible and modest native gardens and food gardens. Beyond the main school, the grounds expand outward to encompass a football oval, a wetland with surrounding fields of native

Fig. 6 Embodied learning in a coastal classroom

grasslands, an extensive chicken shed, arboretum, and a capacious coastal foreshore, as highlighted in Fig. 6. While the younger students (ages 5 and 6 years) care for little gardens closer to classroom buildings, the older students venture to more out-of-the-way sites where they plant trees, make compost, collect native seed from the arboretum to raise seedlings, and build and maintain more expansive food gardens. At the commencement of each Landcare class, students meet at the garden shed to partake in customary rituals that support their transition from indoor work to embodied practical outdoor learning. After putting on gum boots and gloves and selecting the required tools – secateurs, shovels, wheelbarrows, and watering cans – they head off to their allocated projects.

For the younger students, this includes maintaining a newly finished native garden designed to attract local fauna. While weeding around the plastic tree guards, one young student tells us:

> In this garden, we run around in the bushes and we do a lot of dodging things. Sometimes we have hide and seek. I like playing in there too [points to a tree that has open branches where a cubby hole has been made]. This hakea bush [a small endemic plant with spiked leaves] is just about special to everyone because it's spiky and gives protection to birds. And it also gives some good material for making stuff, and the plants next door to it sometimes have nutritious flowers for the birds, so it's a double thing really, they get protection and food. (Sam, 9 years old)

Established as part of the students' Landcare lessons, the garden is now an everyday site where children run and play, exchange materials for building cubbies, and observe the comings and goings of the more-than-human world. The physical construction and inhabitation of this particular site is a good example of how students physically occupy the space through structured teaching and learning, open-ended, self-directed, and spontaneous play.

Similarly, in their wetland work, older students dedicate several Landcare lessons to maintaining the health of the site – clearing weeds, digging trenches, and planting

grasses – as a way of improving effective wetland functionality, such as filtering inland water runoff that will eventually find its way (unhindered) to the foreshore. Students show their understanding of the renewed ecosystem health that has emerged, in part, as a result of their efforts:

> I reckon the wetland has changed a lot. It used to have weeds growing up twice as high as it is now. When we came here it was covered in combungi [invasive weed], it was everywhere. Over there we found it was leaking water into the dam making it worse. There was a giant puddle so we ended up digging a big trench all the way to the dam to fill it up. Otherwise the combungi was just growing, thriving. (Aden, 11 years old)

> The wetland helps the other plants to grow and lets the water flow through. We've been pulling out the combungi weed, it drinks up all of the water. We get our chopper things [machete] and we cut the tops off. We have to make sure we have to get the seeds off and we pull the weeds out. It is so much fun doing it as a class. It gets all muddy and you have to be quick on it, so you go like this [chopping motion] and then you start sinking [in the mud]. And once someone sunk right into it so they had to get Pete and Gary [the grounds men] to pull them out. (Alex, 11 years old)

We view the physical and embodied nature of the Landcare work cited above as multidimensional and worthy of examination. Firstly, the lessons afford an important opportunity to advance children's physicality – digging, planting, mulching, cutting, making gardens, harvesting and cooking food, etc., which ultimately contributes to their own physical health and wellbeing. Secondly, their physical work has a direct bearing on renewing the health of the physical school ecosystem. In this sense, children view their work as instrumental in maintaining the ecological integrity and health of their coastal landscape, which ultimately supports their physical health. Through these various physical acts of sustainability, children are able to pay attention to how they and the place itself are changed and shaped as a consequence of their physical work.

Social Health

The Landcare program provides a number of social health benefits, which can be observed through the utilization of distinctive outdoor learning environments to meet the diverse needs and interests of students. As a school facing considerable socioeconomic and educational challenges, the Landcare initiative supports many students who have spent much of their schooling life alienated by an academically privileged curriculum. The origins of the program, which stem from the environmental teachers' initial outings with small groups of disconnected students, transpired through reengaging them in socially oriented school ground planting activities. In discovering the social benefits of students working together in shared projects as genuine learners and leaders, the program was expanded across the school community through several sustainability-based projects.

At the time of conducting research at the school, the Landcare program was identified by the school principal as a contributing factor in school culture renewal:

> This is a local place and community where there isn't a huge amount of money; our students feel that they're second best. I heard the term 'bush pig' for the first time when I first worked here. The students had this feeling that maybe other schools are better or other parents care about their kids more, so they might send them to other schools. So, there's a feeling of inferiority and cringe amongst the kids that we actually needed to turn around.

One of Landcare's key innovations is inviting community into the school, which has triggered ensuing partnerships with the wider community: farmers, beekeepers, gardeners, flower growers, composters, ornithologists, local artists, and orchardists who bring substantial levels of knowledge and expertise into the school. Known as community-based curriculum, the approach underpins the development of intergenerational relations and communication between community members/elders and organizations and the school community. According to the Landcare teacher:

> This community is a unique community in that it's a beautiful coastal environment, but there's still a traditional sort of community that is part of the old farming ways. Then you've got the enterprising people. I guess it harks back to that sense of who we are as a community and for kids to understand who we are as a community. Kids can work one on one working with these community people who are really passionate about what they do. That's the really important thing about the community, whoever they are . . .we need different people with different views of the world. This is what education should be about.

Similar notions of community are exemplified in the art-based *Flotsam and Jetsam* (Fig. 7) exhibition along the 1 km foreshore-walking trail below the school grounds, involving local artists and other nearby schools. Installations made from miscellaneous objects and materials collected from the foreshore represent diverse interpretations of coastal relations, connections, and inhabitation. Unlike traditional educational approaches that contain teaching and learning within school boundaries (and classrooms), often with one teacher, and which tend to separate schools from the broader community, community-based pedagogies offer important social opportunities that connect students with their community through new relationships and shared engagement.

Fig. 7 Local artists work with school children to create the art-based Flotsam and Jetsam exhibition that features along the foreshore-walking trail

Mental Health

Building on its capacity to support children's social health, the Landcare program characterizes how children's mental health, including resilience, sense of identity, and belonging, is cultivated. A key aim of the program is to encourage children's ecological stewardship or, in other words, a sense of care and empathy for the more-than-human world that includes plants and animals. This also extends to care and empathy to other human beings. One such example is the entrepreneurial chicken project involving a group of older boys challenged by conventional classroom-based learning. Once assigned to the project (focusing on raising chickens and selling eggs), the teacher allocated each of the boys' leadership roles and tasks that provided genuine responsibility, engagement, and outcomes. As the leader of the project described:

> We've got a lot of responsibility here. When I first took over the chickens you would walk outside your class and you'd see a chicken run past, they were everywhere around the school. Me and my team ended up rounding them up, putting them back in their pen and fixing up all the holes in there. And my work has finally come through and we have two, three new baby chickens. He [chicken farmer mentor] talked about how to get rid of mites and black mites which is in their feathers. He said we should have some railing up for roosting that we built in the afternoon. . . we had to paint their legs with used cooking oil and ash to stop mites. Now they can walk easier because the leg mites stopped them from walking. Did you know the mites bury their heads into the chickens and suck their blood? My chickens at home have never looked better. I treat them with the best respect. (George, 12 years old)

George's description of his work with a local chicken farmer highlights the new skills and knowledge acquired from the group about managing the animals with care and respect. The project exemplifies how the boys' sense of identity and self-esteem has shifted. According to their teacher, "They feel proud about what they've done, and they get an opportunity to talk about what they've done." Her observations align with those of the principal who voices a broader perspective of the program:

> The overall strength of the program is its ability to generate success by connecting kids to their place and to their community, so that they now feel really proud of the place that they live in. There's a sense of pride from the whole community so it's not just a school thing. The community has taken it on. And the strength of this program is that it connects kids to their place, to their community. It generates success. And that success is really positive. We're actually setting kids up to have skills and to have values that are going to help them make choices later on in life. (School principal)

As the program develops and gains statewide and national recognition, children conduct student-led tours throughout the school ground property, showcasing diverse sustainability and ecology projects that position children at the forefront of action-based learning. Asking one of the older students to explain the rationale behind the high levels of interest in the program, the student responded:

> I guess they're kind of interested to see what children can do when they put their minds to something. . .what we have done over the last maybe five years is to help this beautiful place become what it is today. We've had lots of schools coming to try and do what we've been

> doing here. So, we've actually influenced others to help the environment and that's such a brilliant feeling. (Catrina, 12 years old)

The student-led tours provide an important opportunity for children to confidently showcase their Landscape work. Additionally, the tours reveal children's sense of purpose in their learning (from a desire to act based on something that matters), deep layers of knowledge, and their intrinsic motivation to defend and preserve an ecological landscape. As participants in a "Landcare" tour, we observed overarching notions of identity, dedication, stewardship, attachment to place, and sense of pride in children's communication.

Spiritual Health

Despite being an often-overlooked dimension of western education, spiritual health or spiritual development is a fundamental element of the Landcare program, which is promoted through children's sense of wonder and connection to the human and more-than-human world. Predominantly, spiritual health is fostered through children's encounters with the living systems and via their emergent interactions with ecological life forms and forces that make up the school grounds – the soil, trees, birds, platypus, the foreshore, gardens, ladybugs, and the weather, all of which are linked to broader ecological themes such as biological diversity, interdependence, food webs and ecological communities, and connectivity.

While children instinctively pursue these exchanges with and without the permission of adults, their immersion in the wonderment and awe of coastal ecologies is also fostered by an explicit pedagogy of care that is relayed and modelled by their environmental teacher, who encourages their alertness to and respect for the wonderment of all life forms.

> My philosophy is to encourage kids to develop a sense of place in the sense of understanding of where we live, where they live and to get to know their place and first to get to know it and understand the sense of wonder about their place. It's not so much about the end product but more about the processes that allow the students to care. It's that development of nurturing and caring for the planet, for our environment and for our place because that develops ownership. Eventually [the children] feel really proud of the place that they live in.

Coming to know a place by simply being in it is encouraged by the teacher, who, at the end of each lesson, invites children to find a "magic spot" and sit contemplatively for a few minutes to pay attention to the "specialness" of their place. As evidenced by the photo below (Fig. 8), these places are often well-known to children and hold particular meaning and purpose. This spiritual perspective of learning was typified when children showed us their favorite school ground sites: trees and bushes, food gardens, a refurbished wetland, a newly built chicken shed, and a foreshore with newly planted grasses. For the children, these are places of purpose, empowerment, inhabitation, connection, and ownership which they intimately embody through everyday interactions.

Fig. 8 Fostering spiritual health through connections with special places

Case Study Conclusion

The Waterford case study represents an important and far-reaching snapshot of how the various aspects of health – physical, social, mental, and spiritual – are constituted through its Landcare program. More than just an environmental initiative, Landcare pedagogies and curriculum have been instrumental in reshaping and expanding the capacity of the school community, equipping it to better support the health and well-being of the local ecosystem, which in turn supports the health and wellbeing of students, teachers, families, and community. Through building partnerships and creating sustainable change through participation, empowerment, and ownership of change throughout the school setting (Whitelaw et al., 2001), the program's evolution can be understood as a major catalyst for cultural, social, and environmental awakening within the wider school community.

Conclusion

In this Chapter, we have profiled how healthy everyday, local, nearby childhoodnature settings, such as school grounds, backyards, and community grounds, serve to promote health across a range of dimensions. In doing so, these spaces stand to be an important part of the "settings approach" to health promotion. We have also showcased, from a posthumanist perspective, how these critical childhoodnature settings help children understand their relationship to and with the more-than-human world.

As academics, we find the theoretical evidence base across the four dimensions of health areas to be comprehensive, convincing, and compelling. In our role as researchers who have studied the impacts of greening initiatives in Australia (Monica and Janet) and Canada (Janet), our research endeavors and associated

findings lend strong support to the ideas presented in this Chapter. Equally important, in our role as teacher educators and practitioners, we have worked with and alongside children, teachers, and community members (such as those profiled in the case study) to create healthier vibrant and functioning ecosystems. Our personal experiences add further credence to the contention that healthy everyday, local, nearby childhoodnature settings have an important role to play in promoting children's physical, social, mental, and spiritual health. Overwhelmingly, in all of our roles as academics, researchers, teacher educators, and practitioners, we witness these settings as valuable contexts for cultivating children's sense of dwelling and belonging. One of the many ways to develop this sense of interconnectedness is through proactive processes that invite children to inhabit their local places through embodied and experiential opportunities. Taken to the next level, these experiences support and encourage children's ecological, personal, and social understandings of the world, and provide a gateway into their comprehension of, and commitment to, the places that sustain ongoing human and ecosystem health and wellbeing.

Cross-References

- ▶ Childhoodnature Ecological Systems and Realities: An Outline
- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Children Becoming Emotionally Attuned to "Nature" Through Diverse Place-Responsive Pedagogies
- ▶ Developing Youth Agency Through Place-Based Education: Challenges and Opportunities
- ▶ Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Re-examining the Human-Nonhuman Animal Relationship Through Humane Education
- ▶ "She's Only Two": Parents and Educators as Gatekeepers of Children's Opportunities for Nature-Based Risky Play
- ▶ Toward a Pedagogy for Nature-Based Play in Early Childhood Educational Settings

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Challenging the Anthropocentric Approach of Science Curricula: Ecological Systems Approaches to Enabling the Convergence of Sustainability, Science, and STEM Education

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Marianne Logan

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Abstract

As we enter the Anthropocene, it is apparent that Earth has been severely impacted by human activities and the very systems that sustain life are challenged (Crutzen, 2002; Zalasiewicz et al., 2010). There is a call for increased awareness and action relating to degraded ecological systems particularly in the approach to the education of children and young people. Science curricula often promote anthropocentric/technocentric attitudes toward the environment. In fact STEM

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(science, technology, engineering, and mathematics) education in Minority western such as Australia and the United States is seen to be driven by neoliberal values where government economic agendas cultivate individualistic and competitive behaviors (Carter, 2016, p 33). With this neoliberal "technical growthist" perspective predominating in science and STEM education (Smith & Watson, 2016, p 5), how can deep respect and understanding of the Earth's systems be fostered within education? There have been calls for decades to shift thinking in science education from looking at components of the Earth's environment separately, such as looking at humans as being apart from nature, to, instead, looking at the components "within the context of the whole" (Capra, 2007). The systems concept can be difficult to grasp, but the emphasis is always on the "wholeness" and the "harmonious integration of the various components" (Orr, 2014). In an ecological systems approach, humans are just one of numerous, interdependent, and diverse life-forms in an ecological system, and there is no separation of childhood and nature, as they are one. Such an alternative view has an impact on how science education is manifested. This chapter challenges an anthropocentric (or technocentric) approach to science curricula. Research into approaches in science and STEM education that are ecologically sustainable and holistic in nature and incorporate relevant socio-scientific issues is explored. A science education that offers young people knowledge, values, and firsthand experiences of ecological systems in their everyday lives and the incorporation of intercultural approaches to science education are promoted. Ecoliteracy, ecological literacy, and ecological thinking are examined in a science education context. Elements of the more recent posthumanist theoretical approach underpin this chapter; an ecological systems approach is adopted in contrast to Bronfenbrenner's socioecological theory.

Keywords
Ecological systems · Ecoliteracy · Childhoodnature · Science · Young people

Introduction

It is now evident that we have entered the Anthropocene, an era where humans have severely impacted the Earth, and as a consequence the very systems that sustain life are challenged (Crutzen, 2002; Zalasiewicz, Williams, Steffen, & Crutzen, 2010). In 1992 David Orr warned that "we have a decade or two in which we must make unprecedented changes in the way we relate to each other and to nature" (p. 3) to ensure life as we know it exists into the next century. As we now progress through the twenty-first century, there is clear evidence of the climate changing such as 2016 being the hottest year on record (Steffen, Hughes, Alexander, & Rice, 2017), marine temperatures rising leading to coral bleaching; sea levels rising, recent extreme flooding events, and intense forest fires (Steffen et al., 2017). However, despite these clear signs of a changing climate, many politicians and others are questioning the reality of human-induced climate change while they continue to view the Earth as

a resource to be consumed. This way of thinking fails to see the interrelationship of human actions and the Earth's ability to sustain life (Capra & Luisi, 2014); the realization that we depend on all other living things is lost (Lovelock, 2000). It is becoming more apparent that people need to understand how the Earth's systems maintain themselves and how human actions impact these systems. Unfortunately, science and technology have been, and continue to be, central to the human quest to conquer nature (Orr, 1992); however, science and STEM (science, technology, engineering, and mathematics) education have the potential to introduce a change in thinking toward an ecological systems approach. Scholars have long argued that in order to move toward environmental literacy, particularly an understanding of human impact on the Earth's systems, young people need to understand the scientific concepts that underpin the Earth's natural processes. Ecological systems thinking can assist young people to move toward a more sophisticated understanding of the Earth's natural processes particularly in real-world contexts (Assaraf & Orion, 2005; Sterling, 2003). With an emphasis on an ecological systems approach in science and STEM education, practices such as water conservation, energy efficiency, and sustainable waste management can be introduced in a holistic context rather than in isolation. An example of a holistic approach is where young people learn about the Earth as a dynamic system with natural cycles where water use and pollution impact waterways and groundwater (Assaraf & Orion, 2005; Batzri, Assaraf, Cohen, & Orion, 2015) and greenhouse gas emissions impact ecological systems. This Chapter challenges the anthropocentric approach to science education, where humans are perceived to be separate from other living things and where environmental conservation practices are for the benefit of humans. Instead a more holistic ecological systems approach to science education is promoted within a posthumanist framework. Traditional socioecological systems theory fails to promote holistic systems thinking relating to the interrelationship of humans and nonhuman others. The socioecological systems and the posthumanist theoretical underpinnings of this Chapter are elaborated on further in the following section.

Socioecological Systems Approach and Posthumanism

Urie Bronfenbrenner's socioecological systems theory, first developed in 1979, dominates systems thinking applied to human systems and has been foundational in education, particularly early childhood education. Bronfenbrenner's model includes four, and subsequently five, nested interconnected systems relating to external influences on the growth and development of the child over a lifetime (1994). The innermost system of the model is the microsystem which includes the child's immediate relationships, such as family, friends, and school systems. The meso- and exosystems surrounding the microsystem include factors that might influence a child such as the relationships between the school and the family or relationship between family members and their workplace. The child may or may not enter these systems, but these systems may impact the development of the child. The outer

system is the macrosystem, which includes cultural or policy factors that influence the development of the child (Bronfenbrenner, 1974). Later Bronfenbrenner introduced the chronosystem which relates to changes in the person's life or social environment, including changes in family structure or marked changes in society that might influence the person's development (Bronfenbrenner, 1994).

Bronfenbrenner's socioecological systems theory however, is not aligned with ecological systems thinking, as it is human centered and in fact silences the essential connection of the child with natural ecological systems. This Chapter takes an ecological systems approach which differs from socioecological theory, as the ecological systems approach taken here is underpinned by a posthumanist lens. It is important to move away from the human as central in our world in order to fully understand an ecological systems approach. The posthumanist approach decenters humans as being "the measure of all things" and shifts thinking to humans as just one organism in relation to all other organisms and other elements, therefore reversing the traditional view of being human (Braidotti, 2013, p. 1). Malone (2018), taking a posthuman/new materialist approach, describes the relationship between the human and more than human world as "existing in an ecological collective of messy entanglement" (p. 19). This describes a world where humans, other organisms, rocks, air, and water interrelate. It does not make sense to consider young people as somehow being separated or disconnected from nature as young people are part of nature. We cannot separate ourselves from the air that we breathe. In fact, the human body itself is populated by a multitude of organisms that are essential to living a healthy life, such as bacteria and other microorganisms, and these organisms are part of who we are (Malone, 2018). The wastes and contaminants that are the products of industry and the human lifestyle, such as plastics, heavy metals, and radioactive waste, become part of nature, and that means they enter the human body as we are nature. The human body is part of and entangled with systems and networks of a multitude of natural organisms and elements, and when we pollute nature we pollute ourselves (Malone, 2018).

To be aware of our place in nature is central to the concept of childhoodnature, where young people gain understanding of how and why humans are an integral part of nature, as are all other living and nonliving elements in the Earth's systems. In education it is important to embrace this holistic systems approach toward nature where there is no separation between humans and other (Capra & Luisi, 2014). This holistic approach is in contrast with the anthropocentric view that predominates much of traditional science education, a view where humans are separated from the untamed, wild, natural world (Rodriguez, 2016) and the dimensions of the world are compartmentalized into biological, chemical, physical, and geological (Gough, 2011). This traditional view attempts to separate young people from nature, but that is not the reality as children are part of nature.

The following section elaborates on the holistic nature of ecological systems that promotes the interconnection of biological and physical systems and highlights the key ideas behind ecological systems thinking that frame this Chapter. This section explores systems thinking generally, with an outline of the Gaia theory of the Earth as a dynamic system and consideration of the terms "ecology" and "ecosystems."

Systems Thinking

The term "system" is broad and can relate to natural systems, social systems, or technological systems (Assaraf & Orion, 2005). Systems thinking is not new; it emerged in Europe in the 1920s, in a number of fields, but largely in the area of biological sciences (Capra & Luisi, 2014). Systems thinking more recently is commonly used in relation to organizational change, particularly in business (Sterling, 2003).

Systems thinking is a way of looking at the unified whole rather than its parts in isolation. Sterling (2003) states that systems thinking is:

> Relational rather than non-relational; systemic and connective rather than linear and fragmentary; concerned more with process rather than substance, with complex dynamics rather than limited cause-effect, with pattern rather than detail, with wholes rather than parts. (p. 102)

Therefore "relationships, connectedness, and context" are at the forefront of systems thinking (Capra, 2007, p. 12).

Assaraf and Orion (2005) describe a system as a unit that continues to exist and operate as a whole through the interrelationship of its elements. Each element needs to have a particular role, and all elements need to be present so that the system can carry out its function. Capra's (2007) description illustrates the complexity of living systems:

> When we walk out into nature, living systems are what we see. First, every living organism, from the smallest bacterium to all the varieties of plants and animals (including humans), is a living system. Next, the parts of living systems are themselves living systems. A leaf is a living system. Every cell in our bodies is a living system. Finally, communities of organisms, including both ecosystems and human social systems such as families, schools, and other human communities, are living systems. (Capra, 2007, p. 11)

To think in terms of systems means understanding and interpreting these complex systems (Evagorou, Korfiatis, Nicolaou, & Constantinou, 2009, p. 655).

Systems theorists emphasize that in systems thinking "the whole is more than the sum of its parts" (Capra & Luisi, 2014, p. 64) as the properties that define the system as a whole are different to the properties of the individual elements in the system (Assaraf & Orion, 2005). Therefore if systems are pulled apart and analyzed separately, some of these properties are destroyed (Capra & Luisi, 2014). By reducing a system to its parts in isolation gives an incomplete and sometimes inaccurate picture. Thus systems thinking requires "contextual thinking" within the context "of the larger whole" and is the opposite of "analytical thinking," where something is pulled apart in order to understand it (Capra & Luisi, p. 66). An example of the importance of interactions and/or processes as essential elements of systems is feedback processes. Feedback loops occur in systems, where each element impacts on the next and eventually the last element feeds back to the first. With such feedback loops, the

whole system is regulated and the first element in the system, "input," is impacted by the last element in the system, "output" (Capra & Luisi, p. 89). Norbert Wiener in 1932, alluding to the theory of "cybernetics," describes how in a natural system the feedback is part of "homeostasis" that enables the system to regulate itself and maintain a balance (as cited in Capra & Luisi, p. 91). Without systems thinking such important processes may be ignored in deconstructive, component-based approaches.

Some examples of feedback loops occur in Australian sclerophyll forests after fire disturbance (Sclerophyll: refers to trees and shrubs with hard, stiff (sclerophyllous) leaves. Sclerophyll forests are prevalent in Australia with dominant species such as *Eucalyptus, Acacia*, *and Casuarina* (Harden, McDonald, & Williams, 2006).). Many Australian *Eucalyptus* trees have dormant epicormic buds that are protected from the fire under the bark, but with the heat of the fire disturbance, they are stimulated to grow. This fire-regulated system promotes the growth of leaves and branches and enables the trees to survive and regrow after fires. The Australian sclerophyllous communities also have other regulation mechanisms for fire disturbances such as the woody seed pods of some *Eucalyptus* and *Banksia* species that open and release seeds following the heat of a fire. The release of seeds and the heat and/or smoke of the fire often results in the prolific germination of seedlings that grow up to restore the forest system. Fires are an integral part of much of the sclerophyllous Australian landscape and play an important role in the regulation of the system to keep it healthy and in balance. However rising temperatures associated with climate change are resulting in changes to the frequency and intensity of fires, so these sclerophyllous ecological systems are challenged and threatened (Steffen et al., 2017). If the fires are too intense or more frequent than the plants' regrowth feedback system can cope with, the trees do not survive, and this impacts the whole ecological system that is based on the resources and habitat the trees provide.

It is important to look further at the terms, "ecology" and "ecosystem," as these terms underpin the ecological systems thinking underpinning this chapter. Ecology was coined by Ernst Haeckel in the nineteenth century, and he defined the term as "the science of relationships between the organism and the surrounding outer world" (Haeckel, 1866 as cited in Capra & Luisi, 2014, p. 66). The term "ecosystem" was created by A. G. Tansley (1871–1955) and was originally positioned in relation to animals and plants. However, the more recent interpretation of ecosystem is "a community of organisms and their physical environment interacting as an ecological unit" which has shaped recent ecological thinking and promotes an ecological systems approach (Capra & Luisi, 2014, p. 67). The Gaia theory of the Earth, proposed by James Lovelock in the 1960s, built on the ecology concept to encompass the whole Earth as a dynamic, self-regulating system, and originally the emphasis of this theory was on living organisms. Lovelock revised the Gaia theory and moved away from the emphasis on the living organisms alone, to emphasize the interrelationship between the living and the nonliving. In this model the entire surface of the Earth, the living biosphere, is a "self-regulating entity," and this

includes the oceans, rocks, and air (Lovelock, 2000, p. 76). Lovelock's revised definition of Gaia is:

> A complex entity involving the Earth's biosphere, atmosphere, oceans, and soil; the totality constituting a feedback or cybernetic system which seeks an optimal physical and chemical environment for life on this planet. The maintenance of relatively constant conditions by active control may be conveniently described by the term 'homoeostasis.' (Lovelock, 2000, p. 424)

Within this dynamic Earth system are networks of systems interacting with other systems. A wetland ecosystem could illustrate this interconnection. The interaction of geological, atmospheric, biological, and hydrological systems, on a micro (local), meso (regional), and macro (continental) level, over time resulted in the formation of the wetland system. These interactions of systems continue to maintain the wetland system. Each organism in the wetland ecosystem is itself a system composed of subsystems. The network of interacting organisms within the ecosystem, such as plants, animals, and other microorganisms, is interdependent for food, oxygen, and habitat. The waste from one organism in the ecosystem is food for another (Capra, 2007). Any disturbance in one component of the system, such as prolonged drought or diversion of water for farming purposes, might cause a chain reaction within the wetland system and interrelating systems. It is important for young people to explore the interconnection of micro-, meso-, and macro-systems relating to the transfer of energy and matter between the systems rather than looking at micro-systems in isolation (Assaraf & Orion, 2005). In this chapter the term the "Earth's systems" refers to the Earth's ecological systems encompassing macro-, meso-, and microsystems.

Sterling (2003) argues that systems thinking requires a "change of consciousness. . .to some degree" (p. 103), and in some parts of society in the late twentieth and early twenty-first centuries, moves toward more ecological systems thinking were taken up (Sterling, 2003). The Gaian principles of the Earth as a self-regulating system are behind "Earth system science or geophysiology" (Lovelock, 2000, p. 146). However, despite ecology being part of the curriculum in many countries, the paradigm predominantly in school science teaching and learning appears to be "analytical thinking," where science is segregated into separate disciplines which are analyzed in isolation (Jacobson & Wilensky, 2006; Gough, 2011). In this compartmentalized model of science education, it is assumed that young people make connections and understand the interrelationships between the different components, such as the connection between geology and living organisms, but often they fail to see the connection (Evagorou et al., 2009). Mathematics, technology, and engineering skills fit well within a systems approach. By integrating the disciplines of science, technology, engineering, and mathematics within STEM education, science curricula could break out of the traditional compartmentalized model of science education. However, there are concerns from environmental educators relating to the drivers of STEM and how this impacts STEM education as discussed below.

STEM Education and Economic Growth

The acronym STEM has been used since the 1980s and originated within the American National Science Foundation (NSF) in the 1990s (Bybee, 2010, p. 30) although some anecdotal evidence suggests that the term was coined earlier in the 1980s (Carter, 2016). The term is predominantly used with a mathematics and science focus, and the technology and engineering aspects are often downplayed in education (Bybee, 2010). STEM education is being widely promoted internationally, and the value that is placed on STEM is echoed by the Australian Chief scientist, Alan Finkel: "Our best future is a future that builds on technology, innovation, ideas and imagination. It is a future with STEM. And it is a future that is ours to build" (Office of Chief Scientist [OCS], 2016, p. iii).

Some STEM programs have a strong sustainability and childhoodnature focus, where young people are encouraged to explore natural elements that drive ecological systems and how human actions impact the Earth's systems. For example, the STELR (Science and Technology Education Leveraging Relevance) project in Australia provides high-quality resources for young people in secondary school to investigate the impact of fossil fuels on the Earth's systems and explore energy transformation using alternative energy sources (Australian Academy of Technology and Engineering [ATSE], 2016). However, these environmental and sustainability issues do not necessarily gain sufficient attention within the STEM agenda, despite claims such as the following from Australia's Office of Chief Scientist in the position paper of 2013 (OCS, 2013, cited in Smith & Watson, 2016):

> Australia's STEM is respected for its contribution to international solutions to global challenges, especially in systems science where, for example, oceans, atmosphere, space and epidemiology are global responsibilities. (p. 23)

Instead economic prosperity is seen as central to STEM education, particularly by governments, and this is evident from a quote in an Australian report from the Office of the Chief Scientist: "the importance of STEM skills to the prosperity of economies is not only recognised by governments, but also by employers" (OCS, 2016, p. 4). The economic priority of STEM is also reflected in Coble and Allen's 2015 report looking at the US global competitiveness and the role of education:

> Improving mathematics and science education in the United States belongs near the top of the policymaking agenda. America's role as a leader in the world's economy and its capacity to produce wealth and quality jobs for its future citizens depend directly on the ability of our education system to produce students who can compete in the math- and science- dominated industries of the future. (cited in Carter, 2016, p. 35)

The economic growth and prosperity focus of STEM is seen by environmental educators as problematic, as it is recognized that rapid economic growth along with increased carbon emissions is impacting climate and degrading natural ecosystems (Thiele, 2016). Just looking at consumption alone, the goods that are

consumed, predominantly in minority countries, have components requiring resources extracted from often fragile ecosystems across the world. These components require energy for processing and transportation involving numerous countries, and the discarded waste that is produced in these processes impacts ecosystems far into the future (Thiele, 2016). Building on the idea of Volkmar Lauber, Orr (1992) states "growth makes the wealthy more so, but it also gives substantial power to government and corporate elites who manage the economy, its technology, and all of its side effects" (p. 86). Orr (1992) sees economic growth as having a fundamentally flawed ideology where "the faster a growing volume of materials flows from mines, wells, forests farms, and oceans through the economic pipeline into dumps and sinks the better" (p. 11). It is the emphasis on economic growth as central to STEM education with sustainability or reference to the Earth's systems being scarcely mentioned or tokenistic that has led to wide criticism of STEM education from environmental educators (Smith & Watson, 2016).

Economic systems are framed by capitalism and open markets. Thiele (2016) highlights the main factors that have led to the substantial economic growth in the postindustrial years as:

- Exploitation of resources (including human resources)
- Cheap energy sources (coal, oil, and gas being at the forefront)
- Development in technologies including mechanization, communication, transportation, and infrastructure
- Population growth resulting in demand for products and services

Building on Georgescu-Roegen's (1971) entropy law, Daly describes the impact of our growing economic systems as increasing "throughput," where ecosystems provide the input of low entropy raw materials and energy and outputs include high entropy waste (Daly, 1996, p. 33; Thiele, 2016). The entropic costs are "depletion and pollution" (Daly, 1996, p. 33). Put simply in systems language, throughput is the measure of energy and raw material flow, and waste, that enters and leaves the system (Thiele, 2016). Economic growth largely fixates on generating growth by increasing throughput, and this is clearly unsustainable with the Earth's finite resources and fragile ecosystems. The result is the impact on our "complex ecological life support services rendered to the economy by nature" (Daly, p. 33). Common sense would suggest that there should be limits to economic growth, but this is not predominantly the case. Cook in 1982 stated:

> The concept of limits to growth threatens vested interests and power structures; even worse it threatens value structures in which lives have been invested. (p. 198, cited in Daly, 1996, p. 35)

Despite numerous initiatives and actions by various governments, organizations, and citizens in the area of sustainability and protection of the Earth's systems, the sentiment described in Cook's quote appears to still dominate in the twenty-first

century. Neoliberalism, the political paradigm that has predominated internationally in the past six decades, particularly in the Minority west, has continued the "economic growth at all costs" sentiment. Carter (2016) described neoliberalism as:

> The deliberate intervention by government to encourage particular types of entrepreneurial, competitive and commercial behaviour in its citizens with the market as the regulatory mechanism. It is also the management of populations to cultivate individualistic, competitive, acquisitive and entrepreneurial behavior. (p. 33)

One of the principles of the Earth Charter Initiative (ECI), which is a universal expression of ethical principles, is to:

> Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-being. (ECI, 2000, Principle 7)

Neoliberalism is at odds with this viewpoint, and with Ghandi's philosophical observation, "Earth provides enough to satisfy every man's need but not for every man's greed" (cited in Krishna, 2014, p. 156).

Carter believes that neoliberal thought has been "naturalized, normalized and ritualized" (2016, p. 34) to such an extent that this ideology is the only way we know and science itself is largely shaped by neoliberalism. Science organizations and scientific communities over the past two decades have shifted from an ideology of "advancement of knowledge" to the "creation of wealth" (Krishna, 2014, p. 142). Science, particularly STEM, has been associated with neoliberalism; Carter warns that this neoliberal agenda in science has intensified "to the exclusion of all else" (p. 34).

In order to see the significance of science education and, more recently, STEM education in the context of childhoodnature and sustainability, it is important to be aware of the history of the science education and environmental education relationship.

The Relationship of Science Education, Environmental Education, and Sustainability Education

There has long been tension between environmental educators and science educators. The term environmental education was used from the 1960s where it mainly focused on the study of nature or ecological/biological studies and at that time people generally looked to science to solve environmental problems. During the 1970s environmental education emerged in its own right (e.g., international conferences tracking the emergence of environmental education: United Nations at Stockholm, 1972; UNESCO (United Nations Educational, Scientific and Cultural Organization (UNESCO)) at Belgrade, 1975; UNESCO and UNEP (United Nations Education Program(UNEP)) at Tbilisi, 1997), and even at this early stage, some scientists

identified that science alone could not solve the emerging problems associated with the environmental degradation taking place on a global scale (Gough, 2011). As early as 1970 scientists looked to environmental educators to bring about environmental awareness in young people. At an Academy of Science Conference in Australia in 1970, Boyden emphasizes the urgency for education in schools to inform young people about the detrimental effect of human activities on the Earth's systems resulting in "social and biological problems" (as cited in Gough, 2011, p. 265), but this detrimental impact was related more to the impact for humans rather than for the Earth's systems. During the 1980s the term sustainable development came into use, and in the 1990s the term "environmental education" was frequently replaced with education for environment and sustainability or education for sustainable development. The term "sustainability" kept the environmentalists happy, and the term "development" kept the business community and "bankers" happy (Orr, 1992, p. 23).

The United Nations (UN) Brundtland Commission's, *Our Common Future*, report defines sustainable development in 1987 as:

> Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:
>
> - the concept of 'needs,' in particular the essential needs of the world's poor, to which overriding priority should be given; and
> - the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. (World Commission on Environment and Development [WCED], Chapter 2, IV)

It is important to note the anthropocentric context of this definition of sustainable development, where the emphasis on human "needs" is in contrast to a holistic context where the Earth is a dynamic system and humans are one organism with needs in the system. In fact, the term "sustainability" can be quite problematic as it has numerous interpretations. David Orr (1992) coined the terms "technological sustainability" and "ecological sustainability." The technological sustainability viewpoint (also referred to as a technocentric or anthropocentric viewpoint) sees the Earth as a resource for human benefit, and technical and market solutions can be applied to solve any associated environmental or social problems (such as sophisticated nuclear technology or carbon sequestration to address the energy crisis) (Cutter-Mackenzie, 2011; Orr, 1992). With a "technological sustainability" mind-set, humans have dominion over nature and shape nature for their needs. A "technological sustainability" mind-set promotes economic growth as being essential for sustainable development, whereas "ecological sustainability" is a mind-set where the Earth's systems are valued, nature is a model, and ecological principles set the agenda (Cutter-Mackenzie, 2011; Orr, 1992). An ecological sustainability viewpoint sees human activity as upsetting the balance of the natural systems unless it fits within the "carrying capacity of the natural systems" as "ecological systems are the only systems capable of stability in a world governed by the laws of

thermodynamics" (Orr, 1992, p. 35). Linking back to the previous section on STEM education and economic growth, ecological sustainability is where throughput is kept in check – a mind-set that aligns with ecological systems thinking.

The change in the terminology from "environmental education" to "education for sustainability" or "education for sustainable development" is seen as problematic by some environmental educators, particularly due to the range of interpretations of sustainability. The Thessaloniki Declaration (UNESCO, 1997), which was a charter for education for sustainability, is seen by Knapp as the "beginning of the end of environmental education" (2000, p. 32). Knapp believes that the spirit of environmental education is being neutralized, and he urges environmental educators to defend the underlying intentions and goals for environmental education. These goals include fostering an awareness, sensitivity, and concern about the Earth and its human impacts and environmental education being a guide for people to live environmentally responsibly by reducing their impact on the Earth (Knapp, 2000). Some environmental educators support the change in terminology toward sustainability and sustainable development. Fien and Tilbury (1996) in their report "learning for a sustainable environment" believe sustainable development and sustainability concepts are underpinned by:

> The hope that the impact humans have on the earth and the way we organize the flows, production and distribution of resources and wastes can be mitigated in both the short and the long-term. The idea of sustainability asks governments, communities and individuals to consider the needs of future generations in what political scientists define as the essential questions of public policy. (1996, p. 9)

This statement by Fien and Tilbury, relating to the concepts of sustainability and sustainable development, highlights a "technological sustainability" perspective (or an anthropocentric viewpoint) where human needs are at the forefront. In contrast the environmental education goals outlined above by Knapp (2000) are more in line with "ecological sustainability" where ecological principles are at the forefront. The period from 2005 to 2014 was declared by UNESCO as the decade for education for sustainable development. However more recently the terms, environmental education, education for sustainable development, and education for sustainability, have been used interchangeably, particularly in Australia (Malone & Somerville, 2015). The term sustainability generally has been adopted widely by governments and in the case of Australia has been incorporated into the national curricula. Despite sustainability being a focus in the Australian Curriculum, actually incorporating sustainability elements into the classroom is problematic, as is demonstrated through the Australian example.

Curricula Incorporating Sustainability: The Australian Example

In Australia a new national curriculum was implemented in 2012, and sustainability was incorporated as a "cross curriculum priority" where it was intended to underpin all subject areas at all school levels (ACARA, 2017) (The Australian Curriculum has

three "cross curriculum priorities," sustainability, Aboriginal and Torres Strait Islander histories and cultures, and Asia and Australia's engagement with Asia (ACARA, 2017)). This priority was guided by the *Melbourne Declaration on Educational Goals for Young Australians,* established in 2008 by the education ministers from all states and territories, and has a strong environmental, economic, and social sustainability emphasis (MCEETYA, 2008, as cited in Gough, 2011). The sustainability cross curriculum priority's goals, which also reflect the "Our Common Future" document (WCED, 1987), include:

> Sustainable patterns of living meet the needs of the present without compromising the ability of future generations to meet their needs. Actions to improve sustainability are individual and collective endeavours shared across local and global communities. They necessitate a renewed and balanced approach to the way humans interact with each other and the environment. Education for sustainability develops the knowledge, skills, values and world views necessary for people to act in ways that contribute to more sustainable patterns of living. It enables individuals and communities to reflect on ways of interpreting and engaging with the world. (ACARA, 2017)

The Australian Curriculum, Assessment and Reporting Authority (ACARA) (2017) statement goes on to proclaim:

> Sustainability education is futures-oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural and economic systems and their interdependence.

At first glance the statement above appears to be a positive step in moving toward an education system that promotes ecological sensitivity and responsibility as well as informed action toward an ecologically sustainable future. This is particularly pertinent in the Australian context with its unique, fragile ecological systems and ongoing loss of biodiversity resulting from human impacts on the Earth's systems (Whitehouse, 2011). Ecological systems thinking underpins the first set of key concepts behind the sustainability curriculum priority:

- The biosphere is a dynamic system providing conditions that sustain life on Earth.
- All life-forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.
- Sustainable patterns of living rely on the interdependence of healthy social, economic, and ecological systems. (ACARA, 2017).

Despite having this strong underpinning of environmental, social, and economic sustainability, the Australian Curriculum fails to translate to subject level. In the four main curriculum areas of mathematics, English, history, and science, there is only one mention of "sustainability" in an elaboration of the descriptors within the curriculum throughout all Foundation to Year 12 Level curriculum descriptions (Kennelly, Taylor, & Serow, 2011).

Some aspects of environmental sustainability are embedded into the science curriculum with reference icons to the sustainability cross curriculum priority (such as with the curriculum descriptors, "Energy from a variety of sources can be used to generate electricity"; and "The growth and survival of living things are affected by the physical conditions of their environment" (ACARA, 2017)). However, there are no explicit elaborations in the curriculum descriptions, and so when implementing science lessons, teachers are left to make the sustainability connection guided only by the presence of the icon that indicates the link. The curriculum largely falls short of its intention for Australian education to develop "the knowledge, skills, values and world views necessary for people to act in ways that contribute to more sustainable patterns of living" (ACARA, 2017) and is left to individual teachers or schools to enhance this mind-set in their teaching (Kennelly et al., 2011). An Australian national study into education for sustainability carried out by the Australian Education for Sustainability Alliance (AESA), looking at the preparedness of Australian teachers to integrate the sustainability curriculum priority into their lessons, revealed that 80% of practicing Australian teachers "don't comprehensively understand education for sustainability," 35.9% of teachers were unaware that sustainability was a cross curriculum priority, and less than 2% were effectively integrating education for sustainable practices into their classroom (AESA, 2014, pp. 89, 90). Furthermore, the Australian science curriculum is quite conservative in its traditional and analytical breakdown of the sciences to biological, earth, chemical, and physical sciences (Gough, 2011). This curriculum promotes a largely anthropocentric or technocentric position. This is evident in Rodriguez's (2016) review of science in the Australian Curriculum, where she revealed the separation of humans and other animals or living things and the absence of values of care for other animals. In this curriculum humans are placed as "managers and administrators of nature and other species" with the Earth as a resource for the benefit of humans (Rodriguez, 2016, p. 1018).

In contrast, David Orr (2012, p. 2) argues passionately for school curricula that trigger environmental change and transform communities, where the connection between "people, places, and nature" is evident. David Orr sees ecological literacy at the heart of building sustainable societies.

Ecological Literacy/Ecoliteracy

> The failure to develop ecological literacy is a sin of omission and of commission. Not only are we failing to teach the basics about the Earth, and how it works, but we are in fact teaching a large amount of stuff that is simply wrong. By failing to include ecological perspectives in any number of subjects, we are teaching students that ecology is unimportant to history, politics, economics, society, and so forth. From television they learn that the Earth is theirs for the taking. The result is a generation of ecological yahoos without a clue about

> why the color of the water in their rivers is related to their food supply, or why storms are becoming more severe as the climate is unbalanced. The same persons, as adults, will create businesses, vote, have families, and above all, consume. If they come to reflect on the discrepancy between the splendor of their private lives and the realities of life in a hotter, more toxic and violent world, as ecological illiterates they will have roughly the same success as one trying to balance a checkbook without knowing arithmetic. (Orr, 1992, pp. 83, 84)

In 1992 Orr uses the terms "environmental literacy" and "ecological literacy" interchangeably, redefining environmental literacy (originally coined by Roth in 1968) to emphasize the building of sustainable communities and to reform education (McBride, Brewer, Berkowitz, & Borrie, 2013). Orr sees the ecological crisis that the Earth is experiencing as being linked to education, and he believes that in order for citizens to become ecologically literate, there needs to be a change in the education system, particularly in the Minority west. He poses ecological literacy as underpinning the building of sustainable societies as this capability is based on an understanding of the interdependence and interrelationship of species within the Earth's systems (McBride et al., 2013). In 1997, building on Orr's work with ecological literacy, Capra conceived the term "ecoliteracy" which he defined as "an understanding of the principles of the organization of ecosystems and the application of those principles for creating sustainable human communities and societies" (McBride et al., 2013, p. 14). There is a view that to become ecologically literate we need to think "from the parts to the whole, from objects to relationships, from quantities to qualities" (Capra & Luisi, 2014, p. 353). Capra's connectedness view is in stark contrast to the fragmented science education practices in Australia. In ecological literacy the strong emphasis is on developing knowledge about, and competence toward, the Earth's systems where we are encouraged by a sense of wonder about our Earth (Orr, 1992, p. 86). To study single organisms in isolation from other organisms and their environment is failing to grasp a complete understanding of the organism (Orr, 1992). The understanding of how ecosystems have evolved over time to become organized systems is central to "ecological literacy" (Capra, 2007, p. 10). Ecological literacy is at the heart of ecological systems thinking and the "wisdom of nature is the essence of ecoliteracy" (Capra & Luisi, 2014, p. 353). Learning about environmental problems in isolation, such as water pollution, without looking at the connected hydrological, geological, biological, and atmospheric systems, does not provide young people with a comprehensive understanding in order to make informed decisions about environmental issues (Assaraf & Orion, 2005). Aspects of systems thinking are evident in science curricula, such as the study of ecosystems in the biological sciences or the study of the hydrological cycle in Earth and space/geological studies. However, as demonstrated earlier with the Australian Curriculum, science curricula tend to promote discipline-based science, and the young people are left to make the connections between the disciplines, which they often fail to do (Gough, 2011), for example, between a rainforest ecosystem and the hydrological cycle.

Strategies for Incorporating Ecological Systems Thinking in Science Education

Assaraf and Orion (2005) found that after carrying out their systems thinking program with young people in secondary science, most young people significantly improved their systems thinking and the young people's thinking became more holistic. Drawing on the work of Assaraf and Orion (2005), Evagorou et al. identify six levels of skills for systems thinking. Young people need to gain each level of skill before being able to move to the next level. These skill levels are:

(a) Identification of the elements of a system
(b) Identification of the spatial boundaries of a system
(c) Identification of the temporal boundaries of a system
(d) Identification of several subsystems within a single system
(e) Identification of the influence of specific elements of the system on other elements or the whole system
(f) Identification of the changes that need to take place in order to observe certain patterns
(g) Identification of feedback effects in a system (Evagorou et al., 2009, p. 663)

A brief outline follows of five key strategies highlighted by Assaraf and Orion (2005) (strategies 1–4) and those from other researchers (strategies 5–7) that have been found to strengthen a systems thinking approach in science education and promote a deep understanding of the interconnectedness of the Earth's systems:

1. Introducing the basic steps of systems thinking in primary school
   Introducing a basic systems approach in primary school, such as the ability to identify at least two components in a system, provides young people with the foundations to move toward more complex systems understanding in secondary school (Assaraf & Orion, 2005). Hung (2008) emphasizes how systems thinking can help young people move toward complex understandings of concepts that they often find challenging, such as complex ecosystems, and is particularly successful in providing them with understanding relating to the interrelationship of living organisms with nonliving elements (Evagorou et al., 2009; Riess & Mischco, 2010). There are few research studies relating to systems thinking with young people at primary school as most studies have focused on systems thinking with young people at secondary school or students in higher education. However, the few studies that have been undertaken with young people at primary school do indicate that they can move toward systems thinking (Evagorou et al., 2009). In a study in Cyprus with young people at primary school, Evagorou et al. (2009) found that most participants developed some systems thinking skills when supported by an appropriate learning environment catering to their cognitive abilities.
2. Inquiry-based approach where young people explore and discover

When implementing systems thinking in science education, it is important for young people to work with an inquiry-based approach. With an inquiry-based approach, the young people are provided with the opportunity to explore, question, investigate, make decisions, and build on their prior knowledge, in contrast to the passive learning of facts where teachers are at the center of the classroom (Assaraf & Orion, 2005; Evagorou et al., 2009). An effective inquiry-based approach assisted the young people in Assaraf and Orion's (2005) research study to move from having "islands of knowledge" of the Earth's systems to conceptual understanding where they made links between the systems. The big question behind the program was, "How should we act in order to preserve our water resources?" (Assaraf & Orion, 2005, p. 524). The young people worked collaboratively throughout the program to answer the question by exploring the Earth's systems and the interrelationships between the systems including the impact of humans.

3. Working with young people in outside settings
   Young people often fail to see the relevance of science to everyday contexts (Bybee & McCrae, 2011); therefore it is important to connect science with the young people's everyday lives. Bybee and McCrae's research demonstrates that taking the young people outside enabled them to grasp systems thinking more effectively and connect their understanding with firsthand examples in their everyday lives. Assaraf and Orion (2005) identify ways to make use of outside settings; this included firsthand experiences such as visiting local waterways or ecosystems to enable young people to experience the Earth's systems and put their learning into context. Orr (1992) emphasizes experiencing the Earth's systems firsthand as being key to understanding these systems and connecting young people to their local place. Ecological systems thinking strengthens the childhoodnature position that young people are interconnected with all other living things and nonliving things in the Earth's systems. Young people are systems or networks themselves within systems like all other living things; in fact young people are nature.
4. Knowledge integration activities
   Assaraf and Orion (2005) identify using tools to integrate knowledge throughout the learning cycle as an important aspect to assist young people in moving toward the conceptual ideas in a systems approach. These activities included "concept maps, drawings and summarizing the outdoor experiences," in order for the young people to understand the water cycle as a "dynamic, cyclic system" (p. 525) and create relationships and connections between the components of the system and subsystems. Using diagrammatic representation and summaries of their experiences can assist the young people to consolidate their ideas and understand the relationships between the systems.
5. Utilizing computer technologies
   A number of researchers advocate the use of computer technologies when introducing a systems approach in the classroom. In 1999, in the early days of computer implementation in schools, Wilensky and Resnick implemented

a computer StarLogo modeling language to introduce a systems approach in science lessons, and they found young people developed rich understandings, particularly between the connections in ecosystems (1999). Evagorou et al. (2009) integrated a systems approach using computer simulations where the young people worked with a forest ecosystem system to develop basic systems thinking skills. Riess and Mischo (2010) also found a forest ecosystem computer simulation worked well in developing systems thinking with young people in junior secondary school in Germany, particularly when incorporated with other modes of implementing systems lessons.

6. Incorporating indigenous views
   Providing young people with the opportunity to experience living systems and to learn from the people who have lived by the "grace of these systems" (Orr, 2012, p. 1) can be effective in connecting science with the young people's everyday life. Indigenous science knowledge tends to be more relational and applied to everyday contexts in contrast to mainstream science education which tends to be non-relational and compartmentalized (Augare et al., 2017). Therefore, indigenous ways of thinking are holistic and more in line with systems thinking as Aboriginal peoples "of many societies" demonstrate a balanced and harmonious relationship with the Earth's systems (Fien & Tilbury, 1996, p. 22). Countries with colonial oppression and the strong Eurocentric curricula are positioned within a colonial (conquering) mind-set such that incorporating indigenous (relational) views into science, particularly ways of living in nature, has not been readily taken up (Aikenhead & Elliot, 2010; Lowan-Trudeau, 2018; Whitehouse, 2011). In Australia "Aboriginal and Torres Strait Islander Histories and Cultures" is a "cross curriculum priority" for all subject areas within the Australian Curriculum (ACARA, 2017). However, it requires teachers to bridge the divide of the traditional indigenous ways of knowing and science worldviews in order for both indigenous and non-indigenous young people to make this connection (Gondwe & Longnecker, 2015). Gondwe and Longnecker advocate going beyond tokenistic activities to incorporate cultural worldviews and how these worldviews influence values, attitudes, and beliefs of peoples of other cultures: for example, the contrasting values, attitudes, and beliefs toward humans' interrelationship with the Earth's systems. Aikenhead and Elliot refer to indigenous views in science as "wisdom tradition" of "thinking, living, and being" in contrast to the traditional Eurocentric views of disconnected "intellectual thinking" (p. 325). In Australia, indigenous Aboriginal and Torres Strait Islanders use the term "country" that "means far more than 'land', 'landscape' or 'environment'. Country is a relationship — a contiguous way of seeing, being and acting. Country is tens of thousands of years of accumulated knowledge and understanding," and with country there is no separation between humans and other (Whitehouse, 2011, p. 230). Orr (1992) and Capra (2007) emphasize the extensive knowledge and practices of indigenous peoples over thousands of years of being in their local areas as being important to ecological sustainability. Learning traditional indigenous knowledge is a benefit to all young people; it

can lead them towards a more holistic understanding of local areas, and in particular it increases the knowledge and engagement of the local indigenous young people (Augare et al., 2017).

7. Debating and discussing socio-scientific issues
   In order for young people to move to more holistic thinking about the Earth and to understand the significance of human impact on the Earth's systems, it is important to involve young people in debating and discussing socio-scientific issues in the science classroom. Young people need to look critically at our society and its values and, furthermore, how it could be changed to "achieve a more socially just democracy and ensure more environmentally sustainable lifestyles" (Hodson, 2003, p. 654). Research has revealed that even though young people in Minority western schools may be interested in scientific issues that they perceive to be relevant to their lives, such as health issues or environmental issues, they often see little connection between science in the classroom and the socio-scientific issues that link to, or impact, their everyday lives (Bybee & McCrae, 2011). Such connections can be achieved by providing the opportunities for young people to study, discuss, and debate issues that confront them and that are relevant to their lives (Hodson, 2003) and can be enhanced using an ecological systems approach. This socio-scientific connection with everyday lives was evident in a school in Chicago (United States) where young people identified the problem of their local river system being polluted due to illegal rubbish, soil, and rocks being dumped on the banks of the river (Bouillion & Gomez, 2001). The young people voiced their desire to address the pollution problem, and they worked collaboratively with teachers, local council, community, and scientists to clean up the riverbank. The teachers encouraged the students to use an ecological systems approach in this project where they explored their own connection to ecological systems. The students investigated the impact of pollution on the river system by measuring oxygen levels and investigating the impact of low oxygen levels on fish and other living organisms in the river (Bouillion & Gomez, 2001).

The following vignette outlines an ecological systems program that incorporates six of the seven strategies identified above for integrating a systems approach into science lessons (using computer simulations was the only strategy not utilised).

Learning About Ecological Systems in Science Education: The Big Scrub Rainforest Program

This place and community-based program in the North Eastern region of the Australian state of NSW involved 120 young people from four schools, three primary and one high school. The young people investigated their local critically endangered subtropical rainforest ecological system, The Big Scrub Rainforest, and learning took place within the whole community (Smith & Sobel, 2010). This example illustrates the cyclic nature of ecosystems where nutrients are continually

recycled along the feedback loop pathways and where organisms have evolved over time to "use and recycle the same molecules of minerals, water, and air" (Capra & Luisi, 2014, p. 354). The Big Scrub Rainforest program in the schools was facilitated by the Northern Rivers Group of Environmental Educators (Cindy Picton, Tamlin Mackenzie, Simone Blom, Lyn Thomson, Barbara Jensen, Georgina Jones, Linda Tohver, Ian Judd, Graeme Patterson) and the Custodian of Nyangbul Country (Lois Cook). Funding was provided by Australian Association for Environmental Education and the NSW Government's Environmental Trust.

Context

The Big Scrub Rainforest ecosystem is an ecological community with geological links to the supercontinent, Pangea (325 million years ago) and subsequently Gondwana supercontinent, when Australia was linked to Antarctica and other continents (Holland, 2017, p. 34). When the continents broke apart, tectonic activity resulted in the formation of volcanoes. The lava flows from this volcanic activity in the Big Scrub region are important as they are "conduits" for the aquifers that give rise to the springs which drive the hydrological systems behind this ecosystem (Holland, 2017, p. 35). The soils of the Big Scrub area result from a combination of eroded basalt from Wollumbin (a volcano that formed in the area 23 million years ago) and soils that originate from Pangean and Gondwanan times. The soils support a rich rainforest ecosystem with a multitude of organisms including tall trees, shrubs, vines, palms, herbs, epiphytes (high up in the canopy), birds, invertebrates, bats, marsupials, humans, fungi, microorganisms, and other plants and animals, some of which are endangered.

Prior to European settlement, the Big Scrub Rainforest was the largest continuous lowland rainforest in Australia (Parkes et al., 2012). The Big Scrub Rainforest is part of the land of the local Widjabul people from the Bundjalung nation, who lived in this area for "many thousands of years and cared for the country" (Gordon, 2017, p. 26), and is also significant to the Nyangbul people and all the Bundjalung tribes. The peoples from the Bundjalung nation "lived with their environment," and their cyclical relationship with this land is closely tied to "seasonal changes and renewal" (Gahan, 2017, p. 104).

After colonization of Australia, new settlers viewed this rich ecosystem very differently to the local Bundjalung peoples who had an interconnectedness with this ecosystem – their country. The rich diversity of the Big Scrub was seen by the settlers as a resource to use as they wished. The magnificent red cedars that had grown to a great height on the volcanic red soils, with girths of over 3 m (Gahan, 2017), were prized for valuable timbers. Following the "cedar getters" in the second half of the nineteenth century, "spurred by imperialist and capitalist ideology," the Big Scrub, with its rich fertile rainforest soils, was cleared for agriculture largely by colonists from England, Ireland, and Scotland (Gahan, 2017, p. 108). During this period, the NSW Government encouraged free selection so any colonists could obtain land in

the area if they "occupied and improved" their chosen land, in other words cleared the land for agricultural purposes (Gahan, 2017, p. 109). By the end of the nineteenth century, the rainforest was reduced to less than 1% of its original extent, with the remaining remnants scattered throughout the Big Scrub area (Parkes et al., 2012). This lowland rainforest is listed as an endangered ecological community under the NSW Threatened Species Conservation Act 1995 (TSC Act 1995) and as a critically endangered ecological community under the Federal Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999) (cited in Parkes et al., 2012). The rainforest consists of scattered remnants that contain threatened animal and plant species, some being close to extinction (DECCW, 2010).

Implementation of the Big Scrub Rainforest Program

The Big Scrub Rainforest place and community-based program integrated six of the seven key strategies for incorporating a systems approach into science lessons using the following processes:

Strategy 1: Introducing Systems Thinking in Primary School

Young people in both primary and secondary school were included in this Big Scrub Rainforest program where they explored their local ecological system over time. The young people identified the elements of the interrelating systems. The feedback systems were explored relating to the mechanisms that enable this critically endangered system to regenerate.

Strategy 2: Inquiry-Based Approach Where Young People Explore and Discover

A strong inquiry-based approach was employed where young people worked collaboratively with their peers, to build on their knowledge about this ecological system and build on their ecological literacy. Botanists, bush regenerators, environmental educators, and Landcare representatives worked with the young people to answer their questions and provide background information relating to the geological, atmospheric, hydrological, and rich biological systems surrounding this ecosystem.

Strategy 3: Working with Young People in Outside Settings

Young people worked outside in rainforest remnants within, or close to, their school where they identified plants, animals, and microorganisms, and assisted with regeneration processes. The young people supported regeneration of the rainforest by planting rainforest species (Fig. 1) and carrying out rehabilitating exercises (such as weed removal in the remnants and riparian [riverside] plantings). By exploring the rainforest remnant systems close to their schools and helping to regenerate the forest, the young people discovered the biodiversity of the forests and saw examples of the interdependence of the elements of the rainforest ecosystem.

Strategy 4: Knowledge Integration Activities

Fig. 1 A student co-researcher planting a rainforest tree in a riparian area next to the school grounds

Diagrams, concept maps, and drawings were used by the young people to explore the interrelating systems over time and to assist them with their understanding of the spatial and temporal boundaries of the rainforest.

Strategy 6: Incorporating Indigenous Views

A local Aboriginal custodian of the Nyangbul Country worked with the young people to discuss the significance of the Big Scrub Rainforest to her people and shared "dreamtime" (indigenous lore) stories.

Strategy 7: Debating and Discussing Socio-scientific Issues

The young people addressed socio-scientific issues surrounding the clearing of vegetation for human use. The devastation of the clearing of the Big Scrub, particularly on the biological systems, was discussed. The impacts of the removal of vegetation on the geological and hydrological systems were also reviewed. The young people explored both calls to protect this rainforest and protests that were conducted in the area dating from the late nineteenth century to the present day (Gahan, 2017). Poems, raps, artworks, and media releases surrounding the protests and the clearing of the rainforest were created by the young people.

Embedded within the Big Scrub Rainforest program was a critical participatory action research/A/r/tography project with a group of 12 young people as student co-researchers (aged from 9–13 years). (The researchers who supported the student co-researchers in this project were Marianne Logan, Simone Blom, and Steven Andrews.) The aim of this research project was to investigate young people's knowledge of, and values and attitudes toward, their local critically endangered ecological community. The project sought to position young people as active researchers where they shared their knowledge, values, experiences, and research findings, to inspire young people both locally and beyond, to take action toward their local natural ecosystems.

The young people shared their immersive creative experiences (such as narratives, drawings, photographs, and poems) in their researcher journals, written texts,

Fig. 2 Year 7 student co-researcher Niamh Montgomery's illustration of where "Cold iron sliced the forest apart"

Fig. 3 Niamh Montgomery and Megan Elliot (student co-researchers in year 7) illustrate their understanding of the spatial and temporal boundaries of the ecological system over time

and online blogs in order to inspire other young people to take action to protect their local ecosystems. The following narrative and illustration (Figs. 2 and 3) by a student co-researcher, Niamh Montgomery (year 7), is the voice of the forest in response to the clearing of the Big Scrub Rainforest:

> The rainforest used to be quiet. Birds sang quietly to themselves in the trees and unseen creatures rustled the leaves that lay undisturbed on the ground. The wind whistled and we whistled back, and everything stayed silent, the same. That was until some new creatures arrived. They were bigger than others and they feared them. The new creatures were loud. They trumped around as if they owned the land. They made light that ate wood. It flickered. The forest flickered back. Then they brought their tools. Cold iron sliced the forest apart. Leaves curled and died. They started a war. They lay our fallen friends in the river and washed them away. The river raged. They raged back.

As a result of taking part in the program, the young people built on their knowledge about this local critically endangered ecosystem. The majority of young people agreed or strongly agreed that they had learnt a lot of things about the Big Scrub Rainforest (86%), that they cared about the future of the Big Scrub Rainforest (83%), that they liked planting trees and shrubs (88%), and that they had a deep understanding of how their actions affect the natural world (77%).

The young people's responses, such as the exemplars below, about what they learnt in the program demonstrate that they were able to build on their understanding of the importance of natural ecosystems and feel empowered to take action:

- *I knew nothing about the Big Scrub Rainforest now I know a lot.*
- *We have spread the word and planted trees.*
- *I now feel a connection.*
- *I love this Big Scrub rainforest so much now.*
- *I think it is an important forest that preserves invaluable habitat for native animals.*
- *The Big Scrub Rainforest is amazingly beautiful and sacred. We need to keep it from disappearing forever.*
- *I think it is a very precious and fragile part of Aboriginal landmarks.*

The young people were working with the rainforest in their school grounds and in some cases their own neighborhood. The following response from a young person demonstrates being able to identify their own local forest after participating in the program: "I now know that the massive rainforest behind my house is the big scrub." By addressing the key strategies for implementation of an ecological systems approach in science education, these young people had the opportunity not only to build on their ecological knowledge but also to develop values and attitudes toward, and their interconnection with, their local ecosystem. Young people's appreciation of their interconnection with the Earth's systems is the essence of childhoodnature.

Conclusion

This Chapter has considered ecological systems and how a systems approach could be incorporated into science curricula. In the Minority west where Eurocentric curricula dominate science and STEM education, and economic prosperity is at the heart of a system driven by neoliberal ideology, science education tends to be compartmentalized into separate disciplines, and learning is centered around the Earth as a resource for the benefit of humans. This economically driven curricuoum tends to dominate, despite moves to incorporate sustainability and, in some countries, indigenous cultures and values. By looking at science curricula through a post-humanist, systems thinking lens, in contrast to the anthropocentric view of mainstream science education, a holistic approach is encouraged where humans are not viewed as separate, but we, like all other organisms, are interdependent on other

living and nonliving elements in the Earth's systems. Incorporating an ecological systems approach in science education encourages young people to look at the Earth as a dynamic system with subsystems such as the geological, atmospheric, hydrological, and biological systems rather than looking at the Earth's systems in isolation. With a systems thinking approach, young people can begin to see how the behavior of every organism in an ecological system depends on the behavior of many others and how humans impact ecological systems.

Ecological systems-based science and STEM education can draw on tens of thousands of years of indigenous knowledge, attitudes, and values, to enrich science education and learning about first people's interconnection with the Earth's systems. Through inquiry-based approaches, young people explore and investigate ecological systems in everyday contexts and connect with their local ecological systems, even within the school grounds or on balconies, and move toward ecological systems thinking. It is important to provide opportunities for young people of all stages, from early childhood to secondary, to debate and discuss current issues that impact their lives, particularly the significance of the Anthropocene.

I am not suggesting that increasing scientific knowledge relating to environmental degradation will lead to environmental action (Selby & Kagawa, 2010). However it is argued that by enabling young people to build on their knowledge, values, and attitudes relating to complex scientific concepts in a holistic way through ecological systems thinking, particularly in the context of their local region, they will begin to move toward childhoodnature understanding, that is, the inseparability of themselves and nature.

Cross-References

- ▶ Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism
- ▶ Children in the Anthropocene: How Are They Implicated?
- ▶ Posthuman Child and the Diffractive Teacher: Decolonizing the Nature/Culture Binary
- ▶ Significant Life Experiences That Connect Children with Nature: A Research Review and Applications to a Family Nature Club
- ▶ Uncommon Worlds: Toward an Ecological Aesthetics of Childhood in the Anthropocene
- ▶ Wild Pedagogies: Six Touchstones for Childhoodnature Theory and Practice

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Part VIII

Childhoodnature Animal Relations

Childhoodnature Animal Relations: Section Overview

52

Tracy Young and Pauliina Rautio

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Abstract

The "animal turn" in academia has been described by researchers like Weil (J Fem Cult Stud 21(2):1–23, 2010) as an increasing scholarly interest in the status of animals beyond that of the utilitarian or agricultural scientific study of animals

In the wake of poststructuralist and postmodern decenterings that have displaced the human as a standard for knowledge, theory finds itself in a similar predicament. It cannot avoid seeing the animal suffering around us, but has contradictory foundations on which to judge the good or the right thing to do about it. Responding to an urgent call for concern, those of us working on "the animal question" may only be able, like Red Peter, to make a report, but hopefully such reports will enable us to make decisions (for that is our human prerogative and responsibility) that will, to the best of our imperfect and partial knowledge, enhance the lives of all animals, ourselves included (Weil, 2010, p. 20).

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and the larger-than-human degraded ecological times we are living in. The human condition has always been defined and studied in relation to the animal, from ancient to contemporary posthuman thinkers, where the study of animal relations forms a large component of this ontological turn, with shifting aspirations to decenter anthropocentric interactions and challenge human assumptions of more-than-human lives. Human-animal studies, while still firmly planted within disciplinary margins, "have been edging towards the mainstream" (Ritvo, Environ Hist 9(2):204–220, 2004, p. 205), becoming increasingly popular, respected topics of inquiry (Ritvo, Daedalus 136(4):118–122, 2007). Creative opportunities for experimentation therefore exist where new terms, becomings, and conceptualizations are underway.

The chapters in this section provoke a diversity of such (re)thinking of child-animal relations within Western families, communities, and education where the complex relationships with children, animals, and environments provide a space for ethical considerations to the social positioning of animals in education and society. The chapters address ideas, conceptualizations, and possibilities of alternative ontologies with some authors venturing into pedagogical territory that attempts to reshape pedagogy and practice. Authors grapple with the taken-for-granted interspecies relationships in their messy, complex, and multiple forms, to look beyond to see the hidden, the marginalized, the unexplained, and the ill-considered. This questioning of multiple relatings has the potential to (re) imagine new models, theories, and ways of crossing boundaries that blur the illusion of separation between children, nature, and animals, where animals can be elevated as crucial components of living together in perilous times. As section editors who engage with human-animal research, ethics of concern, and activism in our work and everyday lives, we acknowledge the "contradictory foundations" of the animal question, and this is reflected in the diverse and sometimes opposing contributions of the chapters in this section. Readers will find a choice of theoretical, educational, and sociocultural representation and discussion in these writings, and this introduction offers signposts to guide the reader through the twists and turns. The authors enhance the explosive range of human-animal studies now underway in diverse disciplines, including arts, humanities, media studies, science, and social geographies, drawing attention to the question of the animal that is under-researched and underrepresented in education. The chapters in this section of the handbook offer alternatives to humanistic thought and actions, and our hope is that these contributions will legitimize the study of human-animal relations, prompting others to join us in research and practice that embraces ethical multispecies futures.

Keywords

Human-animal · More-than-human · Human-animal relations · Child-animal relations · Multispecies ethnography · Animal death · Interspecies education and early childhood education

Introduction

Red Peter, the fictional chimpanzee referred to in the quote above, gives a report to the academy about what he is learning through his transformation to becoming human. Kafka (1917) positions Red Peter in the short story *Letter to the Academy* within liminal spaces of human and animal becomings. He has a foot in both camps where being ape and becoming human means never belonging to either world. Red Peter has learned to speak, stand, and dress as a human but will always be betrayed by his animality, and this animality in turn has been disrupted leaving him stateless, world-less, and species-less as a human-animal representation that is neither human nor animal. Kafka's story is an important fable for human-animal studies, as it characterizes the challenges of animal representation and co-species entanglements. Writing about these entanglements has become a popular aspect of human-animal studies, as scholars draw upon flat ontologies like those of philosophers Spinoza, Whitehead, Latour, Deleuze and Guattari, and Stengers. The complex variations of these worldviews offer thought-provoking ways to position (or not position) the detailed richness of the immanent world of things (human, more-than-human, objects), taking us out of our anthropocentric impasse and enabling multiple pathways to appear. The blurring and entanglement of hierarchical categories of human and more-than-human is a key feature of this handbook; however, where "the animal" is integrated within muddled hybrid terms and flattened ontologies, there is a danger that power relations can become silenced and overlooked, resorting to the privileging of human knowledge over the lived realties of other beings. After all, the fictional Red Peter who is stolen from his family in West Africa, as a young chimpanzee, robbed of his childhood, and trained through violence to perform for and as human is based on countless acts of violence, where this was (and still is) a reality (Gray, 2004). The animal turn therefore brings into question the scale of the "animal question," as we face the perilous environmentally vulnerabilities of current earthly life. The animal turn demands our attention, to (re)learn the art of paying attention to new modes of resistance that requires "new powers of acting, feeling, imagining and thinking" (Stengers, 2015, p. 24).

In our search for alternative ecological lifeworlds, we acknowledge the importance of multispecies relationships and ecological aesthetics that attune with ethics of concern. Until recent times human-animal relations have received minimal attention from social science research, have been a blind spot in philosophy (Derrida, 2008), and have rarely focused on how children learn about and experience animals. Environmental education research has also minimized the question of the nonhuman animal (Oakley et al., 2010), failing "to integrate nonhuman animal advocacy as a serious educational issue" (Kahn & Humes, 2009, p. 179), where we know that animals matter in the lives of children (Melson, 2001; Myers, 2007; Tipper, 2011). We are grateful to the editors of this International Handbook who have chosen to privilege the study of these human-animal relations within a separate section, in recognition of this research gap. This could be seen as a point of contention. Indeed,

many could argue why a separate section for animals in a handbook about how childhoodnatures co-constitute the world and why not plants, rocks, and oceans? We maintain that as we are now ensconced in the epoch of the Anthropocene where humans are described as a geological force (Crutzen & Stoermer, 2000), there is a crucial need to comprehend how humans are enmeshed in cultural, political, and environmental relations with (and as) animals. The animal turn in academia has enlivened recent discussion, sparking hopeful elevation of animals as subjects with shared vulnerabilities, where previously they were relegated to the sidelines as objects of study. Human relationships with animals have always been ambivalent and ambiguous, as pests, pets, and products, where we remove, revere, exploit, and overlook them. This exclusion is a focal point of this section where the authors work in ways to question and challenge human-centric assumptions that acknowledge the importance and benefits of animals in children's lives and children in animal lives.

Many of the chapters including Harwood, Rose, Whitty and Elliot, and Boileau and Russell from Canada; Tammi, Rautio, Leinonen, and Hohti from Finland; Myers and Russell and Fawcett from the USA; and Young and Bone from Australia adopt multispecies ethnography as a way to integrate animals into the inquiry process. Fieldwork with children and animals in education reveals shared threads of understanding and experience where human children, dogs, insects, and worms cross geographical boundaries. Animal relation ethnographic studies require sophisticated techniques and creative approaches that challenge speciesism and the epistemologies that pit the all-knowing human against the passive, dumb, and insentient animal. This is no easy task, for documented research pathways, methodology texts, and studies are still being made and unmade in these early stages of the animal turn. Finding methods and practices that embrace animality demands less-linear and less-obvious approaches, hence the popularity of affective ontologies in this research space. How do you write, for example, a methods chapter in a doctoral study with an animal as a participant? How can researchers include the perspective of a dog or the species-specific worlds of a stick insect? How can we also acclimatize to animal resistance that might be more obvious when listening to the grieving wails of a mother cow whose calf has been taken away hours after birth, but far more difficult when observing the frenetic activity of ants whose nest has been disturbed? While this section does not have the scope to answer these questions, it does provide examples of multispecies, posthuman attunement, widening the inclusive approach that ethnography offers to the study of human-animal relations:

> This is because, with its ability to pay close attention to the symbolic forms, practices, objects and discourses of everyday life, it is a technique that creates a multi-dimensional picture of interactions in their subtle, nuanced and often contradictory cultural context. It does this by encouraging the researcher to engage physically, discursively and emotionally with those under investigation. In other words, it moves us from seeing research "objects" to seeing— and often working alongside—research "subjects" and places these roles as complementary rather than separate or oppositional. This lends itself to regarding humans and other animals in relations and entanglements not as so very different that they cannot be researched together. (Hamilton & Taylor, 2017, p. 9)

Roadmap of Section Chapters

This animal relations section of the handbook has been loosely designed with the intention of ordering the chapters within four parts: (1) theoretical reviews, mappings, and conceptualizations, (2) cultural constructs, (3) lived and fabricated lives, and (4) pedagogical potentialities and conceptualizations. We embrace the disorderly spillage of content and ideas that fall across chapters, for neat ideas are not part of the messy contradictions of the topic under study.

Theoretical Reviews, Mappings, and Conceptualizations

Theoretical mappings and contextual analysis assemble in the first part of this section in diverse and contradictory ways. Children and animals form common and connecting threads between distinct disciplinary methods, theoretical approaches, and familiar concepts of developmental psychology, sociology, media studies, and humane education. The concept of childhoodnature weaves through childhood development, film culture, and pedagogy attempting a renewal and awakening of these onto-epistemologies, endeavoring to embrace the various creaturely others, who are always, already there.

The opening chapter is a contribution from Gail Melson, arguably one the first scholars to address the question of what animals mean to children, resulting in the much-cited book *Why the Wild Things Are* (2001). In this handbook Melson's ▶ Chap. 53, "Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective," offers an overview of child-animal relations through the domains of developmental psychology. The concluding discussion offers a helpful summary of ideas and a challenge to acknowledge animals in the lives of children through existing developmental paradigms, where they are currently overlooked. Are there possibilities, we wonder for developmental paradigms to blur the boundaries of childhoodnature by thinking through how animals experience concepts like attachment, schemas, or moral reasoning? Following Melson are two prominent scholars of Critical Animal Studies, Matthew Cole and Kate Stewart, who approach and address the question of child-animal relations as that of socializing superiority: the cultural denaturalization of children's relations with other animals. ▶ Chapter 54, "Socializing Superiority: The Cultural Denaturalization of Children's Relations with Animals" builds on their existing research of popular culture and cultural representations of nonhuman animals, targeted to children and with the aim of socializing children into simultaneously affective and exploitative relations toward nonhuman animals. An intriguing focus of this chapter is the critical analysis of four mainstream animated movies: *Zootropolis* (Spencer, Howard, & Moore, 2016), *The Secret Life of Pets* (Meledandri, Healy, & Renaud, 2016), *Finding Dory* (Collins & Stanton, 2016), and *The Jungle Book* (Favreau & Taylor, 2016). Through discursive analysis of the movies, the authors show how exploitative relations are (still) variously reproduced and how critical awareness is needed to disrupt the cultural modelling of loving and using animals.

In ▶ Chapter 55, "Re-examining the Human-Nonhuman Animal Relationship Through Humane Education", Maria Saari presents a non-speciesist framework as the potential of humane education with the reexamining of the human-nonhuman animal relationship through humane education. She suggests that assessing the interconnected forms of social justice and oppressive systems, humane education can instigate initial moves away from dominant beliefs of society. Saari discusses how nonhuman animal issues are widely neglected in research and practices of education – even in environmental or sustainability education. She then proposes that humane education takes environmental education further, reflecting the desired curricula of interspecies education, an approach based on compassion and justice focusing on the interconnectedness and interdependence of all life.

Cultural Constructs

The second part of the section engages the cultural situatedness of child-animal relations in recognition of the importance of understanding geographical and cultural contexts. Both chapters explore social, cultural, and political norms and practices through animal death, identifying death as highlighting the conceptual boundary between humans and animals in a given context.

Debra Harwood, Pam Whitty, Enid Elliot, and Sherry Rose present storied encounters between children, educators, animals and the more-than-human, as located within specific social-cultural-political contexts entitled: ▶ Chap. 56, "The Flat Weasel: Children and Adults Experiencing Death Through Nature/Culture Encounters". This fourth chapter centers on ideologies and practices of and around animal death that occupy spaces of early childhood. The authors discuss encounters with a weasel, an owl, and a raccoon as fostering a practice of becoming witness, of being and learning together with children and animals, and of making meaning with animals and their deaths. The authors present a situated lens of co-mattering in relieving the tensions of childhoodnature–animal-matter relations.

Experiences of animal death in childhood memories are the topic of the fifth chapter by Nora Schuurman. ▶ Chap. 57, "Experiences of Pet Death in Childhood Memories" Scrutinizing memories of animal death in childhood, based on narratives on human-pet relations, Schuurman pays special attention to the ways in which cultural conceptions, norms, and practices define the appropriate ways of relating to and grieving the death of an animal. Animal death is frequently contextualized in the experiences of growing up, and both children and adults are reflected on in the narratives. Schuurman finds that special meanings involved in relationships with animals in childhood are epitomized in the experiences of animal death. The historical perspective accessible through the data analyzed for this chapter allows Schuurman to present a long-term overview: the memories analyzed illustrate the position of animals as friends and family members already in agrarian times, before pet-keeping became a central part of home and family.

Lived and Fabricated Lives

A pedagogisized mass incarceration of certain animal species is what the third part of this section provocatively brings to the fore. The case of earthworms dangling in tweezers and being washed "clean" for inspection, or the case of "creepy crawlies" or insects being crushed to death when children learn to take care of them. Keeping and caring for other animals for the sake of human education – even worms or insects – is questioned, and grounding questions remain. What is, in fact, being taught? Who is, in fact, a subject of concern, requiring care, as a subject of their own life?

Tuure Tammi, Pauliina Rautio, Riitta-Marja Leinonen, and Riikka Hohti are the authors of the sixth chapter, ▶ Chap. 58, "Unearthing Withling(s): Children, Tweezers, and Worms and the Emergence of Joy and Suffering in a Kindergarten Yard" in which children and the nonhuman animals that cohabit a kindergarten yard are conceptualized as "withlings" and the processes they engage in as "withling" (verb). Focusing on one event in which children unearth, carry, and inspect earthworms, the authors discuss how different versions of human (child) and animal (earthworm) emerge, or, indeed, don't emerge, as part of practices including participation of different technologies (such as tweezers). While the worm rally made possible the meaningful participation of pupils in the practice of science education and evoked emotions on this regard, it seemed to suppress the compassionate affectivity in human-nonhuman bodily encounters and end up lethal for the particular worm withlings. The burning question remains for educational professionals: "What is being taught when nonhuman animals are removed from their assemblages and relocated within new ones?"

As if continuing where the previous chapter left off, the seventh chapter by ▶ Chap. 59, "Insect and Human Flourishing in Early Childhood Education: Learning and Crawling Together" discusses the pedagogical and ethical implications of various ways of encountering and using insects in education. In learning with and from creepy crawlies, Early childhood interspecies education for human and insect flourishing, they raise the question of who benefits and who is cared for – as a subject of their own life. The discussion of insect-human relations – which are often also unpleasant and troublesome – evokes powerfully what being ethical really is. The authors present a comprehensive review of research on insect-human relations, also with children, and point out that children receive ambiguous and conflicting messages of what "appropriate" or ethical relationships with insects might be like. And so, a particularly valuable contribution of the chapter is the portrayal of the role educators can play in helping children (re)interpret their experiences with insects.

Pedagogical Potentialities and Conceptualizations

Education in the broadest sense of the word can be defied as encompassing complex, dynamic ways that human beings live, work, consume, play, feel, construct, and share knowledge and learn to be in the world (Rowe, 2012). The following chapters

in this section highlight the promise and potential of interspecies exchange and the mutual provocation of learning to live together. The authors have been compelled to think with praxis, exploring pedagogies, educational activities, and the role of the teacher.

Joshua Russell and Leesa Fawcett ponder conviviality – the shared joys, pleasure, and problems of multispecies living in the eight chapter of the section: ▶ Chap. 60, "Childhood Animalness: Relationality, Vulnerabilities, and Conviviality." Highlighting bodily experiences of child-animal relations, they proceed to decenter the anthropocentric visions of individual development and to build a pedagogical vision of conviviality. The authors review pioneering research by Gene Myers, especially focusing on children's "theory of mind" and their experiences of intersubjectivity. They argue that children often recognize vulnerability in their relationships with animals and that a shift in developmental focus on child-animal relationships, one that takes animal agency and children's animality as a starting point, is due.

Chapter nine with the intriguing title, ▶ Chap. 61, ""I Don't Know What's Gotten into Me, but I'm Guessing It's Snake Germs": Becoming Beasts in the Early Years Classroom", outlines how Casey Myers follows children's animal play in an early years classroom by collapsing the human/nonhuman animal binary through attunement to animals. She maintains a loyal viewpoint of how the children themselves articulate the material-discursive particulars of becoming (with) animals within everyday acts of classroom living. This leads her to discuss the (im)proper animals – the beings between the adult-sanctioned animal presences and the children themselves, kinds of more-than-human beasts. Myers presents four cartographies of these beasts, complex, real-life events for young children, and suggests that they might allow us to consider alternatives to the traditional roles allocated for animals within early years education.

Tracy Young and Jane Bone complete the final chapter in the animal relations section of the handbook with ▶ Chap. 62, "Troubling Intersections of Childhood/Animals/Education: Narratives of Love, Life, and Death". They adopt a critical posthuman stance to mobilize attention toward the detrimental effects of violence concerning animals that takes place during childhood and within early childhood education settings that is not conducive to the shared lifeworlds required for ecological futures. They share this chapter with Kosi, a "pedadog" who helps them contemplate a framework of "roaming pedagogies" offering possibilities for teaching and learning about, for, and with these vital human-animal relationships. The oppression and commodification of animal species in early childhood compels them to not just to (re)imagine common worlds pedagogy or to rethink the basic tenets of their interactions but to take steps to (re)imagine relational ecologies of education by (re)making ways of living together with ecological justice in both thought and action.

Conclusion

Casey Myers poses a question in her chapter that sums up a key part of this section of the handbook. "Does the notion of 'child-animal relations' itself need rethinking, as the beasts that emerged through these research assemblages suggest a hybridity that

overruns the stable categories of 'child' and 'animal'?" By beasts she is referring to how the children in her research named a process of becoming-animal (but not quite, and much more) consisting of physical transformations, environmental limitations, adult expectations, material affordances, and children's conceptions of and relationships to various animal actors. There is much to unpack in what is meant and actually researched under "child-animal relations," and many chapters in this section engage in this conceptual and onto-epistemological groundwork.

The work compiled in this collection steers clear of the simple conception of child as the savior of animal and steward of nature, with the framing of childhood as the pivotal time to set their paths straight – for two reasons well accounted for: firstly, not to colonize and reduce the lived lives of younger people into stages and phases engineered and defined by those beyond it and, secondly, in realization that ethical acts and a more just world for all animals are always issues including but essentially beyond the individual requiring complex conglomerates of social, cultural, political, historical, material (and more) interdependencies. Having said this, however, does not release humans of any age, of the responsibility to act with concern in mind and try to "acknowledge what may not be possible to say" (Weil, 2010, p. 4). In this summary of the animal relations section, we report like Red Peter to the academy about our collaborative foray into childhoodnature with animals as our thinking, acting and living companions. We question how we can honor these companions in ways that do not distort or appropriate animal lifeworlds. Our shared aspiration is "to the best of our imperfect and partial knowledge to enhance the lives of all animals, ourselves included" (Weil, 2010, p. 20).

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Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective

53

Gail F. Melson

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Abstract

The study of child development has traditionally focused exclusively on ties with other humans. In recent decades, however, scholars have recognized the pervasive presence of and children's interconnections with nonhuman animals, other life forms, and both natural and built environments. Ecological and systems perspectives on development have encouraged a "paradigm shift," whereby child development is viewed as inherently contextual. Using these frameworks, I address the "animal world" of children, documenting how interwoven children's lives are within the animal world. This "animal world" is broad and complex,

A note on terminology. Although humans are obviously animals, I follow customary usage to refer to human animals as "humans" and other species of animals as "animals." In addition, I use the terms "pets" and "companion animals" interchangeably. I employ the term "pet ownership," to refer to humans who have responsibility for the welfare of animals in their possession. Some critics have argued against terms such as "pets" and "pet ownership" as objectifying animals and diminishing their rights. Instead, the term "companion animal guardian" has been advanced (Staats et al. 2008). I take no position on the moral or ethical arguments underlying various terms but opt for consistency with customary usage.

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encompassing not only the involvement with living animals, such as pets, but also wild animals, animal analogues, such as virtual pets and robotic animals, as well as animal symbols in various media. Child development cannot be separated from this myriad animal world. To illustrate this, four domains of child development are considered in turn: physiological, cognitive, socio-emotional, and moral. Within each domain, a childhoodnature approach reveals how children's development is embedded within the lives and contexts of other species. Because empirical research in many areas remains sparse, hypothesis generation is the focus. Suggestions for a programmatic childhoodnature approach to children's lives are described.

Keywords
Children · Animals · Pets · Development · Context · Human-animal interaction

Introduction

Traditional disciplines studying children and their development have, until recently, almost exclusively focused on their ties to other humans. Even as theoretical perspectives such as ecological systems theory (Bronfenbrenner, 1979) and dynamic systems theory (Fogel, 2008) urged attention to the contexts of children's development, those contexts were viewed through an "anthropocentric" lens (Melson, 2001). Perhaps understandably, given the importance of parents, other family members, teachers, and peers, relationships and contexts were conceptualized solely in terms of human social relationships and human created environments.

However, in the last several decades, the long-neglected contexts of other species and the natural environments we share with them have emerged from obscurity. When in 1986, the US National Institutes of Health convened the first research workshop on human-animal relations, few scholars or practitioners took interspecies connections seriously. However, even then there was recognition, if one knew where to look, that animals were significant for human functioning. For example, Freud and other psychoanalytically oriented scholars had noted children's fascination with animals, the frequent appearance of animal symbols in dreams, and the role of animals in myths and stories (Freud, 1950, 1965; Von Franz, 1972). Pioneering therapists, notably Boris Levinson (1997), began strategically including animals within the therapeutic context. With his dog Jingles as "co-therapist," Levinson demonstrated how a friendly dog might create a non-threatening atmosphere, provide a safe outlet for expression, and even facilitate therapeutic insights. His classic book, *Pet-oriented Psychotherapy*, originally published in 1969, launched a new field, "animal-assisted therapy." Finally, the publication in 1984 of *Biophilia*, by E. O. Wilson, introduced a compelling hypothesis, namely, that humans coevolved with many other species and, hence, are genetically predisposed to selectively attune to other forms of life.

These insights situated children's development within the "living world," not just the world of other humans (Melson, 2008). At the same time, researchers from

multiple disciplines, including psychology, sociology, veterinary medicine, history, and economics, began to focus on the richness and complexity of human engagement with other animal species. More recently, studies in human-animal interaction (HAI) have recognized bi-directional influences, documenting reciprocal effects for both humans and animals. As an example, Handling (2012) showed that oxytocin levels of adult female dog owners and their dogs were positively correlated.

These historical roots of the expanding field of HAI have engendered a shift from "anthropocentric" to "biocentric" theory and research. "Biocentric" refers to the situating of human relationships within a network of other living species and contexts (Melson, 2001). This trend is likely to continue for a number of reasons: (1) growing ecological awareness amid concerns about climate change, species extinction, and environmental degradation; (2) pioneering work by therapists and other practitioners incorporating animals into treatment, education, and enrichment; (3) the contribution of genomic studies to documenting our genetic kinship with other species; (4) the proliferation of interdisciplinary approaches to HAI; and (5) the growth of systems perspectives in many fields, spurred by cybernetics and computer science.

Countervailing trends persist, however. A cursory examination of widely used college textbooks on child development still reveals little or no mention of children's ties with pets or other animals and little recognition of the significance of children being enmeshed with multiple environments. Unfortunately, psychological research too often ignores the ecological rootedness of children's development. The "biocentric" perspective, most often seen in HAI and environmental psychology, remains confined in a conceptual "silo," poorly integrated into the study of children's social and emotional relationships with humans. Nonetheless, there is growing recognition that children's development unfolds in specific geographical and physical spaces, environments in which children, other humans, and other species live together. In this way, the construct, "childhoodnature," captures the indivisibility of human development, other life forms, and the significance of place.

The Animal World of Children

From a biocentric perspective, children's physical and social worlds are replete with other species and life forms. Pets share children's homes. Wild animals are not just creatures to visit in zoos or nature parks but are all around, underfoot, and in the trees (Melson, 2013b). Animals of the imagination – in dreams, play, and various media – are pervasive elements of children's culture. Human-built analogues of animals, through video games, virtual pets, and robotic animals, are increasingly common. As a result, it is impossible to speak of children's development without addressing the importance of animals.

Pet ownership: The field of HAI has stimulated demographic research into rates of pet ownership. Although government census activities, such as the US Census Bureau, survey the population every 10 years, such assessments are restricted to human household members. This has led to less precise measurement of those nonhumans who share households. With this caveat in mind, international surveys

concur in very high rates of pet ownership. Both the American Veterinary Medical Association (AVMA) and the Humane Society of the US (HSUS), in independent national surveys, estimate that 62% of all US households had pets in 2012, with 36.5% owning dogs and 30.4% owning cats. (Ownership of multiple pets is typical of pet-owning families.) A 2014 survey by the American Pet Products Association (APPA) found 68% of American households had at least 1 pet, with over 77 million dogs and over 93 million cats in residence. Similar high rates exist in Western Europe. In developing countries and in developed societies in Asia, such as Japan and South Korea, pet ownership rates are rapidly approaching those in the West. In fact, given demographic trends toward smaller family size and lower birth rate, increasingly households are more likely to have pets than children. For example, in Australia, 66% of all households have pets, while 64% have children under 18 (Mathers et al. 2010).

While pet ownership is high across all households, those with children under 18 years of age are most likely to have resident animals. For example, in a study of a UK birth cohort, 74% of families with a 10-year-old also had at least one pet (Westgarth et al. 2010). Moreover, outside the home, children engage with companion animals. When 7- and 10-year-old California children were asked to identify "special friends" in their neighborhood, on average, they included at least one neighborhood pet (Bryant, 1985). Animals are common in the classrooms of young children as well. A survey of 30 California schools found that 59% of elementary school teachers had classroom pets (Zaslow, Hart, & DeArmond, 1999). Rud and Beck (2003) report that half of all Indiana elementary school teachers surveyed either had or wanted to have classroom pets. Thus, pets are pervasive in the important settings of a child's life – family, neighborhood, and school. This fact alone would argue for inclusion of pets in the study of children's relationships and settings.

Attachment to pets. The presence of an animal makes it potentially an important relationship. There is evidence that, for most families, pets are considered "family members," with many pet owners celebrating birthdays, displaying pictures, and giving gifts as they would to human family members. In one survey, 94% of adult pet owners identified their dogs and 84% their cats when queried about "close relationships." For comparison, 87% mentioned mothers and 74% mentioned fathers (Pew Research Center, 2006). Children too rank pets as important ties. In one study, 6–10-year-olds viewed their pets as more important than even friends or parents as a relationship "most likely to last no matter what" and "even if you get mad at each other" (Furman, 1989). In an interview study with 5-year-olds, all of whom had pets at home, 42% spontaneously mentioned their pet when asked to whom they would turn to share the emotions of anger, sadness, or happiness or the need to tell a secret (Melson, 2001). While children, in general, report a close bond with their pet, dog-owning children who spend more time caring for the dog have been shown to be more attached and the dog to be more responsive (Hall et al. 2016).

Wild animals. Even in urban, industrialized societies, children observe and sometimes try to interact with wild animal species. These encounters are often structured, in visits to nature parks, butterfly farms, aquariums, zoos, bird

sanctuaries, and other similar settings. An estimated 98% of all Americans report visiting a zoo at least once (Dunlap & Kellert, 1994). In one survey, 37% of all visitors to such UK wildlife venues were children (Turley, 2001), and most family groups organized the visits "for the children."

Even more common are unstructured daily encounters with wild animals in and around the child's home, neighborhood, and school. Although we seldom consider these as encounters with the wild, children regularly see birds, butterflies, rabbits, squirrels, frogs, and other small creatures. Backyard wild bird feeders are common. Even in a small patch of dirt, worms, snakes, ants, slugs, and beetles might be unearthed. Almost all families share their homes unwillingly with at least some of the following wild creatures: ants, spiders, flies, cockroaches, mice, and bedbugs. It is unrealistic to imagine a child's daily life without coming upon wild animals.

However, as noted elsewhere (Melson, 2013b), increasingly children's encounters with wild animals are mediated through technological media. In one interview study (Nabhan & Trimble, 1994), US children living near wilderness areas reported seeing more wild animals on television and in the movies than in direct, live encounters. Although this study has not been replicated, existing trends suggest that this "vicarious view of nature" (Nabhan & Trimble, 1994, p. 86) has only accelerated in the last 23 years. Even children living in less industrialized societies are meeting wild animals "at a remove." Thus, young children from Malta identified lions and tigers as their favorite wild animals, although they were not found locally and were experienced only through toys, animal-themed clothing, and school supplies (Tunnicliffe et al. 2008). In general, children are now observing wild animals primarily in nature documentaries, through popular television programs such as Animal Planet and in cartoon depictions. These presentations shape emotions using background music and film editing to create cultural depictions of animals through narrow lens where they perform "amusing antics" or frightening predation and killing.

Such mediated exposure reflects and also increases anthropomorphism, the tendency to attribute human characteristics and behaviors to other species (and even to objects). Such anthropomorphism is ubiquitous in children's media (Geerdts, 2016). Casting animals in human garb and speech is most likely among those with the least knowledge and experience of real animals, both domestic and wild, making children prime candidates for anthropomorphic depictions. In addition, there is a long tradition, dating from Aesop's fables, if not before, of using anthropomorphic animals to convey human stories and morals. In sum, the mediated world of animals is often a highly anthropomorphic one.

Animal symbols. As Kellert (2002) notes, animal symbols, in cave paintings, totems, and legends, are as old as the species *homo sapiens*. In contemporary life, animal names adorn sports teams, animal logos cover clothing, and animal names – "foxy lady," "big bear of a guy," and "wolfish grin" – describe human features. Certain animals have been coopted as holiday symbols, for example, the Easter bunny and the Christmas reindeer, while other animals are integral to religious ritual, as in the worship of cows in Hinduism. In sum, consistent with the biophilia

hypothesis, animals are a ready vocabulary with which we humans make meaning out of our world, including our fellow humans.

Children, in particular, are surrounded by animal symbols, from stuffed animal toys to animal-themed pajamas and bed linen. Animals that children often identify as "favorites" include dolphins, penguins, and lions (Myers, Saunders, & Garrett, 2004), followed closely with extinct animals such as dinosaurs that feature heavily in films, in toys, in games, and in other aspects of children's culture.

Animal analogues. Technological innovation has given rise to new animal forms. Children (and their parents) now have ready access to virtual pets, robotic pets, zoo-based webcams, augmented reality safaris, and animal apps. In the app "Virry," for example, children can watch live video of wild animals, such as rhinos and lions, and even "interact" with them by "feeding" them and communicating in other ways.

Unlike stuffed animals or windup toys, robotic animal analogues, such as the robotic dog AIBO, have embedded within them sophisticated computer technology that allows them to respond contingently to the child, to "learn" over time and to appear to "develop." These characteristics have led scholars to use the term, "embodied objects," to reflect the way computer-aided interactive capacities are merged with organic forms, such as a dog. Emergent research on children's understanding of and behavior with such objects reveals that children view them as neither living animals nor inanimate objects but as something in between – a "thing" that acts much like an animal or an "animal" that has features of a "thing" (Melson, 2013a; Melson et al. 2009b). Thus, as the animal world of children expands into the technological realm, new categories of animal and new relationships with animals emerge.

In summary, children's lives are saturated with animals – pets, wild animals, and animal symbols and analogues. It is impossible to consider children except in relation to other living beings and their symbolic representations. However, the ubiquity of animals is not the same as their developmental importance. One must show that animals are developmentally significant. In what follows, I address four important (but by no means exhaustive) domains of development – physiological, cognitive, socio-emotional, and moral. While these domains are interdependent and form a single complex system of development, one can conceptually distinguish them. Doing so illustrates how, in each domain, this animal world is not simply a critical part but is intrinsic to the understanding of human development.

The Importance of Animals in Child Development

Animals and physiological development. Since children's lives are intertwined with animals of all kinds, it is reasonable to hypothesize that other living beings and their natural environments would affect physical development. Several lines of inquiry have pursued this question. One explores the relation between dog walking and physical exercise and fitness. A study in Liverpool, UK, with 9–10-year-olds reported dog walking as an important activity where dogs were walked on average, several times per week (Westgarth et al. 2013). However, do these walks result in

more exercise and fitness? These results are mixed. When demographic variables associated with pet ownership are controlled (e.g., age, social class, and residence), Utz (2014) found no association between dog ownership and level of exercise. Nonetheless, many pet owners self-report more exercise and better health than do their non-pet-owning counterparts. For example, female dog owners (in China's major cities) say they exercise more and have better fitness, sleep, and overall health, compared to a matched sample of non-dog owners (Headey, Na, & Zheng, 2008). Similarly, New Zealand college students with dogs, compared to non-owners, reported more positive physical quality of life (Lewis, Krageloh, & Shepherd, 2009). Among both US college students and adult community members with dogs, the second most common response to the question: "What does your pet do for you?" was "keeps me active" (Staats, Wallace, & Anderson, 2008). Methodological difficulties abound in these studies, among them: the unreliability of global estimates of activity, the varying samples (some convenience, some population based), bias inherent in self-reports, social desirability effects (whereby owners may feel they *ought* to be walking their dog more), and variations in attachment to and responsibility for the dog. Beyond pet ownership, one must know more about the quality of the relationship between human and pet. As an example, a survey in Victoria, Australia (n = 928), of adolescents' activities on randomly selected school and non-school days found that over 88% of teens had pets but reported little interaction with them. No association between pet interaction and self-reported health was found (Mathers et al. 2010).

A second line of inquiry explores the relation between pet ownership variables and other aspects of physical health, for example, levels of stress hormones, such as cortisol, or glycemic levels. When the quality of the pet relationship is assessed (beyond simply noting pet ownership), the findings are encouraging. Thus, Maranda and Gupta (2016), in a study of 9- to 19-year-olds with type I diabetes, assessed not only children's pet ownership but their involvement in responsible care. Those who had pets and who cared for them responsibly were 2.5 times more likely to control glycemic levels than were children without pets. Other studies, thus far of adults only, have linked levels of the neuropeptide, oxytocin, to the human-dog relationship. For example, oxytocin levels are correlated in women and their dogs who have a close, bonded relationship (Handling, 2012).

A third, more speculative line of inquiry addresses the potential physiological and other benefits of rough-and-tumble (R & T) play, seen in human-dog interactions. R & T play is characterized by vigorous physical movement, such as play wrestling and chase games, and often accompanied by positive emotions such as laughter. Child development experts point out its developmental benefits, not only in physical exercise but in self-regulation of emotion and turn-taking skills (Pellegrini, 1987). However, adults, including early childhood educators, often mistake R & T peer play for aggression and seek to curb it (Storli & Sandseter, 2015). Hence, for some children, playing with their dog may provide an outlet for beneficial R & T play, although this has not been verified empirically (Melson, in press).

Negative health effects of pet ownership. Exposure to animals may be associated with zoonotic diseases, dog bites, cat scratches, and pet-related allergens. However,

proper hygiene can avoid the transmission of disease, while dog training and child education together can reduce the risk of dog bites. As for allergens and allergies, a large-scale study of over 22,000 children who had pets during the first 2 years of life found no relation to later asthma or allergy (Carlsen et al. 2012).

Animals and cognitive development. As the biophilia hypothesis posits, human beings have evolved to selectively attend to animals (and other living things). Thus, we orient toward animals and focus on them and their surroundings to gain information. For example, consider the information provided by birds circling slowly in a blue sky versus the loud squawking of a mob of birds in a darkening sky. In such ways, the animals that surround us are part of a continuous feedback loop of information.

Since attentiveness is a necessary condition for learning, the biophilia hypothesis suggests that children are predisposed to learn from and by animals. Thus, it is not surprising that much of the learning materials for young children uses animal figures and imagery. In fact, the first English language alphabet books featured animals – barnyard and wild – to teach the ABC's (Melson, 2001). Research on young children's attentiveness to living animals supports the biophilia hypothesis. Infants under 1 year of age are more attentive to and more positively engaged with living animals as compared with toy animals (Kidd & Kidd, 1987). In another study, babies reacted with most interest and approach to an unfamiliar living animal, a rabbit, as compared to a friendly but unfamiliar adult or a novel toy, a wooden turtle that moved, made noises, and flashed lights (Ricard & Allard, 1992).

Human and nonhuman animals operate with inherently complex, dynamic "information-rich" systems, behaving in unpredictable yet not totally random ways. Consistent with Piaget's theory of cognitive development (1960), animals provide the ideal stimulus to learning, i.e., "moderate discrepancy" from established "schema" or categories of thought. In this way, animal behavior is somewhat familiar but also contains elements that are surprising or unexpected. Consider the example of a toddler who has a cat at home. On a visit to a park, the child sees a squirrel for the first time and calls out "kitty!" In Piaget's terminology, the child is "assimilating" this creature to the "schema" or concept of a cat. But, then the child notices that this creature looks somewhat different and acts differently. An adult might point and say "squirrel!" encouraging the child to "accommodate" or develop a new "schema" or category of thought. In this example, it is precisely the ways in which the squirrel is both like and unlike the cat – moderate discrepancy – that stimulates new ways of thinking.

"Naive biology" refers to the everyday notions about living beings that children develop from birth into maturity. These notions include understanding what it means to be "alive" versus "not alive" or "dead," what the properties of biological entities are (they reproduce, they develop, they grow), and how various biological entities are grouped (i.e., animals vs. plants). Such ideas are fundamental to understanding of one's environment, the various beings within it and oneself. As children observe, touch, examine, hear, and think about the animals they encounter, they are developing a naïve biology. There is evidence that children involved in caring for pet animals develop more accurate ideas about their biology and are able to generalize those

ideas to other species, for example, frogs, that the children never cared for (Inagaki & Hatano, 2002). Pet-owning children also develop ideas about animal welfare needs (Muldoon, Williams, & Lawrence, 2016). There also is evidence that adult pet owners show more support for species conservation and protection (Shuttewood, Greenwell, & Montrose, 2016), raising the possibility that this might be true of children as well.

Animals and socio-emotional development. There is ample evidence that children view pets as companions, friends, and family members, in short, significant social beings. Both children and adults readily compare their ties to pets with those to other close human relationships. For example, adult pet owners reported that their pets were comparable to their siblings in terms of emotional closeness and support (McConnell et al. 2011). Even unfamiliar pets, owned by others, are viewed as socially significant. When 9–13-year-olds were interviewed after a short play session with an unfamiliar, friendly dog, most children agreed that the dog would be a friend, could play with them, and could understand them (Melson et al. 2009b). According to parent reports, children from ages 5 to 13 play with and care for pets on a regular basis, as much as they do with younger siblings, if available (Melson & Fogel, 1996). In addition, children in this age range also identify neighborhood animals as "important friends" (Bryant, 1985).

Encountering an animal, domestic or wild, is always a social encounter. In light of the previously discussed narrow representation of wild animals in documentaries and television shows, do children perceive wild animals as social beings, with emotions, intentions, and rich thoughts? Observations of preschool children as they encounter such animals as turtles, rabbits, monkey, or snakes reveal not only that the children are fascinated and want to engage but also that they treat these creatures as subjects, as beings like themselves, and not as objects (Myers, 1998).

As noted earlier, children report unique features of pets as friends and companions. They are seen as available, nonjudgmental, affirming, and trustworthy (Furman, 1989). The dependent nature of animals in households means that pets provide opportunities to practice care and nurturance (Fogel, Melson & Mistry, 1986). In this way, the social bond between child and pet has both horizontal (i.e., egalitarian) and vertical (i.e., stratified) qualities, making this relationship more comparable to older-younger sibling than to other ties. Perhaps because of this quality, pet-owning children without younger siblings are more likely to play with and care for their pets than do their counterparts with sibs (Melson & Fogel, 1996).

This finding also raises the possibility that social ties with pets may compensate for deficits in human bonds. Consistent with this is the finding that young children from single parent families express more attachment to their pets than do children from dual-parent families (Bodsworth & Coleman, 2001). Similarly, adults who report feeling anxious about human social ties seek more social support from their pets (Paul et al. 2014). However, overall, evidence on the connection between human and nonhuman social relationships is mixed. While some studies find a compensatory role, others conclude that pets may complement human ties. For example, adult female dog owners derived social support from their dogs, feeling less depressed and lonely, even after controlling for human support (McConnell et al.

2011). In interviews with 10-year-olds, Hall et al. (2016) found that children's attachment to their dogs was not related to attachment to parents, suggesting that each type of attachment bond was distinct. In this way, pets did not substitute for human social support but provided a distinct contribution over and above that support.

Still others (Melson, 2001) have suggested that supportive social bonds may be positively correlated across species. Perhaps children or adults who are skilled at seeking out and maintaining supportive social relationships do so in many contexts, with family, friends, and even pets. In support of this hypothesis, 9–11-year-olds who reported close ties with their dog also were more likely to report being securely attached to their mothers and fathers (Kerns et al. 2017). Much animal-assisted therapy (AAT) rests on the assumption that warm, accepting ties with animals will form a "bridge" to better social and emotional relationships with other humans (Melson & Fine, 2006). This presupposes generalization from ties with animals to humans. Yet, there is remarkably little research clearly demonstrating this.

In summary, the association between intra- and interspecies social bonds remains unclear. Future research on this question may not reveal a simple answer. Perhaps, depending upon context, type of relationship, and characteristics of both human and animal, ties with animals may compensate, complement, amplify, or be unrelated to human-human social bonds.

What are children learning in their social ties with pets? Considering social cognition, bonds with pets are likely to challenge perspective-taking and, thereby, stimulate empathy. When one engages in play with another species, one must imaginatively put oneself into another's "paws" not simply shoes, understanding very different behaviors and communication. Do ties with pets promote empathy, perhaps even extending to empathy in human relationships? In interviews with adult couples, those who owned pets believed that they helped the couple be more empathic toward one another. In fact, when empathy was directly measured, levels increased with the number of years the couple had owned the pets (Cloutier and Peetz, 2016).

Ties with pets may sensitize individuals to animal welfare issues more generally. In a survey of British adults with and without pets, those who had pets were more supportive of species conservation and protection efforts and less likely to prioritize human needs over those of other species (Shuttewood, Greenwell, & Montrose, 2016). Much of humane education rests on the premise that promoting sensitivity to animal welfare generalizes naturally to the way humans treat one another (Melson, 2001). Here, evidence is sparse, although suggestive. Pet ownership alone does not seem to affect empathy toward animals or humans (Daly & Morton, 2003). However, school-based humane education may be more effective. Ascione (1992) found that a 1-year program in humane education for first and fourth graders resulted in higher reported empathy (toward humans as well as animals), and this increase persisted up to 1 year after the program. Evaluation of a 10-week humane education program for first graders that also included visits from therapy animals found increases in self-reported empathy attitudes but not in self-reported behaviors

(Nicoll, Trifone, & Samuels, 2008). Surveys of elementary school teachers find widespread belief that humane education and live animal "visitors" to classrooms promote empathy development in young children (Daly & Suggs, 2010).

In addition to empathy, nurturance and caregiving may be outcomes of involvement with pets. As noted elsewhere (Melson, 2001), children in modern industrialized societies have little exposure to caregiving opportunities, either indirectly or through observation. Smaller family size (and, hence, fewer babies), more professionalization of care, and gender bias in socializing caregiving, all contribute to this trend. The pervasiveness of pet ownership, together with the close bonds most form with pets, means that nurturing animals is one of the few daily caregiving opportunities children have. A study of Chinese children found that pet attachment was correlated with willingness to care for others, including humans (Zhou, Zheng, & Fu, 2007). As we've noted before, such correlational data should be interpreted with caution. Children who are more prosocial, more oriented to helping others, may form closer attachments to their pets as part of that general disposition. Research to disentangle direction of effects is needed.

Moreover, since pet care, unlike human care, is less likely to be gender-biased (i.e., perceived as appropriate for females but not males), this caregiving is equally available to boys as well as girls (Melson & Fogel, 1989). This suggests that pets may provide one of the few socially and culturally encouraged avenues for nurturing that boys have as they are growing up (Melson, 2001).

Animals and moral development. Because even young children view animals, both pets and wild animals, as subjects, not objects, children accord moral standing to animals. In other words, children may view animals as having certain rights, including potentially rights to be free from harm, to have autonomy, and to exercise intention. Moreover, animals may incur obligations upon humans, especially those who have taken on responsibility for their welfare, as all pet owners do. Such obligations, justified as morally necessary, include meeting the animal's need to be appropriately fed, housed, exercised, and socialized. Moral obligations extend to giving affection, companionship, and medical care, consistent with the developmental needs of the animal.

Although the moral standing of animals has received little research attention, there is some evidence. Melson et al. (2009a, b) showed that children ages 7–13 accorded a friendly but unfamiliar dog, named Canis, both moral rights and human obligations. Overwhelmingly, the children stated that it was "not OK" to harm Canis, to refrain from giving needed medical care, or to give away Canis if you did not want him anymore. When asked to explain why such actions were "not OK," children referred to the moral claims of the dog, as a feeling and thinking individual who deserved individual rights. Many children made explicit comparisons with humans and their moral standing.

There appear to be parallels between children's reasoning about moral treatment of other humans and of animals. Dunlop (1989) found that adolescent boys' reasoning about moral dilemmas concerning animals followed the same stages

that Kohlberg (1976) outlined for such dilemmas involving humans. Indeed, while evidence remains spotty, it appears that moral reasoning is not compartmentalized into separate human and animal categories. This is another example of the way in which children's development reflects a "childhoodnature" perspective.

These findings are consistent with Kellert's typology of values applied to nature and living beings in general (2002). According to Kellert, as children mature, they gradually shift from a personal, egocentric stance to an other-oriented moral stance. While this developmental shift in emphasis has support based on questionnaire studies, direct observation and in-depth interviews with children reveal the roots of this other-oriented moral orientation much earlier, even during the preschool years (Myers, 1998). In support of this, interviews with children from Houston, Portugal, and Brazil, all in areas suffering from environmental degradation, showed that concern was widespread and often based on views that environmental harm, especially to wild animals, was morally wrong (Kahn, 1999). Moral development in children should include "eco-morality" as an integral part (Melson, 2013c).

Conclusion: A Childhoodnature Perspective

The ubiquitousness and developmental significance of nonhuman animals has been, by now, well established. It is an artificial distinction to consider children and their environments without the multitude of living beings that share them. Yet, as noted earlier, traditional disciplines, such as psychology and sociology, have not yet transformed from their anthropocentric roots into biocentric disciplines (Melson, 2001). The construct of "childhoodnature" may help stimulate that transformation. This perspective situates children within nature and nature within childhood. Some general guidelines for child development researchers who wish to work within a "childhoodnature" perspective are:

1. Assessment of demographic data on research participants should always include the nonhuman members of households.
2. Social network and social support studies should always consider nonhuman animals as potential network members and support providers. Many instruments ask a variation of the following question: "What people are important in your life?" thereby excluding consideration of nonhumans.
3. Scholars working within an attachment theory perspective now recognize that children form multiple attachments to various individuals. Yet, measurement of pet attachment is not routine.
4. Ecological systems approaches tend to focus on the culturally built contexts of school, peer group, religious organization, or neighborhood. Such studies should always add characteristics of the natural environment, including other living things.

5. As shown in the above discussion of animals and moral development, children are thinking about both human and nonhuman animals in similar ways. This should prompt scholars to include routinely assessments of both.

These guidelines are suggestive only and, hopefully, will stimulate the addition of others. In general, this essay, and others in this volume, urges a "paradigm shift" or new Gestalt, which returns children (and all humans) to the environments in which they evolved, the buzzing, blooming natural world of other living things.

Cross-References

- ▶ Re-examining the Human-Nonhuman Animal Relationship Through Humane Education
- ▶ The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment

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Socializing Superiority: The Cultural Denaturalization of Children's Relations with Animals

54

Matthew Cole and Kate Stewart

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Abstract

Children's relations with other animals in minority (Western) cultures are shaped by a paradoxical socialization process: affective relations with some nonhuman animals (such as "pets") are inculcated alongside norms of exploitation (such as "meat"-eating). That illogicality is central to positive self-concepts of caring for other animals while being complicit in the perpetration of routinized acts of violence against them. Caring and killing share an assumption of human superiority founded on childhood denaturalization, such that nonhuman animals are respectively civilized or commodified through their human encounters. In this chapter, we discuss the development and application of a conceptual model which

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"maps" this childhood socialization process. The "map" is populated by research which explores how children are encouraged to compartmentalize nonhuman animals into "types" that legitimate their existing uses, so that those uses are culturally reproduced (Cole and Stewart, Our children and other animals: the cultural construction of human-animal relations in childhood. Ashgate, Farnham, 2014; Stewart and Cole, Food Cult Soc 12(4):457–476, 2009). Cultural reproduction in the mass media, especially Hollywood films, is highlighted in this chapter: the use of anthropomorphized nonhuman animal "characters" in children's films is enduringly popular (four of the top six films at the 2016 worldwide box office feature CGI animal "characters"). Such films invite children to develop affective relations with fictional anthropomorphic animals while diverting concern from real exploited nonhuman animals. Such an approach also reveals the precarity of the socialization process and is therefore suggestive of means for its disruption, especially through the deconstruction of human exceptionalism and the reintegration of children in particular, and humans in general, with other animals as natural beings.

Keywords
Documentary methods · Mass media · Movies · Socialization · Sociology · Speciesism · Visual methods

This chapter draws on and continues to develop our theoretical and analytical focus on the socialization of the human use of other animals specifically in the context of childhood in the contemporary West. These uses include food, clothing, sport, entertainment, scientific research, and many other areas of activity relevant to childhood socialization (see Cole & Stewart, 2014, 2016, 2017; Stewart & Cole, 2015). In this chapter we return our focus to mainstream animated movies aimed at children. Nevertheless, our previous research suggests that the patterns, styles, and processes of representation which legitimate and/or obscure the uses of nonhuman animals are ubiquitous in all cultural artifacts targeted at children.

Nonhuman animals are abundantly represented in children's stories in whatever medium those stories are articulated. Children are thereby tacitly constructed as closer to nature, through their willingness to suspend disbelief and inhabit imaginative worlds in which nonhuman animals are subjects on a par with humans. Recognizing other animals as subjects is routine in children's films, and these stories can have powerful, enduring effects on us. However, maturation is partly predicated on denaturalizing children as they grow older, by circumscribing intersubjective relations with nonhuman animal characters as infantile conceits that should be abandoned. Our analyses of these stories therefore consider how narrative traditions contribute to a socialization process whereby children learn to conceptually distance animals they have an emotional-ethical bond with, from animals they eat, wear, or otherwise use. Childhoodnature is therefore currently exploited by the culture industries, but then foreclosed by a socialization process that requires commitment to human exceptionalism.

Popular media artifacts, such as the movies discussed here, are produced in specific social, cultural, and historical contexts and can therefore provide insight into society at a particular place and time (Brennan, 2013). For scholars of Critical Animal Studies (CAS), a close reading of such sources helps us unravel dominant discourses around human-nonhuman animal relations, allowing identification and critical analysis of dominant discourses (see Cole and Morgan, 2011a, b; Morgan & Cole, 2011). That critical analysis is a necessary step toward forging counter-discourses that can disrupt the prevailing exploitation of other animals, linking research with activism in CAS and providing an important ethical motivation for our research. In the course of our discussion in this chapter, we highlight instances where children's movies potentially destabilize dominant discourses and how these might be developed.

In broad terms, those dominant discourses center on nonhuman animals being primarily defined according to their perceived utility to humans. These definitions instantiate human-nonhuman animal relations that are fundamentally skewed toward the favoring of human interests. They have elsewhere been analyzed to generate typologies (e.g., Benton, 1993; Cudworth, 2008; Hirschman & Sanders, 1997), membership of which circumscribes the probable fate of nonhuman animals when they enter into contact with humans. Examples include "wild animals," "pets," "vermin," or "food animals." However, these judgments of utility and category membership are contingent and socially constructed, as demonstrated by cultural and historical variability in the species and individual animals assigned to particular types. As we discuss below, that contingency is also demonstrated by the ways in which filmmakers can and do play with nonhuman animal typologies for comic or dramatic effect, albeit typically as a prelude to their reassertion. Animal typologies are therefore transmitted, we argue, through the diversion of polymorphous and nondiscriminatory affective forms of relation between children and other animals, into culturally defined routes: children first learn to love, but then to use, other animals in line with social norms.

In exploring the ways in which cultural artifacts communicate appropriate practices, or uses, relating to nonhuman animals, we have moved away from using typologies and categories, instead developing a framework that supports a more context-specific theoretical exploration of animal use and its representation (Cole & Stewart, 2014; Stewart & Cole, 2009, 2015). As an analytical approach, the framework we use is informed by our acknowledgment that such categories themselves are a product of practices and discourses rather than providing the starting point for critical analysis of representations. This framework is visualized as a relational typology or conceptual map (see Fig. 1). The map reproduced here is a simplified version of an earlier version (see Cole & Stewart, 2014) and shows how human-nonhuman animal relations are produced through human practices and discourses, in ways which tend to privilege humans at the expense of other animals. In other words, nonhuman animals themselves have little recourse to asserting an independent ontology that evades human use. This framework illustrates the contingency and riskiness of other animals' relationships with humans, by virtue of the differential

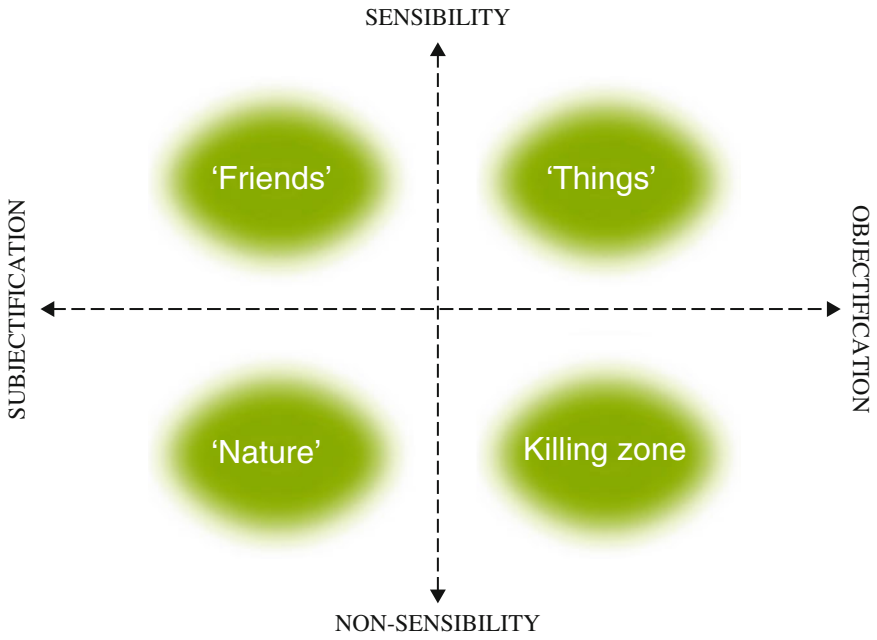

Fig. 1 A conceptual map of the social construction of "other" animals

levels of subjectivity and sensibility afforded them by human practices and discourses.

The framework helps us to identify how different practices and representations shift and interact in different contexts, through the ways in which nonhuman animals are positioned and repositioned. The horizontal axis of the framework represents the extent to which we construct other animals as exploitable objects or as autonomous subjects, or agents. The vertical axis relates to the extent to which different "types" of animals are both culturally and physically sensible (i.e., visible, audible, etc.). The central theme is that Western societies tend to encourage attention and affection for those who need it least – relatively protected animal companions, or cultural representations of animals granted greater levels of subjectivity and/or sensibility – and not on those who need it most: those who are exploited or exterminated in the southeast killing zone of the map.

Methodology

Cultural artifacts and media like films, magazines, TV programming, and games facilitate analysis of the social, cultural, and historical context of their production (Brennan, 2013). For scholars of CAS, these sources provide a useful resource for understanding dominant discourses and practices around human-nonhuman animal relations. In this light, the movies analyzed in this chapter were treated as discursive

documents to be "read," both in terms of the script-as-text and by interpreting the meaning of visual and audio representations on screen. We therefore employed a qualitative analytical approach. This involved analyzing our data with reference to the theoretical framework developed in our previous research and elaborated above (Cole & Stewart, 2014; Stewart & Cole, 2009, 2015). In practical terms, this involved repeated viewings of each movie, independently taking notes before comparing and dialogically refining our interpretations. Particular attention was paid to the ways in which nonhuman animals were situated across the geography of Fig. 1, how they were moved across it, and how they were differentiated from each other in terms of their ethical significance according to their relative positions. Discourse analysis explores how data both describes and performs – content conveys information, but how it is conveyed performs an additional layer of meaning. Thus, discourse analysis shows how versions of the world around us are discursively produced in the way in which information is presented (Silverman, 2015). This approach allows us to analyze exemplars of animal representations in children's culture, with a view to understanding the mass media's role in reproducing our conceptual map.

Conceptually Mapping Childhood Socialization

We have previously applied this conceptual framework in four empirical contexts: the family, education, mass media, and digital media (Cole & Stewart, 2014). Although the focus of this work has been in the UK, much of it is relevant to wider Western society and beyond, especially in light of the globalizing reach of many of the cultural representations of other animals that we have studied. Space prevents us from recapping the full scope of this research, but to place our movie analyses in context, we next briefly review our previous findings in relation to the mass media.

Mass Media

Mass media representations aimed at children are marked by a "cute" style of representation that can also be seen in many of the other areas we have studied, such as representations on clothing or food packaging. These representations are typically of cartoonized anthropomorphized versions of the nonhuman species they are meant to depict: infantilized animals with big eyes, rounded facial features, and expressions subtly distorted to mimic more human appearance. The cutification of nonhuman animals also includes representations of "real" ones in photographs, notably in a genre of UK magazines featuring animals aimed at pre-teenage girls (Cole & Stewart, 2014). The photographs almost exclusively depict infant animals gazing down the camera lens, implicitly giving and receiving adoration with the viewer.

Our previous analyses of films aimed at children that feature nonhuman characters (as very many films aimed at children do) show how these representations

reinforce dominant practices of human use of nonhumans. For example, *The Lion King* (Hahn et al., 1994 and see Stewart & Cole, 2009) clearly reinforces a discourse of a "natural order" where the chief protagonists (with whom the audience are invited to identify) are presented as rightfully and naturally having dominion over other species. Other films we have analyzed (see Stewart & Cole, 2009), for example, *Babe* (Miller, Miller, Mitchell, & Noonan, 1995), communicate a message that it is deviation from "nature" that invites subjectification. Babe's capacity to herd sheep as a unique "sheep-pig" is an example. That is, the appealing quirks of Babe et al. enable them to stand out from the usually massified interchangeable members of their species in the southern regions of Fig. 1. On that basis only are they representationally uplifted toward the northwestern "friends" region of the conceptual map. Our analysis of *Puss in Boots* (Ouaou, Aguilar & Miller, 2011 and see Cole & Stewart, 2012) explores the intersection of these species-related distinctions with discourses that marginalize humans according to gender, race, and class, illustrating how processes communicating subjectivity and sensibility are also mobilized to reinforce patriarchal, ethnocentric, and classist discourses.

Denaturalizing and Renaturalizing Human-Animal Relations in Hollywood Films

In the remainder of this chapter we continue this focus on the mass media and specifically four Hollywood children's films released in 2016 featuring nonhuman animal "characters": *Zootropolis* (Spencer, Howard, & Moore, 2016), *The Secret Life of Pets* (Meledandri, Healy, & Renaud, 2016), *Finding Dory* (Collins & Stanton, 2016), and *The Jungle Book* (Favreau, Taylor, & Favreau, 2016). The discussion of *Finding Dory* is combined with an analysis of its prequel, *Finding Nemo* (Walters & Stanton, 2003). This selection was guided by the commercial success of the 2016 films, all of which featured in the top six at the worldwide box office in their year of release (Box Office Mojo, 2017a). In order, *Finding Dory* took $1,028,570,889 for third position, *Zootropolis* took $1,023,784,195 in fourth, *The Jungle Book* took $966,550,600 in fifth, and *The Secret Life of Pets* took $875,457,937 in sixth place for a combined total of approaching 3.9 billion US dollars. *Finding Nemo* was similarly successful, taking $940,335,536 worldwide for second spot in the 2003 box office league table (Box Office Mojo, 2017b). This scale of commercial success clearly entails a wide viewership, augmented by DVD, Blu-ray and streaming releases of the films for domestic consumption.

Zootropolis

Synopsis

Zootropolis (Spencer et al., 2016, entitled *Zootopia* in some territories) is a CGI animation film depicting a multispecies nonhuman mammal community living harmoniously in an urban environment, albeit one that hosts species-appropriate

habitats such as "Little Rodentia" or "The Rainforest District." The plot centers on the young rabbit Judy Hopps as she pursues her ambition to move from a rural carrot farm with her parents to Zootropolis to become a police officer. The alternate title *Zootopia* alludes to the utopian resolution of interspecies conflict in the city, specifically the cessation of predation, which carnivorous animals have "evolved" past in the film. However, in the course of the film, Judy uncovers and foils a plot to instate a prey hegemony over Zootropolis by the assistant mayor Bellwether, a female sheep. The plot involves drugging members of former predator species, precipitating their atavistic return to "savagery" and thereby justifying their incarceration.

Analysis

The city of Zootropolis is a multispecies melting pot that echoes the human ethnic diversity of an idealized US metropolis, populated with immigrants with multiple trajectories but who all find a home within it. It also models the American dream, as Zootropolis is a place "where anyone can be anything." The species of different characters do not confine them to a single stereotyped destiny, exemplified in Judy Hopps' turning her back on the safe option of remaining a carrot farmer with her parents. This identity fluidity is arguably intended to be a point of identification and inspiration for the human audience and especially to ease the growing pains of children who may be experiencing bullying, discrimination, or the stigmatic application of outcast identities. Judy is shown as having been subject to bullying by the fox Gideon Grey in childhood, who physically and verbally intimidates her, including taunts about the pre-evolution predation of rabbits by foxes. Judy Hopps' determination and success therefore defies her species stereotyping as merely "cute" and ineffectual and models the capacity to transcend othering processes. For instance, on arrival at her police precinct, Judy is greeted by Benjamin Clawhauser, a cheetah who admiringly says, "I've gotta tell ya you are even cuter than I thought you'd be." Judy replies, "you probably didn't know but a bunny can call another bunny cute but when other animals do it, that's a little. . .." The sentence is left unfinished, but the audience is invited to transpose the implied "speciesism" to "racism" and/or "sexism" given Judy's species uniqueness as a rabbit police officer and her female gender. Judy is therefore fully aware of her species identity and the demeaning stereotypes that have been applied to it, but asserts her right to define herself nonetheless. Similarly, she later declares that, "I'm not just some token bunny," riffing on the tokenism deployed in an attempt to placate and defuse various social movements throughout the history of progressive politics. Clawhauser himself subverts an image of cheetahs as dynamic and athletic by being portrayed as a stereotypically obese doughnut-loving police officer, but one with a distinctively camp persona.

Judy is also an empowering figure for others in the film, notably the fox character Nick Wilde. Wilde's surname highlights his outlaw status as a petty criminal, but also his resignation to species stereotypes as inescapable destiny. As he says to Judy, "you can only be what you are [. . .] sly fox, dumb bunny." Nick's resignation is later revealed as a consequence of his having been the victim of anti-predator bullying

and subject to labeling with stereotypes of foxes as shifty and untrustworthy. After being enrolled as an initially reluctant co-investigator by Judy, Nick ends the film having realized his capacity for self-actualization and transcending the limitations of the "sly fox" stereotype. As Judy insists, "you are so much more," an assertion that pays off at the end of the film when Nick has become a police officer and is teased by Judy with a "sly bunny, dumb fox" one-liner. As such, Nick models a path to redemption through cooperating in the restoration of the social order of Zootropolis.

Zootropolis therefore models the denaturalizing of intra-human difference, and thereby an anti-essentialist message, but uses nonhuman animals as ciphers for doing so. This is a less threatening option in a film targeting a young audience than directly confronting racism, sexism, etc., but it also means that the implications it has for speciesism are not developed as they could, arguably should, be. For example, Judy's appearance remains circumscribed by "cute" style, such as her outsized forward-pointing blue eyes and a figure based on a woman as much as a rabbit, with a bipedal gait, prominent hips, and a bustline under her police tunic. There is an echo of the highly sexualized cartoon rendering of Jessica Rabbit from *Who Framed Roger Rabbit?* (Marshall, Watts, & Zemeckis, 1988) which in turn played on the *Playboy* bunny motif and sexualized "bunny girl" outfit. The feminizing of rabbits simultaneously cutifies the species as a whole and women by association in cultural representations. By contrast, the male rabbit characters of Roger Rabbit or Bugs Bunny are markedly non-sexualized. In other words, Judy is resisting a patriarchal-speciesist nexus that predates (pun intended) the film and which is divorced from the "nature" of real rabbits. But she does this within the film without contesting the sexualized feminization of rabbits, or in other words, without undermining the anthropomorphic appropriation of rabbits as human cultural symbols. To contest the distribution of rabbits across Fig. 1, *Zootropolis* would need to portray rabbits as contesting their misrepresentation as human cultural symbols and to assert their nonhuman animality, their "rabbitness."

Other animals remain circumscribed by stereotypes with little hint of their capacity for fluid identity transformations. At the extreme, the film abominates skunks when Nick is upbraided by Mr. Big, a comically diminutive arctic shrew portrayed as a Godfather-mafia character, for selling him a fake woollen rug made from "the fur of a skunk's butt." This is an exceptional instance of the film objectifying nonhuman animals and alluding to real-world violence against them, although it is possible to imagine that the filmmakers intended the rug to evoke the shearing of a skunk rather than the execution and skinning that is integral to the fur industry. This is not to deny the exploitative character of the sheep's wool industry, but to acknowledge its representation in children's culture as unproblematic, notably in the Oscar winning CGI animation film *Shaun the Sheep Movie* (Kewley, Lockhart, Burton, & Starzak, 2015) and also through the presence of sheep characters like Bellwether within *Zootropolis*. The film largely avoids representing food consumption by its characters and therefore suppresses the problem of explaining what (or who) obligate carnivores eat in Zootropolis, implying their transition to a largely plant-based diet. Nick himself describes blueberries as delicious near the end of the film. "Nonviolent" food consumption is alluded to by the presence of a juice bar in

the railway station, the selling of ice cream in a shop staffed by elephants, a brief appearance of a "Frozen Yakcurt" shop, the frequent appearance of doughnuts, a bakery operated by the adult Gideon Grey, and fresh vegetables sold by Judy's parents. Clawhauser's first appearance shows him eating a bowl of cereal called "Lucky Chomps," depicted in milk. The expropriation of milk and eggs in "dairy" or baked goods is absent from the narrative, so the film does not have to explain how, for instance, cows or hens are able to be "anything" when they are still being exploited. The Frozen Yakcurt shop suggests a yak-based dairy industry, but only a male yak – Yax – appears as a character in the film. Notably neither cows nor chickens are represented as characters in *Zootropolis*. The absence of hens is explicable in the mammals-only speciesist line drawn in Zootropolis. This is also hinted at in the fleeting appearance of a large building with a sign proclaiming "Fishtown Market" and a smaller one signed "Clarks Halibuts" in the Tundratown district, suggesting the consumption of fishes by its mammal inhabitants. The species logic of Zootropolis collapses altogether with the appearance next to Fishtown Market of a restaurant called "Blubber Chef," suggesting the killing and consumption of whales. Zootropolis therefore retains a southeastern killing zone from Fig. 1, which is almost as tricky to spot as it is in the nonfictional world.

The irony of the denaturing effects of anthropomorphism is exposed for comic effect by Yax, a yak proprietor of a naturist club that Judy visits in the course of her investigation. In relation to the presumed weirdness of naturism, Yax comments that, "you know what I say is weird? Clothes on animals!" As he speaks, an unclothed elephant and giraffe are shown engaged in a yoga routine. So, their "natural" nudity is undercut by their anthropomorphic performance of a human cultural practice. The fact that the inhabitants of Zootropolis have "evolved" entails that they have become uplifted toward an approximation of humanity. It is their very civilization which makes naturism worthy of comment and defense by Yax. The cultured and herbivorous yoga practitioners contrast with the "savagery" of the atavistic carnivores as the plot develops. The investigation leads Judy and Nick to an interview with Mr. Big, who asserts that, "we may be evolved, but deep down we are still animal," with "animal" being a signifier of irrationality and violence. Mr. Big's warning of atavism is fulfilled by the drugged otter Mr. Otterton, who is described by Mr. Manchas, a jaguar chauffeur attacked by Otterton, thus: "he was an animal, down on all fours, he was a savage." Manchas himself is soon revealed as having been drugged and is described by Judy as a "jaguar gone savage" when he falls to all-fours and attacks them. The equation between animality and irrationality is highlighted by Nick when he accusingly asked Judy whether "you think I might go nuts?"

In summary, *Zootropolis* offers a surface subversion of stereotyping and othering processes and a celebration of the capacity to transcend inequality and freely construct identity. There is a limited disturbance of speciesist constructions of nonhuman animals in Fig. 1, such as the meta-commentary on "cute" style and the inversion of "sly fox, dumb bunny." However, in the main the film depends on the reproduction of stereotypical constructions of nonhuman animal characters: it reduces them to ciphers to facilitate the exploration of the experiences of growing

up and the problems of maintaining orderly diverse human communities. Meanwhile, nonmammalian animals in particular (and some mammals in the case of whales and "dairy" cows) remain thoroughly objectified as "food" but are otherwise absent. The movie ironically subverts childhoodnature as Zootropolis is a purified urban space. While it plays on the ubiquity of nonhuman animal representations in children's culture, it anthropomorphically domesticates them, rather than capitalizing on their potential to encourage children to empathize with nonhuman (as well as human) others. Zootropolis is anything but a peaceable interspecies community, but instead is a metaphorical representation of a utopian human community purged of nonhuman others.

Finding Nemo/Finding Dory

Synopsis

Finding Nemo (Walters & Stanton, 2003) and its sequel *Finding Dory* (Collins & Stanton, 2016) are CGI animation films in which the titular fishes are captured and imperilled and whose whereabouts are sought by their nonhuman friends. In the original film, after capture by a diver, the clownfish Nemo is confined in a tank by a dentist as a gift for his uncaring daughter. Nemo is sought by his father Marlin and Dory, a blue tang, who he meets en route. In the sequel, Dory, aided by Nemo and Marlin, seeks out her long-lost parents at a Marine Life Institute.

Analysis

Although *Finding Nemo* is 14 years old at the time of writing, the appearance of a sequel in 2016 makes its analysis highly relevant. As well as featuring characters in common and a similar visual style and plot, the sequel stimulates renewed interest in its predecessor, as well as providing an opportunity to package and sell the two films together for home release. It is also possible to discern continuities and differences between the two films.

Both films share overt problematizations of human-nonhuman animal relationships, especially in terms of critiquing the captivity of aquatic creatures as unnatural and contrary to their interests and wishes. *Finding Nemo* includes a moral lesson in the form of Darla, the daughter of the dentist who keeps Nemo in a tank in his surgery, along with other aquatic creatures. Darla is described as a "fish killer," whose curiosity and fascination for fishes is not matched with sufficient empathy to avoid harming them. There is an implicit invitation for young viewers to disidentify with Darla and eschew maltreatment of fishes. Furthermore, Gill, one of the other captives in the tank, asserts that, "Fish aren't meant to be in a box," and a key plotline in the film involves the fishes plotting their escape from the tank. However, the admonishment to not mistreat fishes presupposes contact with them in situations of power where maltreatment is a possibility. That may well include the potential for both films to stimulate desire for the keeping of "exotic" fishes despite Gill's assertion, as well as the desire to spectate them in captive environments such as "aquaria." The latter is immodestly confirmed by a filmmaker in the *Finding Nemo*

home release additional features: "internationally it's in the lexicon of aquarium viewers now" (i.e., the clownfish species of which Nemo is a representative). In *Finding Dory*, there is an attempt to partially redeem this risk in the critical representation of a "touch pool" at an aquarium, a shallow enclosure designed for young children to be able to lean over and touch aquatic animals under water. The experience is portrayed as painful for the fishes, who struggle to avoid being touched by human hands. Furthermore, Claire Parkinson (in press) reports that the writers of *Finding Dory* adjusted the script to be more critical of captivity in the wake of the *Blackfish* (Cowperthwaite, Oteyza, & Cowperthwaite, 2013) documentary, by replacing a SeaWorld style attraction with a Marine Life center that operated under a "Rescue, Rehabilitation, and Release" slogan. The film adds a further layer of environmentalist critique absent from *Finding Nemo*, in that Dory is initially caught in a discarded plastic can holder. The defilement of "nature" is highlighted as another moral lesson for the viewer.

The signs of progress in *Finding Dory* may also be found in its downplaying of fishes as food for humans compared with *Finding Nemo* while retaining a theme of fishes as potential food for other animals that injects dramatic tension. The latter is of course justifiable, and even the simplistic claim that "we all know nature's a predatory world" by a filmmaker in the *Finding Nemo* home release additional features acknowledges the reality of the risk of predation in nature. However, predation in the films is represented as a threat to the survival of *subjectified* characters and therefore all the more horrific. Meanwhile, the representation of fishes as human food depends on their objectification, that is, their limited screen time and relative lack of characterization, which therefore does not attract an equivalent response of revulsion. The film's principle characters are not members of species typically consumed by their majority Western audience. While the latter are not personified in *Finding Nemo* and do not invite empathy to the same degree as the "exotic" Nemo et al., there is the potential to transfer empathy to their real counterparts in the oceans. For instance, near the end of *Finding Nemo*, the sight of an approaching fishing trawler is met with screams from fishes who swim away from the net in panic. A shoal is nevertheless caught, but then encouraged to swim downward in unison, which is an act of collective resistance that rips open the net and allows them to swim to freedom. Here, the intervention of a CGI representation facilitates the crossing of the meridian of Fig. 1 from the southeastern "killing zone" to the southwestern "nature" zone. The uplifting of fishes into the upper reaches of the northwestern region is however foreclosed by their massification and relative lack of subjectivity and initiative compared with the "exotic" film characters.

This scene, perhaps more than any other in either film, opens the possibility of genuine challenge to the normality and acceptability of the human consumption of sea-living animals. That is, while *Finding Dory* does not reproduce conventional human consumption practices of aquatic animals, neither does it do much to explicitly contest them. An exception is a passing concern expressed by Marlin that they might be en route to a restaurant and therefore implicitly be at risk of consumption. Meanwhile, the practice of "factory fishing" is portrayed in *Finding Nemo* as decidedly unnatural, destructive, and terrorizing. However, the overt

connection between this nightmarish construction and mundane consumption practices is not made. For example, earlier in the film a seaside restaurant is depicted in the background with a sign advertising, "Hot Dogs Snacks Fish n Chips Cold Drinks." Human consumption practices are also voiced by aquatic creatures when "where's the butter" is a clue given to Dory and Marlin by a shoal of fishes who organize themselves into the outline of a lobster in a guessing game. The use of "dairy products" and cooking underwater are of course nonsensical, but together with the sign, it undercuts the problematization of the objectification of aquatic animals and positions them in the southeast "killing zone" of Fig. 1 alongside land animals killed for "hot dogs" or exploited for "dairy." The critique of "factory fishing" is also allowed to stand as an exceptionally objectionable practice that still leaves room for welfarist constructions of "humane" fishing practices to survive unremarked and uncritiqued. The undercutting is completed in the home release additional features, in which a filmmaker group reminiscence about the film's production and reception includes the joking report that, "I'm still getting emails of sushi and Nemo." More telling still is the recollection that, "the number one question we were always asked is if we were going to have sushi at the wrap party [. . .] which we did." There is scant reason to assume that the filmmakers had emancipatory intentions in creating *Finding Nemo*.

Although *Finding Dory* does not include an equivalently direct critique of "fishing," it does mark the captivity of aquatic animals as morally questionable: "it's our [a rescue centre] goal that any animal we rescue will eventually be returned home, where they belong." This explicitly repositions such animals in the southwest zone of "nature" and not as captive entertainment in "aquaria," as 'pets', or as (human) food. The assertion of freedom is more poetically evoked by Bailey, a captive Beluga whale, who opines that, "there are no walls in the ocean," and is graphically represented in the tortured experience of the "touch pool" described above. As Parkinson argues (2018), the character of Bailey is also significant for deploying echolocation to outwit humans and in so doing tempering anthropomorphism with a "specie-specific trait" that emphasizes difference from humans, but not thereby inferiority.

In *Finding Nemo* and *Finding Dory*, the degree of cutification of nonhuman animals is central to their relative subjectification. As we discussed in relation to its use in mass media representations of nonhuman animals, cutification entails a distinctive style of childlike anthropomorphic representation. This includes oversized humanlike eyes, a range of quasi-human facial expressions, and the capacity to speak in human language. This is in spite of the claim made in the additional features on the home release of *Finding Nemo* that "he [the director] didn't want overly anthropomorphized fish." In a pivotal scene near the end of *Finding Dory*, road traffic is literally stopped by the adoption of cute poses in a "cuddle party" by a lineup of otters in the road. The otters in turn forgo the predation of the "cute" subjects Dory et al., one of them cuddling Dory herself in this scene. Contrastingly, nonhuman predators are represented as more or less monstrous. Early in *Finding Nemo*, the cute clownfish are menaced by a predator fish who roars, but does not

speak. Later on, a deep-sea angler fish also roars threateningly without speaking. Likewise, early in *Finding Dory*, a squid attacks and also lacks the subjectifying characteristic of a voice. Predation is thereby portrayed as uncivilized, animalistic, and barbarous, and therefore there is a disidentification between the audience and "natural" carnivory of living and "raw" prey.

The civilizing of carnivory is represented by the greater subjectification afforded to a predator self-help therapy group of three sharks, led by Bruce, a great white. The sharks are anthropomorphized, but more adult and thereby less cute than the films' heroes. Bruce voices his desire to reidentify as a cultured and civilized subject: "I am a nice shark, not a mindless eating machine. If I am to change this image, I must first change myself. Fish are friends, not food." The therapy session jokingly evokes the demonizing media construction of sharks exacerbated in popular culture by *Jaws* (Zanuck, Brown, & Spielberg, 1975) and its sequels. Bruce goes on to announce that "today's meeting is step five: bring a fish friend," but his instinctive carnivory is aroused by the scent of blood in the water when he excitedly declares, "I'm having fish tonight!" The scene also jokingly exposes the cutification process. The hammerhead shark's rejoinder to Bruce's assertion of fish as friends is "except stinking dolphins," to which the other shark adds, "Dolphins! Yeah they think they're so cute." The sharks' struggles to suppress their natural appetites are contrasted with the unrestrained predatory greed of a flock of gulls who menace Marlin and Dory. Massification, a common technique used to deindividualize and desubjectify nonhuman animals (such as the stampeding wildebeest in *The Lion King*), is here deployed to construct predation as mindless and animalistic. The gulls also lack human speech and are relatively uncutified. Their utterance is restricted to a growing cacophony of "mine!" as they approach potential prey, signaling their collectively expressed selfish greed. There is an interesting contrast here with the more usual tendency to massify herbivores and elevate the subjectivity of carnivores, as also to be found in *The Lion King*. The abomination of the gulls is compounded by Nigel, a subjectified stork who rescues Marlin and Dory, who accuses the gulls of being "rats with wings," discursively condemning them to the "killing zone" as "vermin."

This pair of films then obliquely invokes childhoodnature, especially through the problematization of abusive child-nonhuman animal relations in the figure of Darla in *Finding Nemo* and the "touch pool" in *Finding Dory*. That is, they critique the construction of fishes as spectacles or objects of amusement, by which children are estranged from nature. Ironically, they do so within movies that depend on the construction of certain charismatic aquatic animals as colorful spectacles and, as conceded by the filmmakers, contribute to the "lexicon of aquarium viewers."

The Secret Life of Pets

Synopsis

The Secret Life of Pets (Meledandri et al., 2016) is a CGI animation film in which anthropomorphized and cutified "pets" in a contemporary urban US setting (New York) are able to converse with each other in English, although humans

only hear them making nonhuman vocalizations (such as barking) rather than speaking any human language. The "pets" are depicted as enjoying a "secret life," while their human companions are absent during the working day, socializing and using domestic appliances, for instance, a poodle using a stereo to indulge a liking for heavy metal music. The narrative centers on Max the Jack Russell Terrier, who is upset by the arrival of Duke, a rescued mongrel, into the household he shares with his human owner Katie. The initial schism between the dogs is gradually healed through the course of the film. They are captured by an Animal Control patrol, incidentally rescued by a gang of abandoned "pets," before in turn escaping the gang who turn out to be bent on revenge against humans and traitorous willing "pets." Meanwhile, their friends (other "pets" in their neighborhood) search for them. The film climaxes with the abandoned "pet" gang and Max and his friends uniting to thwart the Animal Control officers and being returned to human "owners" and willing "pet" status.

Analysis

The Secret Life of Pets (Meledandri et al., 2016) has an overt moral message for viewers about the importance of treating "pets" with care and of not allowing them to be abandoned to the precarity of the pound. Loving relationships with animal companions are positively modeled, while abusive or neglectful relationships are portrayed as damaging. The former bookend the film: an early scene in a park shows dogs enjoying walking with their human companions, and the central protagonist, Max the Jack Russell terrier, describes his relationship with his human companion Katie as, "[. . .] love stronger than words." At the end of the film, a montage plays out in which humans return to their homes to be joyfully reunited with their animal companions. Abusive relationships are represented by a group of "flushed pets" who are alienated from humans as a result of their prior maltreatment and seek violent revenge. As the leader of the flushed pets, Snowball the rabbit, puts it; "our primary mission – the downfall of the human race." The "flushed pets" therefore exhibit a "wildness" in terms of rage and violence – they are depicted as driven by irrationality, to the point of an obsessive mental instability. For example, Snowball describes a "flushed" viper as, "fueled by a diet of anti-human rage," and it is notable that the raging viper does not speak. Despite their anthropomorphism then, the "flushed pets" are discursively positioned toward the southwest of Fig. 1, as threats to the owner-"pet" domestic order, similar to the construction of urban foxes discussed earlier. By contrast, the heroic "pets" who have not been abused in the film remain civilized by their association with humans and seek to avoid violent confrontation. In both respects, however, the character of nonhuman animals is shaped by their relations with humans, foreclosing the thinkability of their having independent lives as free-living beings: the "flushed pets" seek revenge rather than escape to a human-free utopia. All nonhuman animals are therefore enclosed within the terrain of Fig. 1. The dramatic narrative of *The Secret Life of Pets* inheres in the disturbance and restoration of the conceptual map in Fig. 1. The transgressive positioning of nonhuman animals in "the wrong place" (both the "flushed pets" and the civilized "pets" while separated from their human owners) introduces a tension that is

resolved by their conventional repositioning at the end of the film – the beneficent reuniting of both flushed and civilized "pets" with humans.

However, the drama re-models the real-world conceptual separation of legitimate nonhuman victims of human violence (especially "food animals") from legitimate nonhuman recipients of human "care" (especially "pets"). This is illustrated early in the film when Chloe the cat is shown eschewing the "cat food" left by her owner and instead eating a cold roasted chicken from the refrigerator, followed by a cake. The separation is reproduced by imputing a humanlike agency to Chloe – indulgence of hedonistic pleasure in eating and especially in eating nonhuman animals (with nothing to indicate a vegan householder, we can read the cake as including hen's eggs and cow's milk, butter or cream as well, in line with the conventional omnivory among the intended audience). There is a point of identification made between the human viewer and Chloe – "we" can recognize her appetite for consuming nonhuman animals in the same form that "we" do, rather than in the impoverished form of "cat food." This is compounded by the later fleeting appearance of remnants of chicken's wings, as well as a pizza, as a meal having been consumed by a sleeping human in an apartment that the "pets" run through. The twin scenes of Chloe and the sated sleeper communicate the pleasures of gluttony on nonhuman flesh, as long as that flesh is disconnected from the nonhuman animals it was taken from (living chickens do not appear in the film). The agency of real "pets" is therefore dragged northwestward toward the position occupied by humans, by means of the intervention of the anthropomorphic representation of Chloe. At the same time, chickens are thoroughly objectified, so that the representation of the bird compounds the objectification of real chickens – in this case the representations intervene to reproduce the cultural visibility of consumable dead animals while distracting attention from real exploited animals.

Later in the film, Max and Duke stumble upon a sausage factory while on their way to finding the home of Duke's previous owner:

> Duke: "sausage [. . .] you smell that? Sausage!"
> Max: "We're coming for you baby!"

Max's excited promise imputes agency to the objects of his desire, as if they could be satisfied and fulfilled by this response to their allure, and subtly reproduces the heteronormative mingling of gustatory with erotic pleasure. As Carol Adams (2004) has extensively documented, the association between the flesh of nonhuman animals and the bodies of women is frequently linked in Western cultural representations and especially when targeted at imagined male consumers. In this case, the diminutive "baby" uttered by Max connotes a sexually desirable young woman, despite the ironically phallic associations of sausages. The factory is called "Weiner Kingdom" (weiner also being common US slang for penis), and the factory sign is adorned with a logo of an anthropomorphized smiling sausage wearing nothing but a golden crown. The kingly status of weiners reinforces their gendering as masculine food, but nevertheless they are feminized as objects of consumption later in the scene, as described below. On entering the factory, Max and Duke are confronted with an

overview of the production process: "meat" (uniform neat cuts) hanging from conveyors is dropped into a mincer and then formed into sausages by another machine, on which the dogs begin to gorge themselves. The process by which nonhuman animals are fragmented into "meat" is absent, so that flesh is dissociated from killing and butchering, stifling sensibility of the southeast region of Fig. 1.

As they eat voraciously, the dogs begin to hallucinate the sausages coming to life: a clothed sausage appears and beckons the dogs with the words "Come on boys" into a fantasy sausage theme park populated with singing and dancing sausages, leading Duke to exclaim "holy schnitzel!" The sausages are singing "We go together," the closing song from the musical film *Grease* (Stigwood, Carr, & Kleiser, 1978). The invocation of *Grease* emphasizes the celebration of Americana in *Secret Life*, not least through the association of "meat"-eating (especially hot dogs) with US culinary, cultural, and heteronormative masculine identity. The same articulation is made in the R-rated CGI animation *Sausage Party* (Ellison et al., 2016), in which personified "fancy dog" sausages are packaged on a US Independence Day display (Cole & Stewart, 2018). In this case, the protagonist sausages themselves are icons of heteronormative masculinity who become aware of their fate as human food, but unaware of their previous existence as nonhuman animals. The fantasy *Secret Life* sausages do not attain even that limited consciousness: while one band of sausage singers perform on stage (dressed in hula skirts made from gherkins and thereby feminized), Max and Duke appear – Max bites off one of their heads, while Duke swallows the others whole, without the song being interrupted or any alarm being expressed by these or any other sausages – a decapitated sausage continues to dance. The camera then sweeps across a bridge populated by sausages feminized by wearing bikinis fashioned from yellow mustard – the sausages leap into the river as if evading the onrushing dogs – a unique expression of alarm in the scene, though their alarm might equally be read as meta-alarm at the intrusion of the camera itself. A dancing line of sausages then walk into Duke's mouth while he lays on his back, before the dogs are shown falling into a huge bowl of inanimate sausages, while animate sausages continue to sing and dance around the bowl. At this point the sausages repeat the refrain "we'll always be together" from the end of the song: the shared experience of gluttony cements Max and Duke's burgeoning friendship, but also the song asserts that the consumption of nonhuman animals will always be a part of their lives. While the lyrics might symbolize Max and Duke's relationship, it is the fantasy sausages who are singing it and who are implicitly included in the "we" being referred to in the lyrics.

The scene recalls medieval fantasies of the Land of Cockaigne, pseudo-utopian stories in which food (including "animal products") falls from the skies into the mouths of supine gluttons, relieved from the troubles of labor and deprivation. Such tropes may be interpreted as escapist relief from the reality of class inequality and exploitation while reproducing species inequality. In *The Secret Life of Pets*, a similar reading is available, and it may even have a critical undertone, as it makes visible the extent to which animal companions' appetites are subject to strict human control and their lack of freedom to feed themselves as and when they wish. However, Weiner Kingdom supplies unlimited satisfaction only on the basis of the

representationally suppressed killing of other nonhuman animals, as well as asserting that "pets" have food preferences that align with those of their owners – they are enrolled as unwitting co-producers of the discursive terrain of Fig. 1. If Weiner Kingdom is a version of the Land of Cockaigne, it is a fraud, one in which nonhuman subjugation continues unabated and unrecognized even while it welcomes valorized nonhumans into its utopian world. Furthermore, the dogs' hallucinatory departure from reality dramatizes their irrational inability to control their appetites, contrasting with rationality as the defining characteristic by which human exceptionalism is culturally asserted and which legitimates the human control of "pets."

It is difficult to assign the "meat" in Weiner Kingdom to any specific species due to its generic appearance in the factory scene, but it is notable that species commonly butchered to produce sausages such as cows are absent from the film. Predatory threat toward nonhuman animals is only represented *between* nonhuman species, not from humans, notably by a domesticated hawk named Tiberius toward Gidget, a female Pomeranian who is romantically attracted to Max. As a dog, Gidget avoids the risk of reminding the audience of the fates of species conventionally consumed by US audiences. When meeting Gidget, Tiberius struggles to suppress his "killer instinct":

> 'You're sweet too [. . .] but not too sweet. There's also a salty gamey thing going on [. . .] You're a very thoughtful food. Food? I didn't say that. I said friend.'

Tiberius succeeds in asserting self-control as he increasingly acknowledges Gidget as a fellow subject rather than an object/prey, according with the audience's pre-existing disposition to afford some measure of subjectivity to dogs. The threat to Gidget is defused and exploited for comic effect. However, a more critical reading is possible: Tiberius could be argued to model the enduring affective dividend from constructing nonhuman animals as "friends," usurping the transitory pleasures of constructing them as "food." This more critical reading opens up a path toward restoring childhoodnature, as against the use of nonhuman animal representations to reassert their radical difference and distance from the child viewer as "types" in Fig. 1. Such a reading is tenuous though, as *Secret Life* as a whole asserts the normality of encountering nonhuman others primarily as genetically manipulated, denatured, subordinate companions, in human-dominated urban space.

Despite the absence of representations of living cows or chickens, the film does include a pig character named Tattoo as one of the "flushed pets." Tattoo is so named because "I lived in a tattoo parlor, the trainees used to practice on me. Until they ran out of space." One of the tattoos alludes to the fate of the majority of "domesticated" pigs: "right rump" is tattooed onto Tattoo's backside, which may suggest his relegation to the killing zone given the exhaustion of his usefulness to the tattooists. Other than this, his unusual former life in a tattoo parlor repositions him *away* from the southeast of Fig. 1 and therefore away from associations with

sausages that might disturb his promotion to the northeastern region as a character. That is, Tattoo is not given a backstory of escape from a factory farm or slaughterhouse, which would force audience confrontation of the objectification of real-world pigs, much as *Babe* achieved. Tattoo is a vengeful "flushed pet" because of his misuse in an entertainment context, if we interpret the use of tattoos in contemporary urban contexts as primarily driven by the construction and performance of identity through consumption practices. He shares this position as an "entertainment" animal (albeit a particularly lowly one) with Snowball, who recalls being "a magician's rabbit" when asserting that all of the "flushed pets" have "suffered at the hands of man" in a speech to Max and Duke: "[. . .] humans say they love us. But then they turn around and throw us out like garbage." Snowball's anger is depicted as justified, albeit exaggerated, and thereby the message is reinforced to the audience to treat "pets" well and to eschew their reductive positioning as objects of "entertainment," but decidedly not to forgo "pet-keeping." There is an irony in the CGI characters being created precisely so as to entertain, and of course the entire film reasserts how "entertaining" "pets" are for their human companions, albeit in conditions of domesticity rather than as unwilling laborers for tattooists or magicians.

This is compounded by the portrayal of the violent "wildness" of the "flushed pets" and, by implication, of real-world animal liberationist activism. Snowball first appears engaged in direct action to rescue his colleague Ripper, a bulldog, from the Animal Control van in which Max and Duke are also imprisoned. After effecting the rescue of Ripper, Snowball excitedly outlines his ideology: "The liberation has begun! Liberated forever! Domesticated never!" He goes on: "We are flushed pets, thrown away by our owners, and now we are out for revenge. It's like a club, but with biting and scratching," and later, "long live the revolution, suckers!" Max implores Snowball to "take us with you," but Snowball resists: "I don't think so, pets. Yeah you got the stench of domestication all over you." Snowball later denounces Max and Duke as "leash lovers" when instructing the viper to capture them. The viper is squashed and killed in the melee as Max and Duke escape, upsetting and further enraging Snowball. It is noteworthy that the viper is constructed as monstrous, mute, and therefore killable in the film, unlike the voiced nonhuman characters. The campaign against "domestication" is therefore perpetrated by irrational, violent, embittered individuals who are ultimately pacifiable by being re-pettified and finding their place once more within Fig. 1.

In summary, *The Secret Life of Pets* reaffirms the status quo of human-nonhuman animal relations, tempered by gentle welfarist critiques of misuses of nonhuman animals for entertainment and admonishments to provide them with the love and care they deserve as "pets." The proper place for nonhuman animals in children's consciousness is as denatured subordinate companions, not as free-living beings, and definitely not as exploited, confined, and killed victims. As Max says to Duke of his erstwhile owner (an elderly man who they discover had passed away rather than abandoned Duke to the pound), "of course he liked you, he was your owner." Without their "owners," nonhuman animals are depicted as being at risk from regression to violence and irrationality. The duty

incumbent upon humans is to attend to their duties as civilizing carers, uplifting their companions into a sentimentalized domesticity. It is through this assertion of a civilizing duty that childhoodnature is subverted, as human ontology is constructed as removed from nature, exclusively occupying the northwestern terrain of Fig. 1.

The Jungle Book

Synopsis

The Jungle Book (Favreau et al., 2016) is a CGI remake of the famous 1967 Disney animation and adaptation of the 1894 story by Rudyard Kipling. The film traces the coming of age of Mowgli, an orphaned boy discovered abandoned by Bagheera, a panther. Bagheera leaves Mowgli in the care of a wolf pack, who raise him as one of their own. The pack and the other animals are menaced by the tiger Shere Khan, and it falls to Mowgli to lead a resistance against and finally overthrow him. Unlike the 1967 version, the 2016 film ends with Mowgli rejecting a return to a human village after vanquishing Khan and choosing to stay with the other animals instead, overtly asserting childhoodnature in a way that none of the other films analyzed above do.

Analysis

The realistic aesthetic of *The Jungle Book* makes it visually distinct from the more cartoon style of the other four films, albeit a realism undercut by anthropomorphism such as the use of human language by some nonhuman characters and fantasy elements, such as the gigantic size of the orangutan antagonist King Louie. The film does however share a theme of problematizing and civilizing predation. All four films tackle the issue with (sometimes comically) monstrous constructions of predation: the regressively "savage" carnivores in *Zootropolis*, the viper and Tiberius the hawk in *The Secret Life of Pets*, the deep-sea angler fish in *Finding Nemo*, the squid in *Finding Dory*, and most threatening of all, Shere Khan the tiger in *The Jungle Book*.

Shere Khan is constructed as a moral threat to the "law of the jungle" because of his pursuit of power as an end it in itself, exemplified in the charge leveled at him by Raksha the wolf, Mowgli's adoptive mother: "Hunting for pleasure, killing for power." For the other hunters, predation is civilized by the jungle law which can suspend carnivores' right to hunt in certain circumstances. For instance, the law dictates that "hunting is forbidden" at the "peace rock," a watering hole where all species can gather and drink free from the threat of attack. Khan is a transgressor of this natural law and is also revealed as being the killer of the infant Mowgli's human father. Raksha's indignation at Khan signals the wolves as more civilized hunters, though their own hunting also depends on an othering process that is less obvious to the audience in that it does not involve the explicit denial of subjectivity that Khan's degendering of Mowgli accomplishes. For example, early in the film the wolves want to "get the deer" and suggest, "let's go chase some mice." These predatory instincts are used to highlight Mowgli's difference: "I realise you weren't born a

wolf, but couldn't you at least act like one?" Mowgli's liminality is set in motion here, not quite in place within the wolf pack, but also estranged from human society – childhoodnature is a problematic construction. The deer and mice share no such liminality of course; they are othered as prey by the wolves through being massified and undifferentiated. Neither species are granted anthropomorphic subjectivity in the film, lacking voices, names, or individual characters. *The Jungle Book* shares this construction of herbivorous "prey" animals with *The Lion King*, most clearly in the strikingly similar stampede scenes in each film. In the latter, Simba the cub narrowly evades being trampled by stampeding wildebeest; in the former Mowgli escapes from Khan by jumping onto and riding a stampeding buffalo. No members of either herd speak, bear names, or are constructed as distinct individuals with a narrative trajectory in the films. It is examples such as these which typically attenuate the subjectivity of herbivorous, or we might say vegan, animals relative to more charismatically constructed carnivores or omnivores in children's films. As discussed above, the subjectivity of carnivores may also be attenuated in order to other them as threats to human or nonhuman protagonists, but their very threat still represents a greater degree of agency than massified herbivorous herds. The very capacity to threaten or consume others is itself a marker of subjectivity; that is, the exercise of power is represented as the capacity to both act as an autonomous subject and to constrain the autonomy of others.

Predation also assumes a monstrous and both literal and metaphorical constraining form in the python character Kaa (it is Kaa who reveals Khan's responsibility for his father's death to Mowgli). Khan's anthropomorphic construction is heavily gendered, relying on masculine constructs of physical strength, bravado, and intimidation. The female Kaa is contrastingly anthropomorphized by stigmatized feminine attributes of emotional manipulation and seductive deception. That is, while Khan presents a threat of overwhelming force, Kaa presents a threat of psychic control. Mowgli is rescued from Kaa's coils by Baloo the bear, a beneficent representative of masculine physical strength who takes on a role as Mowgli's educator. In Baloo's company, the film takes on a comic tone, with Baloo shown eating pawfuls of "funny ants" and informing Mowgli that bees make honey "just for you." The denial of subjectivity to insects is unproblematic in the film, corresponding with their lowly status in general.

From the discussion so far, it can be argued Khan can stand as an allegory for human environmental despoliation and the self-interested disordering of nature, while Mowgli's resistance of Khan allegorizes a model of human stewardship of nature that maintains or restores order. Khan's hunting is excessive and therefore *evil*, which is subtly indicated in his degendering of Mowgli when he utters, "Mowgli? They've given *it* a name" (emphasis added). Here Khan employs a typical trope of objectifying discourse by degendering the "other." The use of "it" is likely to jar with a human audience used to being acknowledged and addressed as gendered subjects. Khan's disparaging insult resonates with the audience indignant at being discursively positioned eastward in Fig. 1 by proxy or in other words rudely dethroned from the privileged northwestern corner. The film therefore dramatizes a

struggle by Mowgli and his nonhuman allies to reassert their subjectivity and autonomy in opposition to Khan's rule.

On the surface, Mowgli therefore invites audience identification on the basis of constructing (some) nonhuman animals as "friends" and agential subjects of responsibility to an ordered and harmonious (albeit still predatory) nature and thereby acknowledges and amplifies childhoodnature. The film simultaneously invites deidentification with Khan's willingness to use violence and intimidation to objectify and subjugate humans and other animals. In other words, the film promotes a notion of humans (especially children) as partially enmeshed within nature, rather than wholly distanced from it in order to dominate it, as embodied in Khan's tyranny. Here the film comes up against an historical tension between the more straightforwardly demonizing construction of Khan as a "man-eater" in Kipling's original story and the recent deployment of tigers as one of the most charismatic endangered species in conservation discourses. The construction of Khan in *The Jungle Book* is therefore somewhat against the Western cultural grain, but arguably a quasi-demonic Khan is a necessary fictive construct to sustain not only the dramatic narrative of the film but also to justify its subtle promotion of the human stewardship of nature. In other words, Khan has to be constructed as an "unnatural" tiger who transgressively exits the southwestern quadrant of Fig. 1, in order to provide a foil for the positive construction of Mowgli as nature boy.

However, the positive construction of humans as "natural" beings has limits in *The Jungle Book*. Mowgli occupies a liminal space between nature and culture, because it is his tool use, and especially his ability to wield fire that is used as a marker of human exceptionalism in the film. His tool use is problematized by other animals in the film and denigrated as a human "trick." His adoptive wolf-mother Raksha admonishes Mowgli's tool use, and Bagheera later instructs him that his "tricks" are out of place in the jungle. However, it is this exceptional ability of tool use that enables Mowgli to act as a savior and protector of the other animals terrorized by Khan. It is also possible to read Mowgli's tool use as a proxy for human intelligence and reasoning capacity. For example, Mowgli demonstrates the value of his "tricks" by using ropes to rescue an infant elephant from a pit. This impresses Bagheera, who is earlier shown revering elephants. Despite the vaunted intelligence of real elephants though, elephants in *The Jungle Book* lack speech or individual characterization. They, and in particular the infant, are thereby constructed as more helpless and dependent on Mowgli as their human savior. Baloo uses Mowgli's "tricks" to admonish Bagheera; "you gotta let him be what he is." This is also highlighted in the contrast between Mowgli's ontological fulfillment and the attempted ontological transgression of King Louie and his army of other nonhuman primates. Louie uniquely possesses the capacity for human speech among his army, with his followers only being able to imitate speech. Nonhuman primates, Louie partially excepted, are impoverished subjects relative to humans. Louie envies human exceptionalism and captures Mowgli expressly to extract the secret of controlling fire from him, which Louie believes will give him access to the "top of the food chain." Louie apes human exceptionalism (pun intended) and is thereby in denial of his own nonhuman ontology, which makes

him monstrous in the film. His monstrosity is represented by his Kong-like gigantism and a lust for power that matches Khan's but takes a different route – appropriating the human other and overcoming species-specific limitations, rather than overwhelming the human other with superior physical prowess. When Louie is frustrated though, he regresses to "animalistic" violence to assert his will, demonstrating his unworthiness of the human "throne" in the northwest of Fig. 1. Mowgli's worthiness is ultimately demonstrated by his use of cunning rather than violence to defeat Khan, following Bagheera's injunction that, "you're not a wolf, fight him like a man." Mowgli first attempts to use fire to thwart Khan, but in doing so accidentally sets the jungle aflame, inspiring fear in the other animals. Mowgli tosses aside his flaming torch, symbolically rejecting an imperial construction of human ontology that seeks the domination of nature. The narrative journey of Mowgli is therefore the fulfillment of a more nuanced human ontology, one that is tempered by his civilized and compassionate use of his species-specific power relative to Shere Khan's megalomaniacal use of his. Khan perishes in flames having been lured by Mowgli onto a tree branch that cannot bear his weight, but his grisly death is therefore framed as a just punishment for his tyranny.

In summary, *The Jungle Book* disturbs some of the terrain of Fig. 1, only to at least partially restore it by the end of the film. This restoration is in accordance with contemporary norms of human responsibility to care for the natural environment and to recognize our involvement with it (but not our full inclusion within it), rather than to reinforce our radical separation from it. Different types of animals, humans included, are put back in place in terms of Fig. 1, albeit *somewhat* closer together. The relative realism of *The Jungle Book* from our sample of four films makes it simpler to transpose subjectivity from the characters to their real "wild" counterparts. But this is also a less risky endeavor as the film does not directly confront human exploitation of "farmed" animals or others confined to the southeastern killing zone. Shere Khan is an aberrant and excessive subject, arguably proxy for the excesses of capitalist exploitation of nature, but the rewriting of the original Kipling story does not extend to critiquing the destruction of jungle habitats for "livestock" ranching (see Nibert, 2013). King Louie is also an aberrant and excessive subject, seeking the usurpation of human supremacy and punished for his temerity. But again, an opportunity for a critical commentary on human exploitation of nonhuman primates is missed. The contrast between the justice of the ape uprising against human violence in the recent sequence of *Planet of the Apes* remakes and Louie's moral turpitude is striking. Mowgli by contrast represents an enlightened subject, using his power for the good of others, but still doing so by ascending gradually toward the northwest from the southwest of Fig. 1. The shift is not as abrupt in the 1967 cartoon, where Mowgli is so entranced by the sight of a human girl that he ultimately finds it straightforward to exit the jungle in favor of the human village (Stewart & Cole, 2009). Growing up is no longer such a simple matter of eschewing "nature" and the companionship of other animals as it was in 1967. However, neither is childhoodnature straightforwardly recognized and celebrated: it is arguably still a matter of embracing an ontology of human

exceptionalism and a civilizing (rather than dominating) mission as regards "nature" and the other animals who inhabit it.

Conclusion

The five films analyzed in this chapter make for an interesting set of comparisons and contrasts, as despite their broadly similar financial success and superficial genre similarities, each populates the conceptual map in Fig. 1 quite differently. *Zootropolis* positions nonhuman animals as full agents in urban space, that is, in an environment that is recognizably "human" precisely because it is denatured. The replacement of humans with other animals in what remains a quasi-human urban environment in the film makes it easy to read the nonhumans as proxies of human characters, with accompanying moral messages about civilized human conduct. Among the four films, nonhuman animal characters therefore come closest to the northwestern corner of Fig. 1 in *Zootropolis* by virtue of their maximal anthropomorphism, but thereby audience sensibility toward real nonhuman animal is arguably attenuated: human audience identification with the nonhuman characters is primarily engendered by the modeling of moral lessons for the transcending of human differences, rather than for the envisioning of an interspecies community. *Finding Nemo/Dory* positions nonhuman animals primarily as "wild" inhabitants of "nature," such that they tend to be presented as out of place in captive environments. They are therefore afforded greater subjectivity than is typical for the southwestern region of Fig. 1, but primarily again through means of their anthropomorphizing. *The Secret Life of Pets* is the most conservative in its positioning of animal companions as quasi-subjects who willingly submit to their own domestication. It therefore reproduces the positioning of "pets" in Fig. 1. Despite the use of anthropomorphism to afford subjectivity to some of the film's nonhuman characters, that subjectivity remains in thrall to human control. Finally, *The Jungle Book* differs from its Disney cartoon progenitor by "rewilding" the human child Mowgli to some extent and thereby collapsing some of the conceptual distance between humans and (some) other animals. It therefore does the most to encourage childhoodnature as pivotal to self-identification among its young audience and therefore to dethrone humans from the northwestern imperial seat of Fig. 1. It envisions an interspecies community with human participants. However, human exceptionalism remains present in the film's narrative, and Mowgli's identity remains liminal, with "animal"/natural and "human"/cultured worlds irreconcilably bifurcated despite his personal choice to remain in the jungle – in other words, Mowgli cannot take us all with him, and childhoodnature is exoticized rather than normalized.

In this analysis, we hope to have drawn attention to the importance of mass media representations in the socialization process as regards childhoodnature. In our sample of movies, little progress is made toward a reconciliation of children with "nature," insofar as asserting a shared animal nature between humans and nonhumans. Such a recognition might help to reconfigure the socialization process

such that human humility and animal kinship with other species is fostered in childhood, rather than human exceptionalism. Instead, exploitative relations are variously reproduced, obscured, or at best left uncritically accepted. However, despite the problematic features of *The Jungle Book*, the updated character of Mowgli takes us closest to a sustained critique of the status quo through his ultimate choice of "nature" over "culture." In its modeling of interspecies companionship and community, *The Jungle Book* at least opens the hope for a future evacuation of the conceptual map. Mowgli's life outside of human culture suggests that it is (speciesist) culture itself that is responsible for our estrangement from other animals and from our own animal natures. This is not to call for a primitivist manifesto but for a critical awareness of the profound damage that is done by denying childhoodnature and denaturalizing children through the socialization process.

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Re-examining the Human-Nonhuman Animal Relationship Through Humane Education

55

Maria Helena Saari

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Abstract

In the time of the Anthropocene, the human species' destructive effect on the planet and other nonhuman species is evident. The socialization process of children plays a significant role in the preservation of a speciesist Western society, as the exploitation, captivity, and instrumental use of nonhuman animals are normalized through the reproduction of speciesist messages in the educational setting, through children's media and our language use, which all reinforce the idea of nonhuman animals as *the other*. Speciesism, the underlying ideology that excludes nonhuman animals from the sphere of moral concern and legal protection, is dependent on its reproduction, just as other dominant ideologies. The exploitation of nonhuman animals and human-nonhuman animal hierarchy is further normalized through environmental education and welfare education and the notion of the *humane* use of nonhuman animals. Can our treatment of nonhuman animals be characterized as *humane*? What does it mean to be *humane*? This chapter examines how humane education can refute speciesist messages, as it offers children the tools to identify and critically assess

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interconnected webs of oppression and thus re-examine the human-nonhuman relationship.

Keywords
Humane education · Speciesism · Human-animal relationship

Introduction

Nonhuman animals undoubtedly play a central role in the lives of humans; we use them for food, entertainment, and sports, as tools for research and trade them as mere commodities. The exploitation of nonhuman animals is legitimized by their legal status as property – objects for humans to own and use as they see fit. Humans have granted themselves dominion over the planet and all other species, creating a hierarchy in which humans are the definition and measure of everything worthy. This anthropocentric worldview, what Bekoff (2013) considers our "rampant anthropocentrism" can be seen to act as a wall between humans and all other species and the natural world, as we not only ignore nature out of convenience, but in Western society many are also physically removed from nature, reinforcing our mental disconnection and detachment from other species and the destructive effects of our actions. The destructive effects of our actions has led some scientists to call this era the Anthropocene, the age of man, defined by deforestation, water and air pollution, environmental destruction, species extinction, and animal exploitation on an immense scale. Animal and environmental protection organizations have long campaigned for greater protective measures, but the baby steps of legal reforms come too slow and too late and fail to challenge the morality of animal exploitation.

Due to the various, involuntary, roles nonhuman animals have in our lives, the consequent relationship we have with them is of great complexity and controversy. Goodall and Bekoff (2003, p. 18) aptly identify how Western societies appear to be confused about the way we think about nonhuman animals, as many of us are unable to broaden our emotional connection and compassion from our pets to other nonhuman animals. Francione (2004, p.108) rightly echoes this concern, calling our relationship with nonhuman animals one of "moral schizophrenia," where we claim to care about nonhuman animals, but our actions contradict our words. How has this morally schizophrenic relationship come to be, where we claim to care about nonhuman animals, but shut our eyes to their plight, and allow exploitation to continue?

Our worlds are entwined with those of other species in numerous ways each day even though many of us do not have physical encounters with nonhuman animals. This seemingly invisible entanglement is the most prominent of all, as it encompasses exploitation, captivity, violence, and death on a massive scale, and the most common "interaction" with nonhuman animals can be seen to be when we are eating them (Adams, 1991). Our lives are abundant with representations of nonhuman animals and the human-nonhuman animal relationship is constructed from a young age. Since childhood, many of us are exposed to a variety of representations through

different media, but have little contact with real nonhuman animals. The limited connection we have with nonhuman animals is restricted to institutionalized contexts, which we erroneously see as normal and natural, such as the confinement of nonhuman animals in zoos.

The way in which children relate to nonhuman animals (Melson, 2005; Myers, 2007; Cole & Stewart, 2014) and the role education can play in challenging the dominant narratives of human-animal relations in society (Pedersen, 2004, 2010; Goodall & Bekoff, 2003; Caine, 2009, 2015; Weil, 2004, 2016) has recently been increasingly emphasized by scholars from various fields, nonetheless research on these issues has been limited. Goodall and Bekoff (2003) identify the significant potential children have in making a great difference in society, which is often overlooked by adults, echoed by humane educators and researchers (Jalongo, 2004; Weil, 2004, 2016; Caine, 2009, 2015). Pedersen (2004) recognizes the role schools play in normalizing the objectification of nonhuman animals, as they are framed in an anthropocentric and hierarchical discourse, and highlights the need for schools to re-examine their speciesist curricula. Caine (2009, 2015) similarly identifies how current pedagogy and curricular design teach children an anthropocentric worldview where nonhuman animals and the environment are viewed as mere resources for human use, stressing the need for a new didactic to shift the existing paradigm.

This chapter looks at the potential of humane education (HE) in offering a nonspeciesist lens through which to critically examine our interactions and relationships with nonhuman animals. Echoing the principles of interspecies education (Andrzejewski, Pedersen, & Wicklund, 2009), HE offers a comprehensive framework to assess the interconnected forms of social justice and oppressive systems and can instigate a move away from the dominant, sometimes hidden, beliefs of society.

Teaching Children to View the World Through a Speciesist Lens

It can be argued that the instrumental use of nonhuman animals, their captivity, and the idea of "happy" or "humane" exploitation is normalized through a speciesist socialization process, where children are taught to give different value to nonhuman animals based on species membership. The way we are socialized to see the world has great influence on how we act in it and "is broadly responsible for re-creating the social and economic processes that keep people and animals in oppressed positions" (Nibert in Torres 2007, p. 4). Children learn to view nonhuman animals as *the other,* which serves to legitimize their oppression and distance humans from other species. Nonhuman animals are categorized according to their use and man-made labels and social positions can grant them a life of pampering as a pet or condone them to a life of torment in a laboratory or factory farm, or a fate of hounding when considered a pest. By creating labels and categories, children are encouraged to view nonhuman animals according to their use, resulting in the normalization of their exploitation and instrumental use. For example, *circus animal* suggests a natural category of tigers, while *farm animals* and *zoo animals* create false categories of nonhuman

animals where children grow up to view the incarceration of nonhuman animals in zoos as normal and legitimize our use of nonhuman animals for food (Dunayer, 2001, p. 8).

Cole and Stewart (2014) identify how children grow up to view nonhuman animals as either friends or objects of use. Although this distinction is twofold, it is far from simple. The difference between friends and objects of use is not always clear-cut and the boundaries between different nonhuman animals make our relationship with nonhuman animals confusing. Caine (2015, p. 5) is critical of the invisible line we draw between different species and our moral concern, calling it a monumental social hypocrisy and a conflict of moral and ethical reasoning. We deny the commonality between species, such as pigs and dogs, treating one with kindness and companionship and condemning the other to a life of pain and death for our palate pleasure.

It is doubtful that children are born speciesist and that these man-made categories are inherent to them; instead it can be argued that the categorization of nonhuman animals is learned through an anthropocentric and speciesist socialization process. How do children learn to view the world through a human-nonhuman animal hierarchy? How do we create a distinction between nonhuman animals as our friends and those who are not? Language is a crucial tool we use to teach children about nonhuman animals and it can be used to promote and enforce certain beliefs. Speciesist views are reinforced through our language use, which shapes our relationship with, and our attitude towards, nonhuman animals. We use language to classify and denigrate nonhuman animals and to distance humans from other species. Language helps a child make sense of the world as we begin to label the things around us in order to understand them. However, Goodall and Bekoff (2003, p. 41) argue that by labeling and categorizing the world around us, we simplify the diversity of living beings and the natural world. The problem of language begins with the very definition we give the word *animal,* as definitions, such as "any such living organism other than human" (Oxford Dictionaries, n.d.) isolates humans from other species and legitimizes "a human monopoly on moral and legal rights" (Dunayer, 2001, p. 2). By differentiating ourselves from all other species, we highlight their presumed *otherness*. Through our language use, we classify nonhuman animals as objects by using the pronoun *it*, erasing their gender, and by speaking of other nonhuman animals as one species, we turn "unique individuals into a generic species representatives" (Dunayer, 2001, p. 6). Nonhuman animal terms are also used to insult or denigrate humans, which further legitimize the exploitation and oppression of nonhuman animals, as "negative animal idioms normalise and trivialise violence towards animals" (DeMello, 2012, p. 285). Language portrays nonhuman animals as lesser beings and characteristics are imposed on different species: criminals are labeled *animals*, someone crazy becomes *a bat*, cowardly behavior makes someone *a chicken*, to say someone is stupid we call them *a birdbrain*, and to call someone *a pig* connotes gluttony or dirtiness.

Not only is language a dangerous tool, but the false imagery children are exposed to through stories, cartoons, movies, toys, and advertisements play a key role in shaping the way children view and connect with nonhuman animals. A prime of

example of false imagery is the representation of nonhuman animals used for farming purposes. Children's storybooks and toys provide false idyllic portrayals of old-fashioned farms where nonhuman animals enjoy their lives happily. Children are not encouraged to question the practice of farming; instead it is a concept that is normalized and grow up to view a farm as a natural place, never questioning whether it is acceptable to use nonhuman animals for our own purposes or understanding the reality of animals exploited on factory farms. Children's stories perpetuate the false belief that animals live a happy life, as well as the idea that they must die in order to provide us with food (Singer, 1999). Advertising campaigns for animal products replicate similar idyllic old-fashioned farm seen in children's literature, using images of happy pigs, cows, and chickens to advertise their own flesh to consumers, grossly misrepresenting and hiding the true nature of modern factory farming. Humans have claimed ownership over their representation and thus can represent them as they wish and create a narrative that serves human purposes.

Anthropocentric Education

Education functions as a subsystem of the total social system, transmitting knowledge that meets the needs of the society, not to address the needs of an individual. Despite the role of education in the upkeep of dominant ideologies, it can also be used to "initiate social changes by bringing about a change in outlook and attitude" (Patil, 2012, p. 205). Environmental education and welfare education have largely failed to address the "animal question" limiting their approach and scope to solely human-centered and speciesist views of the world and have largely failed to challenge the underlying anthropocentric and speciesist values of the human-nonhuman animal relationship. Weil (2004, p. 49) aptly acknowledges how nonhuman animal issues "are generally neglected in education, even in sustainability education, environmental education, character education, social justice education, and media literacy education." While environmental and sustainability education focus on conservation efforts and environmental and climate protection, the exploitation of nonhuman animals is often overlooked, particularly nonhuman animals used for farming purposes, despite the crucial role it plays in both climate change and environmental destruction. Caine (2009, p. 10) identifies how nature is framed as a resource and "traditional environmental education often prescribes stewarding, managing and controlling nature for the sake of humankind."

Horsthemke (2009, p. 209) argues that environmental education has flourished in schools because "it has been demonstrated that its cause ultimately benefits people" where nature is framed as a resource and commodity (Kopnina, 2014), analogous welfare education, where the human-nonhuman animal relationship is framed through utilitarian discourse where nonhuman animals are ultimately represented as resources and commodities for humans. Oakley et al. (2010, p. 97) recognize the "curious silence about animals" in environmental education research and the neglect of human-nonhuman animal relations in environmental education, highlighting the importance of blurring the boundaries and fictional divides between "human,"

"animal," and "nature" and the need to question our own animality (Oakley et al., 2010, p. 90). Kopnina (2014, p. 296) identifies the difficulty in surpassing the anthropocentric focus of environmental education and the need to challenge the ethical assumption of human superiority, as even when the interconnectedness of humans and nature is acknowledged, the idea of human superiority remains.

Caine (2009) recognizes the limitations of current schooling, arguing that career building and monetary success are framed as benchmarks for becoming productive members of society, while references to the natural world and the needs of other species are practically nonexistent. The study of the natural world and other species is largely left to the natural science domain, in which humans and nonhuman animals are studied within separate discourses and value systems, establishing a subject-object relation between humans and nonhuman animals (Pedersen, 2004). This subject-object relation, however, is established long before students enter biology lessons, and the objectification of nonhuman animals is established when children are at a young age. Despite speciesist curricula, Pedersen (2004) sees the possibilities of transformation offered by education, as schools can be seen as agents in the reproduction processes of certain ideals and knowledge, and thus have the potential to critically reassess its role in mediating value messages, affirming how the relation between humans and nonhuman animals is not predetermined by force or natural order, but is entirely within the control of humans beings to change the relation. But how many want to change the relation?

The increase in public awareness of animal protection issues has led many animal protection organizations and some governmental institutions to offer forms of *welfare education*. However, welfare education endorses the idea that the exploitation of nonhuman animals is acceptable, as long as we do so in a *humane* way, perpetuating the property status of nonhuman animals and demonstrating the difficulty of educating children through an unfiltered lens. Welfare education fails to "demand that we understand the subjugated status of nonhuman animals in our society as related to or concordant with the historical reality of oppressed human groups as well as with the domination of nature generally" (Kahn & Humes, 2009, p. 181). Welfare education assumes human dominance over other species and thus portrays our use of nonhuman animals as natural. The idea of the *humane* use of nonhuman animals is an oxymoron and it is highly debatable whether our treatment of nonhuman animals be described as *humane*. The word *humane,* originally defined as qualities pertaining to a human being, is also defined as:

- showing kindness, care, and sympathy towards others, especially those who are suffering (Cambridge Dictionary, n.d.)
- having or showing compassion or benevolence (Oxford Dictionaries, n.d.)

Showing kindness, compassion, and sympathy may be true for a small percentage of nonhuman animals, such as some we categories as pets, but for billions of nonhuman animals who suffer and die at the hands of humans, the idea of showing kindness, sympathy, or compassion is an implausible concept. Torres (2007, p. 26) points out that *humane* forms of exploitation as when "we use another being instrumentally, we

have denied that being its right to exist on its own terms, whether that being is human or non-human." Francione (2004) argues that if we are to make true our claim to take nonhuman animal interests seriously is to accord them basic right not to be treated as things and that sentience, subjective awareness, is the sole factor that matters.

Humane Education

The earliest form of HE, the Band of Mercy was formed in Britain in 1875 with an anthropocentric focus, as the aim of promoting kindness towards nonhuman animals was rooted in the idea that cruelty towards nonhuman animals transferred to inhumane acts towards humans (Brake & Demoor, 2009). Members of the Band of Mercy, formed in the United States in 1882, pledging to try to be kind to all living creatures and try to protect them from cruel usage (Unti & DeRosa, 2003). The educational focus of the animal protection movement normally centered on acts of individual cruelty and failed to address socially sanctioned forms of animal abuse (Unti & DeRosa, 2003, p. 32). HE has since extended its scope from its original *kindness-to-animals ethic* focusing on compassionate treatment of companion animals to a more intersectional approach looking at social justice issues as an interconnected web of oppression (Caine, 2015).

Although HE is often used as an umbrella term to cover welfare and responsible pet ownership programs, it extends beyond these approaches. Many HE programs approach the human-nonhuman relationship through a posthumanist viewpoint, placing "all creatures, both human and nonhuman animals, in a non-hierarchical web" (Morris, 2015, p. 43), unlike welfare education. Whilst welfare education promotes the idea of the *humane* use of nonhuman animals, HE aims to uncover the immorality and interconnectedness of exploitative practices, aiming to demonstrate how "our daily lives are inextricably connected to institutionalized brutality, injustice, and environmental devastation" (Weil, 2004, p. 49).

One of the objectives of HE is to widen children's circle of empathy, leading children "to embrace what was previously categorised as *other*" (Jalongo, 2014, p. xvi) and to build a generation of *solutionaries* – people who identify inhumane, unsustainable, and exploitative systems that affect people, nonhuman animals, and the Earth and develop practical, effective solutions to replace these systems with ones that are restorative, healthy, and just (Weil, 2016, p. 5). Caine (2009, p. 9) highlights the importance of empathy, as it is the bridge to compassion and understanding the connections we share with nonhuman animals, stating that "if we can empathize with the experiences of other living beings and place ourselves in the shoes (or paws, claws, fins) of a suffering other, we can begin to develop compassion for this *other.*"

In many schools, the discussion of social issues or anything controversial has become taboo (Weil, 2016, p. 18) and many educators lack the necessary training and resources to handle controversial and emotive issues in the classroom, and HE is sometimes criticized on the assumption that social justice issues are too complex or abstract for young children to comprehend, underestimating the intellect and

emotional intelligence of children. However, according to Jalongo (2014, p. xi), the thinking of adults if frequently "too limited and developmentally inappropriate to communicate effectively with the very young" and often adults can be seen to stand in the way of educating, as teaching children kindness to all living beings requires a change in perspective of adults and rethinking speciesism connects too closely to the reality of curricula (Oakley, 2011, p. 10) and our everyday lives.

HE aims to provide accurate information that is hidden from school curricula and popular media, covering a vast range of topics, including the exploitation of nonhuman animals, genetic engineering of food, aquaculture, factory farming, species extinction, resource depletion, and deforestation. It also tackles social injustices including racism, sexism, and homophobia. HE reflects the proposed curricula of *interspecies education*, an approach based on compassion and justice focusing on the interconnectedness and interdependence of all life forms on Earth (Andrzejewski et al., 2009). HE topics can be infused into any subject area, for example, a mathematics lesson on percentages can look at the rates of extinction and provide data on the number of nonhuman animals killed each year in different geographical settings because of hunting, disease, or agricultural expansion (Caine, 2009). Students are encouraged to critically assess how our choices are linked to the suffering of others and reassess practices we are taught to view as normal, as well as re-examine the man-made categorizations of nonhuman animals. HE can help students assess the biased and carefully framed narratives behind corporate funded materials and critically think about what information is not included in school curricula. For example, students can uncover the biases and motivations behind dairy advertising in schools and other corporate funded materials. HE promotes c*uriosity, creativity, critical thinking* with the aim of teaching children "how to scrutinize information with a critical eye and to uncover the hidden links between our product choices and the suffering they may cause to others" (Weil, 2004, pp. 15).

HE aims to nurture *reverence*, *respect*, *and responsibility* to encourage positive action and choices that benefit nonhuman animals, the earth, and other humans. Visits to sanctuaries and refuges are an important part of HE programs, allowing children to have direct contact with nonhuman animals and learn about where they have been rescued from and why these exploitative systems exist. They also allow children to connect with nonhuman animals on an individual level, enforcing the fact that they are sentient beings with individual needs and interests. Visits to sanctuaries are an alternative to the usual visits schools organize to zoos, aquariums, petting zoos, or circuses, which maintain the status quo and enforce a speciesist worldview, enforcing the divide between the human and nonhuman and normalizing the captivity of nonhuman animals. The HE approach introduces children to a range of challenging issues that may seem overwhelming and offering positive choices, and giving examples of people who have made a difference, students see that they have the power to instigate change that positively affects the lives of nonhuman animals, the environment, and humans. Caine (2009) highlights the value of introducing real-world topics into lessons as it can instigate discussion and critical thinking about the ways in which human behavior contributes to species extinction and what can be done about it. Once students are introduced to real-world topics and identify the

oppressive systems and how we contribute to exploitation, they can identify ways in which they can make a difference.

HE programs are tailored according to age group and take shape in many forms, including in-classroom instruction, visits to animal shelters and refuges, camps, animal protection clubs, books, and videos, and antispeciesist children's literature, and various animal protection organizations, and HE providers offer tailored lessons plans. Despite an increase in HE programs, there is limited research on its effects. According to Weil (2004, pp. 43), secondary school students who take part in humane education are less susceptible to media messages, become critical thinkers, take more responsibility for their actions, have increased self-confidence and respect, demonstrate leadership skills, develop more compassionate attitudes towards others, and are empowered to make a positive change. HE programs have reportedly demonstrated an increase in a child's empathy towards nonhuman animals (Nicol et al., 2008) and an increased awareness on environmental issues, which have prompted schools to create different committees and programs tackling issues such as waste and nonhuman animal protection. According to Weil (2004, p. 43), secondary school students who take part in HE are less susceptible to media messages, become critical thinkers, take more responsibility for their actions, have increased self-confidence and respect, demonstrate leadership skills, develop more compassionate attitudes towards others, and are empowered to make a positive change. HE has primarily focused on younger learners, as children are more flexible in their habits and attitudes (Jalongo, 2004), but the importance of HE reaching older students and infusing HE topics into higher education and teacher training has been highlighted by Gómez Galán (2005) among other scholars.

Conclusion

If children are the future, what should we teach them? Given the current state of ecological destruction and the rising number of nonhuman animals exploited, it is crucial to re-examine the values that govern society and re-examine the human-nonhuman animal relationship starting from a young age. Although the changes we now make will come too late for the millions of nonhuman animals who now suffer and the countless species already extinct, it can help spare the suffering of others (Goodall & Bekoff, 2003). Weil (2004) believes that by educating future generations to be compassionate, we can change the disastrous path we are on and help prevent future suffering. However, the prevention of future suffering depends on reshaping the relationship we have with nonhuman animals and the natural world. HE takes environmental education a step further, extending on the prior's failure to integrate nonhuman animal advocacy as a serious environmental issues (Kahn & Humes, 2009). HE offers a holistic approach that tackles the interconnected injustices and critically questions the frameworks currently embedded in the socialization process of children and in Western society and offers a platform for cooperation between environmental and animal protection movements through its intersectional approach.

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The Flat Weasel: Children and Adults Experiencing Death Through Nature/Culture Encounters

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Debra Harwood, Pam Whitty, Enid Elliot, and Sherry Rose

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Abstract

The children's storybook, the *Flat Rabbit*, by Bárdur Oskarsson, explores complex ethical dilemmas experienced by the dog and rat after they discover the rabbit flattened on the road. Similarly, in our collective experiences with children and educators in three nature programs across Canada, we take up complex

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ethical dilemmas experienced by our unanticipated encounters with various deaths in the outdoors, including those of baby squirrels, a raccoon, and an owl. Common world (Latour. *The politics of nature: How to bring the sciences into democracy*. Cambridge, MA: Harvard University Press, 2004) theoretical framing helps in positioning the child as an "indivisible part of the natural and more-than-natural world." This natural and more-than-natural world provides the impetus for children's development of understanding and working theories related to sensitive concepts such as death (Mankiw & Strasser. *Young Children, 68*(1), 84–89, 2013). We identify and examine ideologies and practices around death that continue to occupy early childhood spaces (Haraway. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, UK/London, England: Duke University Press, 2016). In reimagining child-nature-animal entanglements, we posit that "staying with the trouble" (Haraway. *Staying with the Trouble: Making Kin in the Chthulucene*. Durham, UK/London, England: Duke University Press, 2016) disturbs sedimented embodied ideologies so that we might listen and foster a "practice of becoming witness" (Rose & Chrulew. *Extinction studies-stories of time, death, and generations*. New York: Columbia University Press, 2017). We are working toward a more performative, storied, and experimental way of being and learning together with children and animals, "learning to stay with the trouble of living and dying in response-ability on a damaged earth" (Haraway. *Staying with the trouble: Making Kin in the Chthulucene*. Durham, UK/London, England: Duke University Press, p. 2, 2016).

Keywords
Child-animal relations · Common worlding · Co-mattering · Early childhood education pedagogy · Death

Introduction

In this chapter, our aim is to think together across the country about encounters with deaths of animals that children and educators have experienced in natural environments such as forests, shorelines, and bluffs. These encounters provoke us to trouble the Anthropocene era and move toward that of the Chthulucene which as Donna Haraway (2016) articulates as "learning to stay with the trouble of living and dying in response-ability on a damaged earth" (p. 2).

Facing a dead owl, a dead raccoon, and the gaze of the living weasel brings educators and children to questions of the vulnerability of all life. How might we pedagogically "stay with the trouble" to explore the affect, emotion, and child-animal co-mattering and explore what it means to be kin (Haraway, 2008, 2010)? By paying attention to the ways in which human/more-than-human entanglements unfold, we explore the connectedness between animal and child, realizing that each species is intricately linked to the other. New narratives are possible, narratives that account for ideas of children "becoming with" the whole world (Haraway, 2008),

where humans are considered "members of multispecies communities that emerge through the entanglements of agential beings" (Rose et al., 2012, p. 4).

Much Western thinking has positioned humans as placing culture over nature, with culture dominating (Ritchie, 2012). Death disrupts this power relation. Observing a dead vole or raccoon and watching maggots or bugs wiggle out of the animals' bodies are concrete and dramatic illustrations of the inevitable fate of all organic matter. Yet, our anthropocentric frame of reference has the effect of blocking our "sensitivity to and knowledge of the nature, blocking humility, wonder and openness in approaching the more-than-human" (Plumwood, 1999, p. 109). Here, we argue for a messier, entangled, enmeshed, intra-active, and co-shaping conceptualization of children/nature (Taylor, 2013). A common worlding framework helps to challenge human centrism and romantic notions of child innocence and purity that often separate children from nature (Malone, 2016; Pacini-Ketchabaw, Taylor, Blaise, & Finney, 2015). The framework helps in recognizing childhood as part of a situated, collective, unequal, political, ethical, messy, and unsettled world (Pacini-Ketchabaw, 2017), as well as guiding queries focused on the "ethical and political challenge of learning how to live well together and to flourish with difference" (Taylor & Giugni, 2012, p. 109).

Lenz Taguchi's (2010) "ontology of immanence" also assists here in highlighting the interdependence and interconnection of all human and nonhuman matter. She explains an ontology of immanence as meaning "that we need to go beyond the human/non-human divide, as we understand our existence as a co-existence with the rest of the world" (p. 15). Thus, as humans we do not live separate from, rather we are part of, entangled with, and enmeshed with the lives of others (both human and nonhuman) (Haraway, 2010; Taylor, 2013). Questioning the human-animal boundaries of this relational "throwntogetherness" of our world (Massey, 2005) helps further our understanding of mattering (and co-mattering) of all kin, where "to be kin in that sense is to be responsible to and for each other, human and not" (Haraway, 2010, p. 54).

Common worlding serves as a way/means of problematizing the "romantic view of childhoodnature," which is the separation of the "child" and "nature" rather than the positioning of the child as nature and the animal as nature (Malone, 2016; see also ▶ Chaps. 31, "Rats, Death, and Anthropocene Relations in Urban Canadian Childhoods", ▶ 26, "Situating Indigenous and Black Childhoods in the Anthropocene", this volume). The promulgation of the "new nature movement" (Louv, 2006; Sobel, 2013) seems somewhat rooted to Anthropocentric views entangled with nostalgia, what Dickinson (2014) calls a "fall recovery narrative." This fall recovery involves a form of reminiscing and romanticizing of a utopian past where children and nature were entwined, a problematic discourse according to Dickinson in how the commentaries have created "a blind spot to the realities of the majority of the world's children, who live in a diversity of 'childhoods'" (p. 44). Alternatively, a discourse of common worlding (Latour, 2004; Taylor, 2013) might offer means of "deliberately reposition[ing] children within the full, heterogeneous and interdependent multispecies common worlds in which we all live" (Taylor & Pacini-Ketchabaw, 2015, p. 507).

A common world framework also offers new pedagogical potentials when we stay with messy, entangled, complex, ethical dilemmas; when we stay with the

trouble, learning through specific unanticipated animal deaths, we make meaning in human and more-than-human contexts, re-narrating death and drawing out new meanings and "situated pedagogical responses" (Nxumalo & Pacini-Ketchabaw, 2017; Pacini-Ketchabaw & Taylor, 2015). How do children and children and adults together make meaning of their relationships with animals and ultimately their deaths? Like Affrica Taylor (2013) we also ask: how might we approach the relationship between childhood and nature without rehearsing nostalgic adult idealizations, sentimentalized attachments, or heroic rescue and salvation appeals?. How might pedagogies shift when we encounter animal deaths in the outdoors and knowledge is conceptualized as "being-of-the-world" (Lenz Taguchi, 2010)? For us, the animal, child, adult, material, space, place, land, experience, and so on are inseparable, and teaching and learning are enacted in the intra-action among all these facets, "the spaces in between" (Lenz Taguchi, 2010, p. 58).

We preface our discussion of child-animal co-mattering with a brief introduction of the spaces, places, and lands where the three respective nature-based programs are enacted. We invite readers to think with place in mind as we retell the stories of child-animal-death encounters, recognizing that our retellings are partial and incomplete. Purposefully, we have selected "stories that create openings, stories that can help us to inhabit multiply-storied worlds in the spirit of openness and accountability to otherness" (Rose, Dooren, & Chrulew, 2017, p. 3). We offer these stories as a way of questioning and complexifying pedagogies within early childhood education, advocating for "staying with the trouble" (Haraway, 2016) and questioning the child/nature divides that fail to account for the entanglements and co-mattering of child-animal relations. This is an ongoing journey that we as researchers are just beginning. However, we propose by paying attention to the messy entanglements and "thinking through" (Nxumalo & Pacini-Ketchabaw, 2017) death; we can help query the potential of pedagogies that foster "a practice of becoming worldly with" (Haraway, 2008, p. 3).

Spaces, Places, Land, and Treaties: Troubled Inheritances

In the forest spaces of our respective studies, children, educators, animals, and the more-than-human are co-located within very specific social-cultural-political contexts. The geological history of New Brunswick dates to the Precambrian period of 4.6 billion to 542 million years ago to the present. The province itself is mapped upon the traditional territories of the Wabanaki Confederacy composed of the Mi'kmaq, Wolastoqey, Passamaquoddy, Abenaki, and Penobscot Nations. Wabanaki translates into English as People of the Dawnland, and in 1993, the Confederacy was revived. Recent archeological excavations within these traditional territories have uncovered artifacts indicating that the Wabanaki peoples have been living here for 13,500 years. Following the 2010 Declaration of Rights of Indigenous People (UNDRIP), Wabanaki leadership emphasized the continuing role of the Confederacy in protecting natural capital. One of its leaders advised:

> When we talk about Wabanaki people, we're also talking about Wabanaki people being the land, being the trees, being the animals, because in that cultural perspective, we're all related...The Wabanaki are in a far better position to defend the land," says Gkisedtanamoogk. "No land was ever ceded, and that's acknowledged by both the province and the federal government. So, on the basis of the treaties, what we're suggesting is that you and I have a common responsibility to the land under those treaties." – Gkisedtanamoogk, the Gathering's fire keeper. (Wabanaki quotation is from Howe, Miles (2012). "Rebuilding the Wabanaki Confederacy," Halifax Media Co-op).

The children and educators in the University of New Brunswick's faculty-based program regularly visit a small wooded area, centrally located on the university grounds. These woods, and the university itself, sit upon the traditional lands of the Wolustoquy people. There are no cultural markers of these shared and troubled colonial histories, and their entanglements are invisible to children, educators, faculty, or anyone who visit this land and the occupying university buildings. This lack of representation works to continue to erase shared colonial histories between settlers and indigenous peoples, a troubling oversight when clearly place matters (Pacini-Ketchabaw & Taylor, 2015), and particularly land dis-/ownerships impact inheritances.

Cajete (1994) informs us that for indigenous peoples, "the Earth was alive and had its own sense and expression of consciousness and being" (p. 89). He continues to speak of a "natural democracy" where "plants, animals and other entities in the natural world, have rights of their own and must be given respect" (p. 89). The Sooke Nature Kindergarten (NK) is located on the Coast Salish territory on Vancouver Island, British Columbia, a place of rocky shoreline, sandy beaches, coastal bluffs, and wooded hills with coastal Douglas-fir and western hemlock ecosystems. There are many streams throughout this landscape which are home to fish and a habitat to bears, cougars, and deer. Dave Elliott Senior noted in 1980 (as cited in Turner & Hebda, 2012, p. 11): ". . . ours was an abundant land. Our forests, meadows, creek sides, marshes and seashores offered many plants for our use" (p. 11). Coast Salish has been on these lands for over 10,000 years (Turner, 2005), and the land has supported and nourished it until recent colonial history when our "scientific sophistication has not been matched by our caring for the Earth" (Turner, 2005, p. 11).

In the Ontario context, the children and animals coexist within a unique biosphere comprised of diverse varieties of trees, mammals, birds, plants, insects, and a geological history that is estimated to be 430–450 million years. Indigenous peoples have lived and entangled their lives with the animals and more-than-human materials of these Ontario woods for at least 10,000 years. The Anishinaabe and Haudenosaunee peoples' original territory encompasses the region where the Ontario children of the nature program now play. One aspect of traditional knowledge that Anishinaabe peoples value is referred to as "Gnawaaminjigewin," that is, "firsthand knowledge – which brings an appreciation of the relationship between the observer and the observed" (Nokomis, n.d.). Rasunah Marsden (n.d.) describes:

> the knowledge that the observer and the observed are not separate, they are 'related' and that a teaching and learning process is inherent in this action. The key learning which arises from

> Gnawaaminjigewin is that we are all related ("All My Relations") – a learning that eventually applies to everything that can be observed: earth, plants, animals, human beings and the spirit world infused within all creation and which binds them together.

Briefly stated, the Haudenosaunee worldview is predicated on balance and reciprocity and equality of all life forms, human and nonhuman alike (Venables, 2010). Venables citing Oren Lyons (an Onondaga Haudenosaunee leader and spokesperson) stated:

> In our perception all life is equal, and that includes the birds, the animals, the things that grow, things that swim. All life is equal in our perception. (Lyons, 1979 as cited in Venables, 2010, p. 27)

What we hope to highlight, while also acknowledging our collective Westernized backgrounds and limited representation of indigenous world views of the first peoples whose land the programs occupy is that across the three distinct contexts (New Brunswick, Ontario, and British Columbia), there are significant commonalities. Each space is situated on traditional lands where cultures have lived for thousands of years (or time immemorial as most indigenous peoples recognize) coexisting, enmeshed, and balanced lives with human and non-human. Other ways of thinking, being, learning, are relating are possible, ways that value living relationally and contest the human-animal boundaries that are more dominant within Western epistemologies. Leanne Hinton, a language revitalization scholar of Native American languages, wrote a song based on her experiences living and working with the Havasupai people. Her lyrics are an important reminder of the importance of thinking/living relationally (the chorus is cited here):

> For the land knows you're there
> And the land knows you're there
> And the rocks and trees and rivers
> Give you friendship and care. (Hinton, personal communication, 2017)

Greenwood (2013) notes "people, and other species, live embodied and emplaced lives" (p. 93) and place-conscious learning includes the "historical, socioecological, and ethical dimensions of place-relations" (p. 97). (See also ► Chap. 9, "In Place(s): Dwelling on Culture, Materiality, and Affect" by Sue Waite, in this volume.)

Co-Mattering and Questioning the Human-Animal Boundaries

Children themselves have long noted the importance of animals within their own lives (e.g., Hallden, 2003; Morrow, 1998; Rasmussen & Smidt, 2003). Yet, research on the influence/importance of interspecies relations seems in its infancy. As Tipper (2011) critiques, the ubiquitous attention paid to psycho-developmental explanations or the "biophilia hypothesis" in examining child-animal relations seems grossly

inadequate. Most children develop an understanding of animals' needs at a young age related to realistic conceptions, greater ecological awareness, and insights into conservation need, these aspects changing as a child matures (Myers, Saunders, & Garrett, 2004). Clearly "animals matter in their own right...as individuals with whom children relate and for whom they care" (Tipper, 2011, p. 149); thus paying close attention to the child-animal inter-and intra-relations within early childhood education is paramount.

Co-mattering occurs in the Anthropocene (and the myriad of alternative terms Capitalocene, Misanthropocene) (Haraway, 2015). Certainly, companion animals like family pets are often viewed as social actors sharing a social-emotional life with humans, quite capable of complex animal-human relations (e.g., deception) (Heberlein, Manser, & Turner, 2017) and corelations (Haraway, 2003). Donna Haraway's (2003, 2008) notion of kinship or relations is important here, fully recognizing human-animal coevolution, mutuality, and symbiosis with what she has labelled "naturecultures," "companion species," and "becoming with" (Haraway, 2003, 2008, 2016). Haraway's influence is also evident in Taylor and Pacini-Ketchabaw's (2015) explorations with children, worms, and ant encounters. These early childhood scholars advocate for a "reimagining of agency and our place in the world" (p. 511) to foster a common world understanding where educators "encourage children to develop a multispecies ethics" (p. 511). The child's ethical relations and fondness for his or her dog, cat, or hamster are easily recognizable. But what of other species like the weasel, owl, and raccoon (species we discuss in this chapter)?

Taylor and Pacini-Ketchabaw (2015) draw upon Myra Hird's (2010) work with bacteria to highlight the interdependence of human lives on the "less glamorous and often invisible" creatures of the world, such as worms and ants that they encountered with children. As these scholars aptly point out, earthworms and ants predate humans by 100–600 million years; they are diverse and adaptive creatures that are vital to the ecosystems that we humans also inhabit. In their research, the child-ant and child-earthworm encounters invited opportunities for children to relationally and ethically respond while also experiencing tensions and the vulnerabilities of other species. Taylor and Pacini-Ketchabaw among many other scholars cited in this volume (e.g., Mindy Blaise, Amy Cutter-Mackenzie, Fikile Nxumalo, Margaret Somerville) advocate for common world pedagogies within early childhood education, practices that recognize and support the multispecies interdependence of all things (human and more-than-human), and humans learning *with* other species. Albeit, "decentering the human" is a daunting task (Harwood & Collier, 2017; Taylor & Pacini-Ketchabaw, 2015). Perhaps, a lens of co-mattering can help in responding to the binaries and tensions of childhoodnature-animal-matter relations. The weasel, owl, and raccoon each figured prominently in the ethical encounters within the three distinct woodland early childhood programs located across Canada. In this chapter, we revisit these multiple encounters to question and contest culture's seductive appeal to use nature in purifying, romanticizing, and simplifying (Taylor, 2013) Western conceptualizations and pedagogical approaches to the topic of death.

Staying with Death: Confronting Decaying, Decomposing, and Predation

> We relate, know, think, world, and tell stories through and with other stories, worlds, knowledges, thinkings, yearnings. So do other critters of Terra, in all our bumptious diversity and category- breaking speciations and knottings. . . .Critters are at stake in other in every mixing and turning of the terran compost pile. (Haraway, 2016, p. 97)

In her chapter, "The Camille Stories: Children of Compost" (pp. 134–168), Donna Haraway (2016) narrates, along with others, Camille's imaginative transformation over five generations, as she shape shifts from (the) Anthropocene to living more fully in and as Chthulucene. Here, we tell stories of children of the present encountering death with animals over the past few years in the forest spaces these animals inhabit and where these children regularly play. We take this as a starting place to think consciously about being and becoming within a Chthulucene era. Our account and our thinking with kin and death, with decaying and decomposing, circulates through a series of what Sara Ahmed names as "fleeting encounters" (2012, p. 12), encounters that, for us, have become storied moments. These storied moments occurred among children, educators, parents, and specific critters in the context of the various early childhood programs. We weave these encounters as means of practicing education otherwise, engaging in a pedagogy that might "bring a larger number of values into cohabitation" (Latour, 2013, p. 11). Our intent is to speak to the co-mattering of all critters of the Terra, grounding pedagogies within a powerful presence, as one way to shift from a posthumanist way of being to that of a "compost-ist, where we inhabit the humusities rather than the humanities" (Haraway, 2016, p. 97).

Pacini-Ketchabaw (2012) speaks eloquently to the ethical challenge of decolonization while illuminating a premise of powerful presence. Against any one dominating body of knowledge or experience, powerful presence proclaims the idea of relationality, asserting the mutuality and connectivity of all things; opening spaces between existing binaries is possible and needed to make visible the complexities. Within our efforts to gather up complexities, we strive to release ourselves from the dialectical habits of binaries (Braidotti, 2013) limiting enacted values specifically related to animal death as experienced within classrooms and wooded spaces. By staying with the complexities of these fleeting encounters, we recursively return to death as experienced between critters, plants, children, and educators. We ask: What children's theories get taken up or are even able to be voiced? What happens when we stay with the trouble of death?

Strange Kin: Children-Squirrels-Weasels-Mothers-Chickens

Childhood innocence as a discourse often acts to keep us from engaging in conversations with children about death and decomposition of animals. For example, in this children's space in New Brunswick, indoors and out, children and adults together

have studied decomposing plant matter in a range of ways. These decomposing studies include vermiculture, garden composting, and the watchful act of observing a jack o' lantern decay over several months, long enough that a new pumpkin plant emerged from the rotting pulp. In contrast with this collective engagement with decomposing plant matter, we bury critters who die during the process of hatchings, ducks, and chicks. We hide from the children the animals who emerge from eggs malformed. We bury classroom pets, and, initially, we buried dead animals found in the woods. What might this mean? Is it our own vulnerability as mammals that provokes us to bury the animals, burying with them mammal decomposition and decay? How might we approach the relationship between children and nature without romanticism or protectionism?

A Weasel Encounter

The children are aware that there is a red squirrel nesting in the tree hollow. They have been feeding the baby squirrels and chickadees each day as they play within the wooded patch located centrally within our university grounds. They look forward to seeing these small creatures when they enter the forest. On this day, a mom meeting the children within their wooded patch helps the children up to peer into the tree hollow. To their surprise, they came face to face with a weasel (Fig. 1). Enthusiastic

Fig. 1 Weasel as strange kin

about encountering the weasel, the mom held each child up so they too could peek in at the weasel, a repeated action that may have disturbed the weasel.

Upon returning to the classroom, the educator shared the weasel encounter explaining that it looked as if the squirrel family was most likely gone, devoured, or cached as dead kill, as it appeared that a weasel had moved into the hollow. Collectively, the children and adults wondered if the weasel had killed the squirrel babies. The educator expressed concern that the mom held the children up to see the weasel. Was her concern of the effect of this action on the weasel's home a concern over the threat of the weasel as predator or the knowledge that the weasel had predated the baby squirrels? This educator asks aloud, "Well, would you have held the children up?" The researcher (Sherry) is surprised by the question, and this in turns raises other questions. How do children engage with the animals they encounter in the forest? How do they encounter their homes? What do they know of the predation cycle? Are ideas of death and prey and the predation cycle itself considered taboo topics for young children? How do we respectfully visit a space, that is, for the most part, the home of others – spaces that have been transgressed by humans to our ends. Potentially, the presence of the weasel, the absence of the baby squirrels, and the predation cycle disrupt the "innocence" of childhood while introducing the vulnerability of all lives – squirrels, weasels, and humans, all of whom live with the constant presence/threat of death and with land that has multiple occupants – nonhuman and human. Protecting children and ourselves from direct confrontations with death is somewhat limiting and naive, particularly given that unscripted encounters with death in nature can provide ample opportunities for complex learning experiences (Ghafouri, 2014).

Lingering with the embodied complexity of children-educator, weasel, mother, and squirrels, Sherry encountered a weasel in the outer room of her hen house just prior to leaving for a family trip, as she was quickly watering and feeding the chickens.

> My son and daughter are with me, I open the door and come face to face with a weasel perched on top of the wood pile. The weasel looks directly at me and I at the weasel. The children call out gleefully, "oh isn't he cute." I am thinking silently that my chickens are at risk in this month of January when winter hunger may be at its peak. Looking around the outer room I find one of my roosters behind the woodpile partially consumed. What is to be done? The car is packed and the family is waiting. I leave the rooster and the weasel, who now will be cohabitating with the flock of chickens. Two days later we return home. I look in to feed and water the chickens. The weasel is not visible but evidence of his predation is visible in the increasingly consumed rooster. I research the weasel and learn that as in the case of the squirrels, this weasel has moved into the den of its prey to consume and survive. I decide to leave the half-eaten rooster to the weasel, thinking that if I remove it, the weasel will only be enticed to kill another chicken. Over the winter the weasel consumes the rooster, leaving a skeleton with only wingtip feathers intact. No other chickens are taken and the weasel has moved on.

At the child care center, the squirrels are never located. Collectively, the group assumes that the weasel in the tree meant the death of the baby squirrels who became the weasel's food cache. Unlike an earlier dead mouse encounter in these same

woods, there was no call for a burial as the deaths of the squirrels were essentially invisible. Conversely, with the dead mouse, the children and educators took up burial rituals associated with specific religious beliefs, and similar to those enacted by the children in Margaret Wise Brown's *The Dead Bird* (Brown, 1958): a hole was dug, the mouse covered with dirt, and its burying place marked with a stone. A few weeks later, when a girl wanted to dig up the mouse to see what had happened to it, she was encouraged to leave the gravesite undisturbed – out of respect to the deceased mouse.

When Sherry and Pam relayed this burial story to Enid at a conference, she in turn shared the owl encounters described below. We took her story back to our educators. It was a story that as Donna Haraway (2015) writes "was just big enough to gather up the complexities and keep the edges open and greedy for surprising and new connections" (p. 101). Sharing the owl story provoked new insights for the educator, and with a more recent death encounter of a rabbit, the children and educators did not bury the animal. Rather, they chose not to bury it, leaving it to decompose naturally while keeping an eye out on the process and its ultimate integration with the earth.

A Death on the Path

In the first year of the Sooke NK program, the children found a dead owl lying beside the path that they walked each morning as they headed to the site (Fig. 2). The children's first response was sadness that the owl had died and then curiosity as they looked more closely at the bird. They were concerned that it had been hurt and

Fig. 2 Walking the trail to Sooke NK

possibly suffering when it died, and they hoped he or she had had a nice life and that his family would not miss him/her too much. They all wanted to acknowledge him or her by saying something nice to the owl, and so going around the circle, they did just that. Each day as they passed, they spoke of their sadness about the owl's death and their interest as they watched the decomposition. The children narrated multiple feelings, thoughts, and questions, complexities that were documented for later critical reflection and reexamination (Fig. 3).

A couple days after the discovery, Muriel, the class' Aboriginal Support Worker, was with them. She shared with the class that one indigenous belief is that by seeing an owl, this can mean a death. She explained that it did not necessarily mean the death of a person or creature, but that it could signal a time to give up something that might be preventing your growth or harming you. This information invited a discussion about habits or attitudes that might impede one's right action or thought. The children shared thoughts of what ideas or actions might prevent them from being kinder or more focused or more inclusive. Muriel's story helps to highlight for the children their responsibilities in face of death. Similarly, Nancy Turner (2005) shares Mary Thomas' memory of her grandmother who was Secwepemc from British Columbia's interior region, "Our grandmother would tell us a little legend and at the end of the legend she would say, 'Now you see, if you don't do it this way. . ..' They always used something in Mother Nature to teach us our lessons, our values" (p. 77). Robin Kimmerer (2013), botanist and member of the

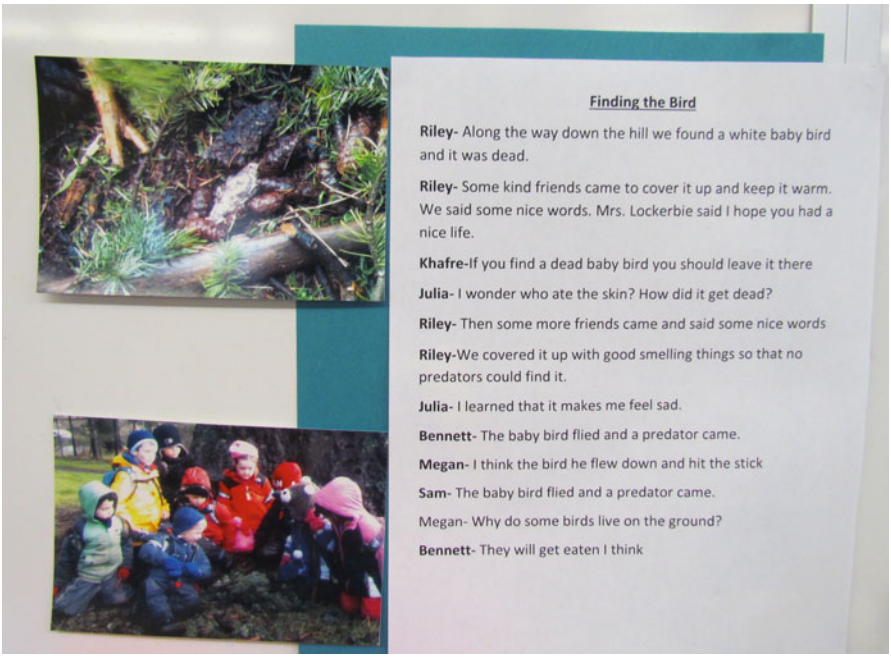

Fig. 3 Documenting the dead owl

Potawatomi Nation, "One of our responsibilities as human people is to find ways to enter into reciprocity with the more-than-human world. We can do it through gratitude, through ceremony, through land stewardship, science, art and everyday acts of practical reverence" (p. 191).

Seeing the owl closeup, motionless, and dead stopped the children in their normal walk along the path. Birds are most often seen in flight, in motion, and at a distance. To see the owl on the ground motionless was thrilling, intriguing, and terrifying. The children reacted with their feelings first: they were sad. But seeing the bird on the ground, lying still, also provided an opportunity to see him or her up close, see the feathers, the feet and talons, and the beak. This is an "in-the-moment sensuous experience that can have the most vivifying, enlivening effect..." (Bai, 2009, p. 143). It also brought feelings of sadness as children connected to other deaths in their lives and perhaps suggested they too could die.

Children were aware of cougars in the forest and their own vulnerability as prey, because at the beginning of the year, they practice what to do if they meet a cougar. Do they make a connection to the dead bird and birds that hunt other creatures to the cougar possibly hunting them? Like Pam and Sherry indicate above, as adults we often carefully hide from our possible identity as prey. Yet, perhaps the dead animals awaken some sense in the children of their own immortality, an affinity and positioning of oneself as prey and a "need to acknowledge our own animality and ecological vulnerability" (Plumwood, 1995, p. 34).

The children experienced the death of the owl and their questions about the owl as a community, as an opportunity to listen deeply, to be affected by the environment around them, impacted by forces which as humans we are often unaware (Brigstocke & Noorani, 2016). Each child seemed to emotionally respond to the owl's death individually and as a member of the group, an experience in a particular place and time. Ingold (2000) reminds us that "ways of life are not therefore determined in advance, as routes to be followed, but have continually to be worked out anew. And these ways, far from being inscribed upon the surface of an inanimate world, are the very threads from which the living world is woven" (p. 242).

"Look! He died happy!" the Dead Raccoon

The Ontario children stare intently at the carcass of the raccoon. The educator and researcher (Debra) stand alongside the children looking down onto the animal. One boy asks, "I wonder how he died?" The children take their time to closely observe the raccoon pointing to different body parts that are visible. They are familiar with terms like skeleton and stomach, and the educator labels the intestine that is also visible. "Look he died happy!" pronounces a boy. When asked why he thinks so, the child points to the visible teeth and explains that the raccoon was smiling when it died (Fig. 4). Later that morning as we revisit the dead raccoon, the boy asks again, "what happens when you die?"

Raccoons are common in the Ontario forest where the children and educators have made an outdoor classroom that they refer to as "the clubhouse." Throughout

Fig. 4 Observing the dead raccoon

the weekly forays into the forest, we had observed raccoon tracks and droppings as well as evidence of multiple other animals typical of this woodland space. Our animal-human encounters were plentiful, serving as pivotal meaning making moments and ethical encounters. For example, the raccoon's death helped the children to empathize with the animal, recognizing him/her as distinct and separate being while also acknowledging the vulnerabilities. The raccoons lived within the forest near the university campus, and the children had observed (and responded to) some of the impacts of human garbage and fast-moving traffic, as well as the effects on the environment from the extreme weather that was experienced (e.g., long dry spells without rain or erosion from spring flooding). Until these raccoon encounters in the woods, the animal was something the children had only experienced in storybooks, a somewhat romantic and innocent notion of the animal. Given the environmental complexities the children confronted, this innocence is problematic, particularly within early childhood education where the "romantic coupling of innocent young children and perfect nature" (Taylor, 2013, p. 53) is so deeply ingrained.

Pacini-Ketchabaw and Nxumalo (2015) refer to the raccoon as "boundary crossers" and highlight the complexity of the "actual, messy, unequal, and imperfect worlds that raccoons, educators, and children inherit and co-habit along with other human and nonhuman beings and entities" (p. 152). At first glance, the raccoon carcass provides a wonderful impromptu science lesson for these young children (e.g., decomposition, physiology of the animal, etc.). But perhaps, something far more complex is happening here. The entangled encounters of child-animal-nature suggest a co-mattering, the child being affected by and coming to understand his/her own role and vulnerabilities in this world within this human-animal relational context. Like Sherry, Pam, and Enid's descriptions above, the death sparked interest in the idea of vulnerabilities and threats to the natural habitat of the raccoon, as well as discussions about one's own mortality. For example, children reacted by

collecting and recycling garbage, placing signs on the road for cars to slow down, and picking wild apples and placing them throughout the forest for the animals to find. Additionally, a "rights" discourse also ensued in relation to ideas of habitat, use of the land, and burying the raccoon. The children visited the dead raccoon over several weeks, monitoring its decomposition while also marveling and imagining the animal's death and life. At varied points throughout the weeks, the carcass appeared to have been moved and placed at different angles.

The children conversed about this development, requesting that the educator recall prior images from previous weeks on her digital device so they could investigate. They were perplexed by this activity, and as time passes (like the children from New Brunswick), these children decide to perform a burial for the raccoon. Initially, the decision to bury the remainder of the raccoon was not a unanimous one, with one boy, objecting to the idea, stating matter of factly that the carcass was food for the bugs and other creatures. The educator opted to support the majority will of the group and a type of Westernized ritual was initiated. The raccoon was buried, crosses were fashioned from sticks (the children's idea) with the lone dissenter choosing an X configuration "like a treasure map," and the children took turns saying goodbye (Fig. 5). After several weeks of being buried, the children return

Fig. 5 The raccoon burial

to the spot to discover the animal had been dug up. The children remark on the state of decomposition (a word they have learned previously in relation to plants). The original dissenter appears to feel somewhat vindicated, commenting how "the coyotes weren't done yet." The remaining children now seem content to leave the carcass as originally suggested. The children continue to check on the decaying raccoon each time we pass the spot in the coming weeks, and eventually, only a tuft of hair from the raccoon remains hanging in a nearby tree.

For these eight children, death was a relatively new phenomenon, and none had much experience with death. Potentially, the raccoon's death helped to heighten within the children an "awareness of the function of death [and] acknowledgement that life is a relational web incorporating a variety of objects, subjects, and bodies along a spectrum of animation, vitality, and decomposition" (Russell, 2017, p. 76). Certainly, the ecology of the children's experiences and framing included both human and animal relations, interactions that were entangled, meaningful, and complex. This co-mattering was evident in a subsequent encounter this time with a live (albeit sickly looking) raccoon.

The children, educators, and researcher are gathered on logs around the fire pit discussing what they have liked most about the year in the forest. Several children call out excitedly, "raccoon!" The adults are momentarily stunned by the response but soon realize the children are pointing and jumping up and down to indicate a raccoon pilfering through the wagon of supplies that they have brought to the forest. One educator uses a stick to bang on logs to make loud noises to "scare" the raccoon away; the children join in with the stick banging. The raccoon slowly saunters down the trail with a somewhat uneven gait (Fig. 6). The educator returns to an animated group of children all talking at the same time. The children seem quite aware that this

Fig. 6 Encounter with a live raccoon

is a somewhat atypical behavior for a raccoon. After their last encounter with the dead raccoon, they have used resource books and videos to learn information about the animal's behavior and habitats (e.g., primarily nocturnal). One of the children flops to the ground and calls out that he's a raccoon, embodying the swaying motions and uneven gait of the raccoon he has just observed. Play resumes in the forest until the educator hears the raccoon returning. The group decides to leave the forest for the day. Once we are back on the trail adjacent to the forest, the children inquire about the raccoon, "is he sick, old, hungry, lost, dying?" The educator explains that perhaps the raccoon's erratic behavior and appearance might be a result of any one these factors or that the animal might be looking for a place to die. The children affirm the animal's right to the forest home, recognizing that perhaps we were disturbing the raccoon in some way. The children emotionally respond to another potential death of a second raccoon. The educator reminds the children of the commonalities between our own organic nature with that of the raccoon(s). This kinship seems confirmed by one girl who verifies that all things die "just like us." Reaffirming these similarities, another boy moves around in a circle among the group pointing to each of the adults, the children, the leaves, and the trees and so on stating how we were all going to die when we were old.

In some ways, the children seem to be attuned with the raccoon; they were affected by the animal's death and life, responding emotionally and ethically in the ways they cared for the animal's environment. The children's understandings here are entangled with the experiences of the dead and living raccoon. The children (and adults) demonstrate an intensity of feelings and a complexity of the web of relations within this place in the woods; in brief the child (person) is indivisible from place-animal-nature.

"Staying with the Trouble"

Perhaps, "staying with the trouble" of death can help to foster generative ways of being with the world. Deborah Bird Rose and Thom van Dooren (2017) call for an ethical approach with the more-than-human world, a *practice of becoming witness*. They describe this practice as:

> an openness to others in the material reality of their own lives: noisy, fleshy, exuberant creatures with their multitude of interdependencies and precarities, their great range of calls, their care and their abundance along with their suffering and grief. . .a mode of responding to others that exceeds rational calculation, one that arrives through encounter, recognition, and an ongoing curiosity. (pp. 124–125)

For most of the children and animals storied throughout our chapter, we engaged in acts of becoming witness. Death itself was somewhat of a taboo and uncomfortable topic within early childhood education. Yet outdoors, death was an organic relational experience, one that was entangled with the children and adults' encounters in the woods. The owl, weasel, and raccoon and their deaths, or the deaths they

instigated, are "worthy of attention" (Loveless, 2013), enmeshed and meaningful engagements with others (human and nonhuman). The children and animals' curiosities, encounters, and recognitions were foundational. Although our focus of the chapter was largely centered on the practice of becoming witness, the animals in our storied encounters co-mattered, and we advocate for staying with the trouble as an important aspect of exploring the multitude of situated and ethical responses that are possible.

Arguably, much more research and dialogue is needed to contest dominant and Western ways of viewing death, burial customs, and ethical actions within early childhood education; perhaps an appreciative and place-based discourse and situated responses related to death could help to further complexify and decolonize practices within early childhood education (Pacini-Ketchabaw & Taylor, 2015). Clearly more research beyond our collective stories is called for, research that also fosters "the overturning of binaries that separate human from nature, and human from animal; an interest in affects and intensities; and the imperative to map becomings, encounters and relations between bodies" (Gannon, 2017, p. 95).

Conclusion

Moving outside of the four walls of the classroom provides multiple opportunities for children to engage with life including death, diverse materials and challenges, and the relationships that rocks, trees, weasels, raccoons, worms, and owls offer. While one never knows what might present itself in this context, these children in these encounters were affected by and ready to see and seize upon the opportunities for relating to the nonhumans of the forest world, while adults often must (re)learn to do the same. Undoubtedly, it is a challenge to move beyond the physical walls of the classroom and the mental maps that are often constructed within our adult minds. Yet, the materialities that outdoor life, and in this case death, present significant encounters for young children.

Aligned with Lenz Taguchi's (2010) ideas, we view binaries such as nature-culture, life-death, child-animal, and indoors-outdoors as naive and exclusionary. As these storied moments highlight children and adults and are entangled beings, coexisting with the rest of the world (Lenz Taguchi). The weasel, owl, and raccoon co-mattered alongside the children, adults, rocks, sticks, mosses, and so on of the places that we have described. We posit that by listening, engaging in the practice of bearing witness to the multiple stories of place ethical actions can be fostered. By "staying with the trouble," that is, the uncomfortableness and messiness of an entangled world, we are invited as educators and researchers to confront and (re)consider the ways in which place, human, and the more-than-human are "alive and thinking" (Watts, 2013, p. 21). These frictions in the forests, depicted with our human encounters with dead animals, contribute to a reconceptualization of beliefs and pedagogies, challenging us all to embrace entanglements and think *with* forests and animals (Pacini-Ketchabaw, 2013).

Cross-References

► Posthuman Theory and Practice in Early Years Learning

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Experiences of Pet Death in Childhood Memories

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Nora Schuurman

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Abstract

Studying relationships with animals in childhood illustrates cultural conceptions of animals as well as those about children and childhood. Similarly, childhood experiences related to animal death demonstrate associated rituals, practices, and conceptions. This chapter scrutinizes the memories of animal death in childhood, based on data comprising narratives collected in a nationwide writing collection on human–pet relations in Finland. The data used includes the authors' memories of animal death in childhood. Theoretically, the study draws on recent studies about childhood and about human–animal relations, with a relational viewpoint that emphasizes emotions and embodiment.

The study suggests that there are special meanings involved in relations with animals in childhood, and these are epitomized in the experiences of animal death. The memories analyzed illustrate the position of animals as friends and family members already before pet keeping became a central part of home and family. Animal companions have been lost and killed, buried, and mourned,

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and their death is frequently contextualized in the experiences of growing up. In the childhood memories analyzed in this study, the human–animal boundary does not appear clear-cut, but instead, mourning the loss of an animal bears similarities to mourning the death of a human. However, grief for a dead animal has been culturally forbidden, which is seen in parents' relative silence and the challenges faced in communicating the grief between parents and children.

Keywords
Childhood · Death · Emotions · Finland · Human–animal relations · Memory · Pets

Introduction

The practices and conceptions concerning animal death are closely associated to the different ways in which the conceptual boundary between humans and animals is understood, transgressed, and reinforced. The norms and practices that shape death are different in the case of humans and that of nonhuman animals, and, therefore, transformations in the conceptions regarding death, killing, and mourning of animals illustrate the complexity of the human–animal boundary. Moreover, the boundary is always contextual (Charles & Davies, 2011). In can be asked, for example, how is animal death experienced and understood in the context of childhood, in regard to the human–animal boundary?

In late modernity, keeping pets in families with children has become increasingly common, at the same time as child–pet relationships have been promoted as beneficial for the development of children (Russell, 2016; Tipper, 2011). However, relatively little attention has been paid to individual relationships with pets in childhood, let alone experiences of the death of a pet. When a pet dies, there are several issues to consider: relationships between humans and animals, children and adults, and children and pets, as well as children and death. Studying relationships with animals in childhood illustrates cultural conceptions regarding animals and their death as well as children and childhood.

This chapter scrutinizes memories of animal death in childhood, based on data comprising narratives on human–pet relations collected in Finland. The study aims to make visible the ways in which human–animal relations and death are understood in the cross-generational context, based on the narrators' memories of experiences ranging from agrarian times to the urban pet-keeping culture. The question is, in what ways are experiences of animal death described in childhood memories? The focus is on the loss and grief experienced at the death of animals understood as pets by the narrators. Special attention is paid to the ways in which cultural conceptions, norms, and practices that define the appropriate ways of relating to and grieving the death of an animal for both children and adults are reflected on in the narratives. The methodological challenges regarding the study of adults' childhood memories are also discussed.

Theoretically, the chapter draws on discussions of relationality, emphasizing the emotional and embodied aspects of human–animal relationships (Acampora, 2001).

Child–animal relationships have often been described as a phenomenon that is natural to childhood, and children, perceived as innocent, have been paralleled to animals (Tipper, 2011). In more recent studies, however, children have been understood as active agents with meaningful social relationships with others, including animals (Tipper, 2011; Wyness, 2012, p. 62). In this study, the naturalization of child–pet relationships is rejected and the subjectivity and agency of children is appreciated, similarly to those of animals.

Companion Animals, Childhood, and Death

Animals that share their lives with humans in close companionship can be termed pets or companion animals (Charles & Davies, 2011). A pet is given a human name, it shares the home with a human, and its body is not used for human consumption (Thomas, 1983, pp. 112–115). These animals are often understood as conscious and sentient subjects and agents, who interact with humans and share their everyday life with them in meaningful ways (Charles, 2014). Relationships with animals based on kinship in such a way have a possibility to blur the categorical boundary between humans and nonhuman animals, resulting in interpretations of "posthuman families" (Tipper, 2011).

A substantial number of pets in Western countries live in families with children, which suggests that "families place children and pets firmly together within the sphere of domestic life" (Russell, 2016, p. 83). Pets are often acquired on children's initiative, and children call them siblings, best friends, and confidants (Charles, 2014). Children know the animals they live with individually, and they interact and communicate with them and describe them as close friends who listen to them in moments when adults cannot (Leinonen, 2013, p. 70; Morrow, 1998). Children tell their pets their secrets, and especially dogs give children an opportunity to move outside the home (Morrow, 1998). Pets are part of the family network, and their position as family members is largely based on the duration of their cohabitance with humans and the quality of the relationship (Tipper, 2011).

When pets die, the practices and understandings concerning their death illustrate the position of pets and cultural conceptions regarding human–pet relationships, but they also reflect recent transformations in the ways of relating to death in the West. It has been argued that death has become a silenced subject and expressing grief openly has become forbidden in modern societies. Bauman (1992, p. 134), for instance, writes that "death has become a guilty secret." Giddens, on the other hand, (1991) suggests that death has been moved away from the public sphere, rendering grief a private process. The idea of death as a taboo has increasingly been challenged, suggesting that "relationships between the living and the dead are being rediscovered" (Howarth, 2007, p. 19). It is characteristic to human death in late modern society that it can partly be controlled by the medical science, as terminal illnesses can increasingly be managed (Bauman, 1992). The death of animals is controlled by humans to a far greater extent, as most "domesticated" animals are killed by humans (Marvin, 2006). Killing animals emphasizes the hierarchical

boundary between humans and animals, as the human is the only animal whose killing is considered murder (Haraway, 2008, pp. 79–80).

Animal death, including pet euthanasia and grieving for the loss of a pet, is regulated by cultural norms and practices (Redmalm, 2015). They include norms regarding the ethically appropriate killing of animals in different circumstances, but they also define the rules concerning feeling and expressing emotions about the death of animals (Morrow, 1998; Turner & Stets, 2005, pp. 26–36). The death of a pet is mourned in much the same way as a human's death, but, according to Redmalm (2015), it is ambivalent in the sense that it reflects the status of animals as either resembling humans or different from them. The animal is often mourned as a separate, sentient being and a partner in a social relationship, comparable to a close human. In situations where expressing the grief is risky or too much of a burden to the mourner, the pet is distanced to the position of an animal different from humans.

The next section discusses the methodology of this study, followed by an analysis of the emotions and meanings attached to the grief over the death of a pet, the difficulty of parental support, and experiences of unjustified killings, before drawing conclusions on the analysis.

Using Childhood Memories as Data

Childhood relationships with animals have been investigated by studying children themselves but also by exploring adults' childhood memories, as in this chapter. The data for this study comes from a nationwide writing collection under the title *The cat, the Dog, and the Horse – The Animal as a Family Member (Kissa, koira, hevonen – eläin perheenjäsenenä)*, organized by the Folklore Archives of the Finnish Literature Society in 2014–2015. The writing collection was announced widely in Finnish magazines and social media. People were encouraged to write about their memories and experiences of sharing their life with pets, including experiences of animal death. The author of this chapter personally involved in designing the themes for the collection.

Narratives collected in writing collections are typically autobiographical (Latvala & Laurén, 2013). Autobiographical narratives about human–animal relations can be used to explore shared experiences between the human and the animal and the cultural meanings given to them (Leinonen, 2013, p. 67). Smith and Watson (2010, p. 15) nevertheless point out that the concept of truth in autobiographical writing is not easily defined: "[a]ny utterance in an autobiographical text, even if inaccurate or distorted, is a characterization of its writer." As Jones (2008, p. 199) points out, in researching childhood "we need to be extra vigilant and reflexive about how we approach, engage with and render the other in our research accounts and conceptualisations of children/childhood." This is especially true about research based on adults' childhood memories as data. Memory is relational, and in narrating childhood memories, the authors engage with their childhood self (Russell, 2016). Jones (2003, p. 27) notes that "[m]emory is not just a retrieval of the past from the past, it is always a fresh, new creation." This means that the child of the past as well

as the others remembered in the narrative – human and nonhuman – is always represented by the one who writes the narrative (Russell, 2016). In experiential narratives such as the ones analyzed in this chapter, the authors reflect on their own life events and experiences in a way that makes sense to themselves (Latvala & Laurén, 2013). Narrated experiences are part of cultural meaning-making as they provide access to past experiences by giving them meanings in the present. They thereby assist in understanding temporality and change.

For the writing collection, 193 responses were received, comprising 1187 pages in total. For this study, 111 descriptions of animal death experienced in childhood were selected. Of the 65 narrators whose texts were included, 60 were women and five men. The authors were born in the years 1919–1998, and the data thus includes childhood memories from the 1920s to the early 2000s, reflecting the transformations from the agrarian culture to the present. For the purposes of the analysis, the data was thematized in three themes: the emotions related to animal death, the role of adults, and how the author experienced the event ethically. Throughout the analysis, attention is paid to the ways in which the authors reflect on their memories at the time of writing them.

Grief Over the Death of a Pet

In the narratives, childhood relationships with animals are described in detail, and nearly all narratives end in the death of the animal. Animals typically died in accidents or were killed in different ways. Very rarely did they die naturally. The authors describe their attachment to animals in childhood as a strong emotional experience. They often grew up with puppies and kittens but also with foals, calves, lambs, and piglets, which they cared for and considered pets, close friends, and family members (see Leinonen, 2013, p. 71). This chapter concentrates on relationships with animals understood as pets, leaving out the slaughter of farm animals.

The death of a close animal is remembered in the data as a very sad event. As one author states, "you experience the death of an animal more strongly when you are a child, and I also mourned Riku for a long time" (SKS KRA. Pets 40–43. 2015). According to Jones (2003), children's lives are more emotional than adults' lives. This is evident in childhood memories, also because memories not only consist of past events but also of emotional responses to those events (Jones, 2003). Many authors express a longing for an animal they have lost as a child, even as they are writing about the event as adults, as in the following example from the 1970s: "I dreamt about Netta every now and then until only a few years ago. These dreams only ended – almost – when our own dog Pike came into the household in 2009" (SKS KRA. Pets 189–190. 2015). When the dead pet is defined as "only" an animal, different from humans, it can easily be replaced with a new one (Redmalm, 2015). If, on the other hand, the pet is seen as a friend or family member comparable to humans, it is perceived as irreplaceable, at least immediately after death. Such a case is described in the following example from the time of WWII:

> For a few years, he was our joy. Then he got distemper and was paralyzed. Mother knew a car driver who carried a gun, and he euthanized our friend. Life felt empty after Evacuee's death. Aunts, uncles, cousins and Father were away from home at the war front, and the animal friend was also gone. Already then I decided that I would never have a dog myself, as losing it is so hard. (SKS KRA. Pets 92–115. 2015)

In agrarian times, it was common to kill kittens, sometimes also puppies, because there were simply too many animals. This was sometimes the case in the countryside even in the 1980s: "Grandpa put them down by throwing them against a rock. It still feels horrible, because I saw it with my own eyes" (SKS KRA. Pets 922–927. 2015). Animals were usually killed at home, because there was no other way, and the neutering and euthanizing of small animals by veterinarians were not common practice before the 1960s. For children, the frequent killings of young animals were a painful experience.

In the narratives, there are several references to pet burials in the decades following WWII, usually at the farmyard or summer cottage. With the development of pet-keeping culture, features of human death rituals, such as burying and mourning practices, have been adapted to the death of pets (Kean, 2013). According to Tipper (2011), the body has a special significance in childhood, and this is evident in detailed descriptions of the bodies of dead animals. These descriptions reveal the significance of the event to the author:

> Soon after this White Spot was hit by a train. He was completely cut in two in the middle, and his open green eyes stared at the sky. It took a long time before I stopped mourning him, because he was my cat. His remains were buried in the garden. (SKS KRA. Pets 116–117. 2015)

If the animal died in wintertime when the ground was frozen, digging a grave was not possible. In the following example, the animal continues its embodied presence in the life of the author during a long liminal phase between death and disposal of the body: "The cat could not be buried in winter, so he was kept in a cardboard box in the greenhouse. I went there every now and then to pet the cat's body" (SKS KRA. Pets 441–442. 2015). Here, touching the body of the dead cat is described as a pleasant experience, which serves the purpose of mourning the feline friend. In the narrative it is presented as an embodied memory, epitomizing the emotional and embodied relationship with the childhood pet (cf. Russell, 2016). It can also be interpreted as representing the child's agency in actively managing the continuation of the relationship after death (Howarth, 2007). There are also examples in the data of the agency of the animal at the moment of death, as in the following memory about the death of a guinea pig in the 1970s:

> I remember the morning when I was leaving for school and we looked each other in the eye. Tiku was very weak and reaching for me, his gaze still touches me. It was a farewell gaze and those stay with you forever. There is a lot of feeling in them. I think animals understand more than people understand that they understand. (SKS KRA. Pets 607–609. 2015)

Again, the relationship appears to continue after death, this time in the narrator's interpretation of the pet's gaze as an eternal "farewell gaze." The narrator further contemplates the gaze, to the extent of attributing significant understanding to it. She thus acknowledges the animal's agency, which dissolves the hierarchical human–animal boundary (Charles & Davies, 2011). It also contributes to the grief felt, as without acknowledging the animal's agency, it would be much easier to encounter the death of the pet and the end of the relationship.

The Challenge of Parental Support

Human–animal relations are always situated in the surrounding world of social relations, norms, conceptions, and practices, and this is also the case in childhood (Russell, 2016). In the data, it is evident that in agrarian times, killing animals has been the realm of adults, regardless of the relationship between the child and the animal: "We, the children, felt sad when the grown-ups decided to put Terri down. Maybe he was not a good hunting dog. Children's views were not asked nor heard" (SKS KRA. Pets 655. 2015). Children were not permitted in the world of death, and, in several accounts, parents tried to protect them from seeing the killing of a beloved animal. Instead of keeping the children happy, this practice has apparently resulted in some of the most painful memories of animal death. They also illustrate the distances between children's and adults' experiences and understandings of animals, emotions, and morality (cf. Jones, 2008).

In the narratives, memories of the loss of a pet appear as isolated experiences in childhood. According to Giddens (1991, pp. 167–169), a sudden encounter with death can be a shock. The authors write about close and meaningful relationships with animals in childhood, and their own emotional reaction to the death of such an animal is remembered vividly. In contrast, the narratives reveal the relative absence of parental support at the moment of loss:

> One day, when the inseminator arrived at the yard, Misse hid herself under the car, in front of the back wheel. And when the inseminator left, she went too. I don't know where, but only a little lifeless body was left. Someone came and picked it up. I did not cry. I did not say anything. And I was not taken on the lap by anyone. (SKS KRA. Pets 266–332. 2015)

What is striking in the narrative is the absence of any expression of grief or consolation. Mourning a dead pet has been considered an instance of "forbidden grief" that cannot, according to cultural norms, be expressed openly (Taylor, 2013). The experience of loss and the relationship between the mourner and the deceased are not recognized, leading to a difficulty in sharing the grief and a lack of consolation to the mourner. The lack of parental support in the context of animal death is an example of how forbidden grief may be experienced in child–adult relationships. For adults, the death of an animal is a controversial event, and expressing the emotions related to it may not have been possible without ridicule

(Tipper, 2011). As one author states, "in the old times it was not allowed to show grief over the euthanasia of a pet, at least if you were an adult" (SKS KRA. Pets 404–405. 2015). The silence over the grief over losing an animal emphasizes the difference between humans and animals and therefore reinforces the human–animal boundary.

Emotional attitudes toward animals are not a new phenomenon. Instead, expressing these emotions has become more acceptable after urbanization distanced farm animals from everyday life and pet keeping gained in popularity (Charles, 2014). In child–adult relationships, on the other hand, the transformations following WWII led to more open communication between children and adults (Cunningham, 2013, pp. 213–219). Both of these developments are visible in the narratives. Accounts of more recent events illustrate how the grief over animal death is shared with parents, as in the following example from the early 2000s:

> I remember how Mother came to my room late at night and said that we may have to put Nana down. At first I did not understand what Mother meant, but gradually I realized the sad truth. I remember my last day with Nana, when I hugged her and hoped that time would stop and Nana would not leave my side. Soon we sat in the car outside the vet clinic and watched Mother lead Nana away. I prayed for Nana to come back. I was struck by grief when I saw my mother walk back without Nana. (SKS KRA. Pets 473. 2015)

Here, the mother takes the child all the way through the experience while still protecting her from seeing the actual killing. The experience is very different from those in the memories of agrarian times. The changes have, however, been slow and difficult, as can be seen in the example from the 1970s, where the parent tries, in vain, to protect the child from the shock of killing:

> I stroked Lotta for the last time. Father took her out and I stayed inside with Mother. After some time I went outside. I noticed Father there and started walking closer. Then, suddenly, I saw him sling the cat against the stone wall of the outbuilding. We both flinched. I, for seeing the violent death of my dear pet, he, for me to be staring there. Father's expression was not delighted. (SKS KRA. Pets 607–609. 2015)

Experiences of Ethically Unjustified Killings

It is a recurrent theme in the narratives that children's possibilities to control the death of animals are limited. Many respondents recount the practice of killing a pet without first telling the child about it. Sometimes the fate of the animal has remained a mystery, as in the following example from the 1960s:

> I was 15 or 16 years old. One day, when I came home from school, Mirri wasn't there anymore. I never got to know the full truth about Mirri's death. My impression was that one of my father's co-workers had euthanized our pet. Why? By whom? Where was Mirri buried? (SKS KRA. Pets 2–5. 2015)

Many authors feel that the killing of their pet was unjustified. It has been hard to understand the adults' motives for killing, as these have not been openly discussed in the family. Emotions felt for an animal assist in remembering the specific events related to its death, and the descriptions of unjustified killings are often detailed:

> Pörri's life was very short. Aunt Riitta died in December 1961 and Irja from Mustola was preparing the funeral. Her brother Antti took her to our house, and I heard my father say to Antti that there was a "black hare" in the house. That night Pörri disappeared. I decided then, although being a minor, that this was the first and last dog that anybody killed without my permission. (SKS KRA. Pets 335–343. 2015)

In another example from the 1950s, the author describes the unexpected killing of the children's pet dog as cruel:

> The most terrible shock came when, close to Christmas and after this visit, we went to my uncle's. My aunt invited us 'big girls' upstairs to see a surprise. And what a surprise! By the door to my uncle's study there was a smallish black dog skin. "There's Tarjukka now!" my aunt said and added something that was even more shocking: "Tarjukka was euthanized by shooting in the head, at the Pengerkatu police station." (I haven't as yet been able to decide whether my aunt was a conscious sadist. For us girls Tarjukka's death was a matter of grief, and showing/using the skin was cruel). (SKS KRA. Pets 153–172. 2015)

Both narratives reveal a feeling of powerlessness expressed by the authors, regarding the fate of their pet. In the first excerpt, the author feels that she should have had the right to decide on the life of her own pet. In the second one, the adults' actions render the death of the pet purely material, epitomized by the use of the dog's skin. Although preserving the skin of animals was quite common in agrarian times, for the author the dog is a sentient animal, and keeping its skin is not perceived as an acceptable way of managing its death. In both cases, the authors describe their shock and frustration of being dependent on adults' understanding of their pet as "only" an animal and the dismissal of their emotional relationship with the pet.

The reason for their emotions can be associated to the blurring of the animal category: pets are not considered animals that can be killed without a reason, especially not for human consumption (Leach, 1964). The narratives, however, illustrate intergenerational differences in the interpretations of the acceptability of killing animals. What has been presented as a justified killing by adults may have been experienced as unjustified by children – even as adults, at the time of writing the narratives. By transgressing the categorical boundary that defines pets as companions and family members, the pet has been "made killable" by the adults, in the sense that they have not needed to justify its killing (Haraway, 2008, pp. 78–80). For the authors, however, the boundary could not be transgressed. The emotions evoked by this controversy are expressed strongly in the narratives, suggesting that memories are, first of all, *emotionally felt* (Jones, 2003).

There are also cases in which the death of a pet has been caused by an outsider, as in the following memory from the 1980s: "When the cat was about four years old I found her dead in the woods. Somebody had poisoned her. The grief was enormous

and the cruel deed of the human was difficult to accept" (SKS KRA. Pets 629. 2015). Encountering death as an isolated experience causes not only shock and grief but also contemplations of morality (Giddens, 1991, pp. 144–180). In this case, such contemplations concern the place of animals in a just world. Often found in the narratives, they suggest that such experiences and the emotions they evoke have a profound meaning in childhood, one that is not easily forgotten.

According to Tipper (2011), children are conscious of intergenerational dynamics and power relations. The data used in this study support this notion. The authors of the narratives reveal a feeling of injustice regarding the ways in which adults have understood animal death and carried it out. Killing an animal without telling about it to the child becomes an ethical issue. The pain and bitterness expressed in the narratives suggest that the denial of communication and grief on the part of the adult is a central part of the memories created of the experiences. Also, the narratives reflect a generational change in the ways of relating to animals as companions. For the authors, expressing painful memories of lost pets is supported by contemporary pet-keeping culture which increasingly allows the mourning of pets. Their parents' reactions, instead, indicate that such an openness in both human–animal relationships and adult–child relationships has previously been restricted.

Conclusion

This chapter has explored childhood memories of experiences related to animal death in autobiographical narratives. The study suggests that the special meanings involved in relationships with animals in childhood are epitomized in the experiences of animal death. The memories analyzed illustrate the position of animals as friends and family members already in agrarian times, before pet keeping became a central part of the home and family. The narrators do not always make a clear difference in how they write about humans and animals: both are described as persons participating in relationships with (other) humans (Tipper, 2011).

It seems that in childhood, the human–animal boundary does not appear as clear-cut, but instead, mourning the death of an animal is comparable to mourning the death of a human. Children appear to have been willing to recognize their pets as conscious agents, often in situations where there are no adults present. Acknowledging animal agency at the moment of death, however, makes mourning the death more difficult (Redmalm, 2015), also for children. Expressing emotions related to animal death have also been culturally forbidden, which is seen in parents' relative silence and the challenges faced in communicating the grief between parents and children. By emphasizing the human–animal boundary, adults seem to have "lost sight" of their children and the agency they have displayed in their relations with animals. Recent changes in allowing the expression of emotions toward animals therefore also contribute to parent–child relations and to acknowledging children's own agency.

Jones (2003) notes that in memories of something permanently lost in childhood, mourning it easily becomes intertwined with the lost childhood itself. In

remembering the deaths of close animals, the authors of the narratives may express feelings about their childhood more comprehensively, including parent–child relations and the general happiness or unhappiness that characterized their everyday life as a child. It is evident, however, that in the relational networks of childhood, animals and their lives and deaths are an inseparable part of everyday existence.

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Unearthing Withling(s): Children, Tweezers, and Worms and the Emergence of Joy and Suffering in a Kindergarten Yard

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Abstract

While there have been several attempts to account for relationships between humans and nonhuman animals in the social sciences and humanities, the discipline of education has, until recently, steered clear from the so-called animal turn. Drawing on post-anthropocentric theorizations, we introduce a concept of withling(s) and develop it empirically in the context of early years education. In particular, we zoom into one practice of science education at a kindergarten in order to consider what kind of child-animal relations are and might become invoked. Our concept of withling(s) is not an a priori positive relatings, as during the dance between earthworms, pupils, teachers, and technologies, both joy and suffering are invoked simultaneously.

Keywords

Withlings · Child-animal relations · Early years education · Multispecies ethnography · Worms

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Introduction

This chapter is based on a wider study of children's emergent more-than-human literacies explored at early education contexts in Australia and Finland (Somerville et al., 2016). The data grounding this chapter was produced mainly with children and chest-mounted action cameras during a total of eight research visits (c. 16 h of audiovisual material) to a kindergarten in Finland, in the spring of 2016. In this chapter one selected episode from this data is discussed in detail. The theoretical-methodological approach of the chapter embraces post-anthropocentric qualitative inquiry, multispecies inquiry in specific (e.g., Kirksey & Helmreich, 2010; Wilkie, 2015). The novel, yet rapidly emerging approach of multispecies ethnography sees animals as embodied individuals sensing and making meaning of their environment and thus legitimate participants in ethnographies of shared lives (Buller, 2014).

We conceptualize children and the nonhuman animals that cohabit the yard as "withlings" and the processes they engage in as "withling" (verb). This chapter is an exploration and discussion of how withlings and withling help us further understand complex and often conflicting emergence of child-animal relations. While in many ways akin to Donna Haraway's (2008, p. 330) critters as a "motley crowd of lively beings" that are "always relationally entangled rather than taxonomically neat," the construct of withling(s) – simultaneously a noun and a verb – encompasses mattering for those involved (on mattering see, e.g., Rautio & Jokinen, 2016). Where critters can be microbes and fungi that matter bio-physiologically but often implicitly to a human child, withling targets those co-beings children themselves identify as mattering for them. This is a neglected aspect as child-animal relations research tends to emphasize developmental views beyond children's own experiences and actual, particular, and contextual encounters (Rautio, Hohti, Leinonen, & Tammi, 2017; Tipper, 2011).

There are many attempts to account for relationships between humans and other animals in the social sciences and humanities. Majority of human animal studies (HAS and/or critical animal studies or CAS) are conducted within or stem from anthropology (e.g., Hurn, 2012; Ingold, 1988, 2013; Noske, 1997), geography (e.g., Buller, 2014; Wolch & Emel, 1998), cultural and literary research (Fudge, 2002; Wolfe, 2003), or more recently also sociology (Irvine, 2004; Taylor, 2012; Wilkie, 2015). Rhoda Wilkie (2015) points out that each discipline embracing human animal studies both shapes HAS and is shaped by it. For example, the increasing interest of sociologists in HAS both animalizes sociological imagination and socializes HAS.

The discipline that has, until recently, stubbornly steered clear from HAS (and CAS in particular) or only dealt with it via psychology is education. Conversely, most of HAS research (excluding psychological studies) have not explicitly dealt with children or educational thought. And so, the recent advances in early childhood education (e.g., Pacini-Ketchabaw & Nxumalo, 2015) and environmental education (Lloro-Bidart, 2016; Spannring, 2015, 2017), as well as educational philosophy (e.g., Pedersen, 2010; Snaza & Weaver, 2014) of engaging HAS can be thought of as beginning to animalize education and perhaps in time to also child-orient HAS.

The so-called animal turn (Armstrong & Simmons, 2007) in the social sciences and humanities has been reviewed efficiently, for example, Reingard Spannring (Spannring, 2017; or Oakley et al., 2010) from the viewpoint of environmental education, Teresa Lloro-Bidart (2015) from feminist (posthuman) scholarship and education, Birke, Bryld, and Lykke (2004) from the viewpoint of feminist science studies, and Rhoda Wilkie (2015) within sociology. These reviews present conceptualizations of human-animal relations that often foreground performativity. This means a focus on mutual creative becoming where the smallest unit of analysis is not the participating individual but the relation (Haraway, 2003) or in other words the interdependence (Pickering, 2005) of beings.

Donna Haraway (2008, p. 249) talks about tangled species as infoldings engaged in "dance of world-making encounters." For Andrew Pickering (2005), the dance is that of agencies. Both include a multitude of other actors or technologies and things beyond the human(s) and the animal(s) in the choreographies. Vinciane Despret (2004) in turn focuses her conceptualization closer to the animal bodies and talks about anthropo-zoo-genesis where bodies of different species accomplish something together because of each other and the ways their bodies are able to "attune" to each other. Traci Warkentin (2010) calls for an "interspecies etiquette" for meeting up with other animals and emphasizes attending with one's body, rather than only verbally or by looking.

Relying on species constructs and on human-animal engagements between adult humans and the animal individuals as if ageless, the existing research can appear slightly "off" when working with younger humans. This is because the species constructs that the earlier research aims to unsettle are only in the process of being constructed in the everyday lives of younger humans. And, arguably, this is taking place through an intense phase of socialization into speciesism and anthropocentrism (Pedersen, 2010). So rather than focusing on undoing of something already settled (a habit of thinking anthropocentrically or through the construct of species), research with children focuses *also* on the ways in which that something is continually in the process of being normalized, sedimented, or "striated" (Deleuze & Guattari, 1987) within the historical-social-cultural-material contexts of the child-animal relations.

Following the outdoor playtimes of circa 20 kindergarten children for 2 months, we became drawn to generative "world-making" events in which dances of agencies produced children and the animals encountered not as entangled companions but distinct and hierarchically anthropocentric. To begin to address what was happening – and why other possibilities were not actualizing – we begun to craft a conceptual tool the use and definition of which is the focus of this chapter. The concept of withling(s) will focus us on the ways in which the dances and choreographies of Haraway and Pickering can also end up creating, repeating, and reinforcing speciesism and binaries – in children's lives in particular (Russell & Fawcett, 2013; Spannring, 2017).

Taking seriously the need to renew our concepts for the benefit of processually entangling onto-epistemology (Deleuze & Guattari, 1987), we now turn to introduce our concept of withling(s). After a short introduction to the empirical context in which the concept emerged, we provide an episode we have named "worm rally" in

order to put it to work. Finally, we move on to a more specific conceptualization in order to make future experimentations possible.

Emergence of Withling(s)

The concept of withling(s) functions as both a noun and a verb, thus interfering the commonplace linguistic separation of the subject, object, and the direction of the doing. As a noun, it points toward the participants who comingle in the process of "becoming (different)" (Deleuze & Guattari, 1987) – withlings. As a verb, it suggests the ongoing assembling, collaborative and relational doing – withling. As a consequence, thinking with this concept allows us to consider what comes together in the analyzed events, as well as what other kinds of withling could also become possible in the given developments. Thus, it resembles the Bergsonian insight of descending and ascending and Deleuzo-Guattarian (Deleuze & Guattari, 1987) translation of it as virtual and actual, possible and real.

This chapter is based on a wider study of children's emergent more-than-human literacies explored at early education contexts in Australia and Finland (Somerville et al., 2016). The data grounding this chapter was produced mainly with children's chest-mounted action cameras during a total of eight research visits (c. 16 h of video) to a kindergarten in Finland, in the spring of 2016. In this chapter one selected episode from the data is discussed in detail – that of a worm rally. In the whole data, there are altogether more than ten different children who take turns in carrying the camera. In the worm rally depicted in this chapter, the camera is carried by one 6-year-old boy during a 2-h outdoor playtime in the morning.

The theoretical-methodological approach of the wider study, as well as our approach to the overall theme of this handbook, childhoodnatures, locates within the rapidly emerging "posthumanist" (i.e., beyond or after humanist, human-centered) approaches to educational research (e.g., Snaza et al., 2014). Posthumanism is often seen as converging with "sociomaterialism," "post-anthropocentrism," "new materialism," or "new empiricism" and is mobilized by theorists such as Haraway (2008), Braidotti (2013), Latour (2004), Bennett (2010), and Stengers (2011). At the core of these approaches, there is a focus on the *relations between partaking entities* rather than on the individual (human) actors or groups of humans. This means that emphasis is on the shared processes through which relations take place rather than on individual (human) views of these relations or exclusively human sociality and meaning making where the environment remains as a mute context for human activities. This approach highlights a premise for childhoodnature according to which humans and their nonhuman surroundings do not exist as independent of each other (Malone, 2015; Pedersen, 2010; Rautio, 2014; Snaza & Weaver, 2015).

Aligning with posthumanism as a theoretical approach, the emerging approach of multispecies ethnography (Kirksey & Helmreich, 2010) foregrounds all animals as legitimate participants in ethnographies of shared lives (Buller, 2014). According to Maurstad et al. (Maurstad, Davis, & Cowles, 2013, p. 323), "these ethnographies

allow for a radical rethinking of natural and cultural categories for analysis." Multispecies ethnography of withling(s) focuses on human-animal coexistence in terms of not only what the individuals are (biologically) but what they do (biosocially) and not as beings but as becomings creating themselves together through action and interaction within their surroundings (also Ingold, 2013). These becomings can be viewed through Ingold's ideas about the relational constitution of being (Ingold, 2006, p. 12) where organisms are thought of "as trails along which life is lived." They form a meshwork, a web of lines of growth. Also persons "extend along the multiple pathways of their involvement in the world" (Ingold, 2006, p. 13) with other becomings and withlings.

The materials produced by chest-mounted action cameras provided us audiovisual material of children's biosocial cominglings in the yard of a daycare center. As the cameras were propped on humans and due to our natural(ized) ontological attitude and our adjacent training as scholars, we had to intentionally resist perceiving the "child" and "environment" as separate from each other. Instead of reducing children's doings to intentional actions in an environment that functions as if a backdrop of affordances for the humans, we focused on viewing the engagements as ontologically a priori to "child" (or to any single individual element). This is to say that we focused on how different kinds of doings emerge temporally, spatially, and materially, producing different variations of a "child" (and of other individualizable elements or beings). This is how the notion of withling(s) begun to emerge. We realized we were searching for simultaneous relational emergence of subjects and doings – withlings and withling.

Worm Rally

The kindergarten yard comprises sand, rocks, pebbles, pine trees, toys, recycled play materials, slides and jungle gyms and swings, three smaller and one bigger playhouse, a storage building, teachers, a researcher, and many other animals such as earthworms. There is a compost behind one of the buildings. In the middle of the yard, there is a long table with benches. A child with an action camera is running back and forth between the compost and the table, delivering worms from the former to the latter. In what follows, we will first describe the event we named a worm rally. The description remains fully anthropocentric and is then followed by a rereading with the concept of withling(s) to exemplify how it highlights non-anthropocentric and relational emergence of subjects and doings.

> The child is walking from the compost towards the table. He is holding a worm with tweezers. He keeps his other hand palm open under the worm as if for safety. He goes to the table, takes the worm from the tweezers, drops it into a small plastic cup with water in it and after rinsing the worm, he moves it to another container with other washed up worms. There is also another worm in the water container, which he tries first to take with the tweezers but decides after all to take it with his hand. "Dirty work", he utters, drops the worm in the container with washed worms and looks at his hand.

There are also magnifiers, containers, gloves, hats and a book on the table. Other children's voices echo the many games that are evolving in other parts of the yard.

The child looks at the worms, "Jaakko, we're not going to wash that [worm] – that one is not at all dirty", he comments to the teacher, who agrees. Then the teacher begins to organize the table. The child spends time by the table, looking at the worms with a magnifier. Then he checks what other kids are doing. While chatting with them, he presses his own finger with the tweezers.

The child returns to the table and lifts one of the worms from the container. He then heads back towards the compost. At the compost there is a teacher (Anna) and another child digging the ground. "Anna, I have grippers". Anna glances at him and returns to digging. The boy starts to look for worms using both his hands and the tweezers. His friend finds a worm. There is a lot of excitement in the movements of the children. He places the worm on his hand and tries to catch it with the tweezers. It takes a while before he succeeds as the worm squirms. As he succeeds, he cries out: "Now it won't be able to flee!" He bypasses Jaakko and repeats: "Now it won't be able to flee". He rinses the worm and places it in the container with other cleaned up worms. And then starts heading back to the compost, now with increased speed. He is running.

The children at the compost have found two worms. The child with the camera takes them in his tweezers and walks back to the table with a faster pace. "Jaakko, again two worms in the grippers!" Rinses them. Puts them in the other container. Runs back at the compost. Takes another worm and places it in the tweezers. Drops the worm half way to the table. Picks it up in his hand. "This is so little that it's not possible to have it in the grippers!" He checks quickly what others are doing. And runs again. "Worm alert, worm alert!", he exclaims to another boy.

The child has now one worm in the tweezers and another on his hand. "No, no, no!", he comments when the worm almost drops from the tweezers. "Here come many worms to be washed!", he yells excitedly to those at the table as he approaches.

This worm rally is repeated quite a few times during the outdoor playtime. Worms start to pile up in the container, some of them now very still. Children are leaning against the table, watching the worms, and studying them with magnifying equipment. The child with the camera runs and delivers, every now and then jumping over obstacles, and checking what the others are up to, at some point telling a joke, but delivering the worms with tweezers is the doing that he sustains. When we listen carefully, we hear his heartbeat speed up as the worm rally repeats and repeats.

Worm-Child Withling(s) During the Worm Rally

The worm rally is an example of a repetitive pattern of the daily outdoor playtime: whenever the children encounter an animal, usually a bug of some kind, they call for

Jaakko (one of the teachers) who then proceeds to fill the long table with equipment for inspecting the found creatures. As he is preparing the setup, the children form a neat queue at the end of the table. Everyone knows this choreography by heart.

On the surface, and through a conventional humanist and anthropocentric reading, this kind of practice reflects the participatory and child-centered ideals of contemporary pedagogical practices. The looseness of the adult-led instruction provides opportunities for the children to initiate, to explore, and to engage in activities that are commonly valued and to rehearse meaningful tasks and skills such as collecting samples and practicing fine motor skills with tweezers. The recurring nature of the worm rally is not exhaustive in that it becomes continuously interrupted by various encounters between pupils and teachers at the yard. It works its way through various rhythms, accelerations, and slowing downs in between of which it becomes continuously reenacted. For example, the rally is continuously augmented by greeting of others, chatting, and observing what else takes place at the yard among fellow humans. In sum, the worm rally is an example of the material practices of (science) education in the given kindergarten. This practice is intensive because it becomes reenacted almost on a daily basis and is thus able to endure and become routinized.

Our concept of withling(s) encourages us to reconsider the worm rally, however. A focus on the comingling of humans, nonhuman animals, and technologies, including the worm's perspective, affirms the critique that animals are often objectified, especially in educational practices (Pedersen, 2010). Animals are engaged as objects of human vision and practices (Haraway, 2008; Spannring, 2017). When the magnifying loops are brought to the table to study the worms, they become objects of inquiry. As they are carried with tweezers to the washing spot at the table and put afterward to another container with other rinsed worms, they are actively separated from their commonplace set of relations where dirt, microbes, birds, and compost play a significant part. They become relocated in another assemblage where shovels, containers, tweezers, science books, and magnifiers among others participate in the emergence of "child," "worm," and "education." This child-worm-education "meshwork," a field of interwoven lives (Ingold, 2006, p. 13), consists of lines of material flow that are also the "pathways of biosocial becoming" (Ingold, 2013, p. 18).

The ongoing withling in the worm rally is sustained and facilitated by certain technologies, namely, the tweezers, books, and magnifiers that work on both the worms and the children: the withling that children and worms participate in is giving birth to certain kinds of worms and children, certain kinds of withlings. As the worms are literally washed away much of their previous "wormness," they become what might be called techno-scientific worms – as do the children. The pathways of children and worms are pedagogized with the "worm-kit," tools for investigating the worms, and formed into a meshwork of children, worms, adults, soil, water, and tools.

The ethical consideration that the worms are also living becomings with experiences and that they are valuable as what they do (see also Shapiro, 2002) is nonexistent in the recurring worm rally. What Haraway (2008, p. 20) calls "a simple obligation of companion species" has to do with the curiosity about what the

companion "might actually be doing, feeling, thinking, or perhaps making available" to the other participants in the situation by "looking back at" them. The bodies of (earth)worms are assembled in a way that doesn't enable them to look back in a literal sense. They do not have eyes through which to sense the depths of their becoming. They don't have a "face" even though they have a mouth and a body, for example.

Understood as embodied and relational becoming, the concept of withling(s) allows us to consider a variety of ways in which humans and worms comingle – not all of which are desirable from the viewpoint of all involved. In short, withling takes place and produces withlings simultaneously. Whether the outcomes are good or bad or something in between is up for ethical discussion. For example, when the child in the worm rally places the worm on his bare hand, the two living bodies inevitably touch each other. There is a subtle collaboration of these two bodies, an attunement (Despret, 2004). Now, the important question arises: *how come this touch between living bodies does not begin to matter?* Why doesn't this dance draw an empathetic line of flight from the striated patterns of objectifying inquiry? Would it be possible for such an encounter to trigger "joy of withling," of cohabiting the world as mattering and interdependent becomings?

Instead, we interpret such a joy emerging as the child becomes enmeshed with the practice of science education as it materializes in the kindergarten yard in relation to adults, books, magnifiers, containers, and tweezers among other things. As the child is running between compost and the table, carrying worms, the space that comprises all of these processes becomes striated hierarchically (Deleuze & Guattari, 1987). This is supported by the historically formulating technologies and discourses regarding what it is to study nonhuman animals. This analysis yields an important thought for conceptualizing withling: *it is possible for joy and excitement (of the human) to become mingled with patterns of objectification and domination.* In the case of the worm rally it is thus worth mentioning that after the excited and joyful exploration and studying of worms, the worms were left in a plastic container with little soil and a lid for over a week, resulting to their drying out and dying.

Instrumental in perception, conceptualization, and treatment of other species is their cultural meaning and place in "sociozoologic scale" (Irvine, 2009). Worms are at the very bottom of the scale in a Finnish cultural context, far from culturally revered species such as bears or horses, which can also be included in the so-called charismatic megafauna, majestic or cute animals that have characteristics that appeal to humans (DeMello, 2012, p. 53; Lorimer, 2007). Withling(s) as an analytic tool directs attention to the emerging of such scales: how things and beings become certain kinds of things and beings, and not other. How an earthworm becomes a techno-scientific worm and not, say, a compost-dancing worm, or a fish-luring worm, or a bird-food worm.

Withling(s) is a tool that maps relations and becomings as complex, often simultaneously positive and negative. And it yields us insights of how engaging with "just a worm" transforms also us, and not just the worms. From an ontological presupposition that emphasizes relationality, entanglement, comingling, and

co-dependence (e.g., Deleuze & Guattari, 1987; Haraway, 2008), there is no such thing as only a worm. And as a provocation, is it not so that a kind of micro-fascism (Deleuze & Guattari, 1987) was actualizing in the case of worm rally? A mass incarceration, experimentation, and eventual slow death. This is a far cry from the cute and innocent representations of child-animal relations well known in the Western cultural imaginary (Taylor & Pacini-Ketchabaw, 2017).

On the Possibilities of Alternative Worm-Child Withling(s)

In what follows, we will briefly discuss whether the emergence of techno-scientific withling(s) really had an alternative in the worm rally. From the get-go, the tweezers had a significant role in "striating" the space of the worm rally (Deleuze & Guattari, 1987), building a distance between bodies, thus defining the possibilities for *touching* in withling. The tweezers can be understood as actors that, in relation to magnifiers and other tools, work to produce a distinction between a knowing subject and a known object – they bring with them the power to set living bodies apart. Tweezers carry with them, as participants of the striating space, the way in which humans, in their attempts to understand what a worm is, come to construct a worm that did not exist before this act. Each particular worm with each particular child (not to forget the adults) becomes enmeshed with the techno-scientific assemblage. Yet, many of the potential directions regarding what it is to be a worm – and a child – remain unexplored or at least uncognitized. Maybe the bodily worm-child encounter was not intensive enough in the given relational assemblage to trigger care regarding the wormly other.

Ethologically thought (e.g., Lorimer, 2007), worms and humans have differing capabilities to affect and become affected. The bodies of worms in the particular circumstances did not allow them much opportunities to resist or flee. The material-discursive practice within which the worm rally emerged, on the other hand, did not allow the child (or adults) opportunities to attune with the movements (such as potential resistance) of worms. While the worms became techno-scientific worms, the human participants became enmeshed with the technologies and the anthropocentric histories they brought along. Yet, these were being actively practiced and, on the human part, enjoyed as well.

Haraway (2008), among others, asks if there are ways in which it is even possible to us to *learn to respond*, to the suffering, joy, and quotidian, of the multiplicity of others. Which invitations to respond can we recognize when they are offered; how can we foster sensitizing to withlings that might open up new movements in response-ability? As Haraway (2008, p. 35) firmly puts it: "When species meet, the question of how to inherit histories is pressing, and how to get on together is at stake." Withling(s) is not a positive or negative concept. Rather, the concept of withling(s) invites us to consider multiplicities and the ways in which they become produced. The worm rally exemplified how joy and excitement can coexist with objectification, domination, and suffering.

Conclusions: Conceptualizing Withling(s) in the Context of Education

The inventive etymology of withling(s) can be located in the notion of "earthling," the meaning of which is derived from science fiction. Conceptualizing the critters of planet earth as earthlings allows for distancing and belittling considerations. Our own species is seen as part of other earthly species from a distance (maybe by extraterrestrials). The diminutive -ling suffix allows us to question the ongoing production of hierarchies and human exceptionalism as it positions all critters as changing and learning becomings, assemblages of forces stable enough to undergo continuous transformation (see also Braidotti, 2006).

While earthling refers to the species and individuals cohabiting our planet, withling(s) emphasizes the connections, relations, and entanglements of these bodies: their co-constitution in movement, or dance, following Haraway (2008) and Pickering (2005), among others. Here we have focused on human-animal withling(s) and how different versions of human (here, child) and animal (here, earthworm) emerge or, indeed, don't emerge, as part of earthly practices including participation of different technologies (such as tweezers) as well. Withling(s) refers to the ways in which bodies become different as they take part in each others' corporeal (physical, chemical, psychical) and social life. Withling(s) is corporeal and real, affective and practiced.

Withling(s) is a political concept as it allows us to ask and speculate, what certain encounters made possible for its participants and, importantly, what might also have been possible. In Deleuzian words, what kind of molecular de- and re-territorializations were taking place? Withling(s) is not loaded merely with positive and emancipatory meaning but takes seriously the potential presence of both joy and suffering in the process of repeating while becoming different (Deleuze & Guattari, 1987). Philosophically, withling(s) directs us to questions, such as what is it to be and become with, what are the conditions in the situation to become with, with what else are we becoming, and what are the potential and actualized directions of withling(s)?

As our data is situated within an educational context, we will now turn briefly to consider some emergent pedagogical issues. Recently Spannring (2017, see also Taylor & Pacini-Ketchabaw, 2016) has pointed out a tension between the practices that objectify nonhuman animals and the aim for fostering sustainable futures. The objectifying and commodifying practices, such as animal dissection and holding nonhuman animals in captivity for the sake of human curiosity and learning, may intensify desensitization among students (Spannring, 2017). This argument begs a question: what is being taught when nonhuman animals are removed from their assemblages and relocated within new ones as was the case in the worm rally? While worm rally made possible the meaningful participation of pupils in the practice of science education and evoked emotions on this regard (e.g., excitement as manifested in increasing speed of the repetition and of the heartbeat), it seemed to suppress the compassionate affectivity in human-nonhuman bodily encounters and end up lethal for the particular worm withlings. Could other pedagogical practices be

crafted in order to promote compassionate affectivity and making oneself available (Despret, 2004) much needed to tackle the Anthropocene?

There are some promising studies regarding what these practices might be. Among others, these include Warkentin's (2011) study regarding the potential in nature journal keeping in a particular spot, "a slow pedagogy of place," Fawcett's (2002) encouragement to keep journal on the changing relationship with the chosen nonhuman animal, and considerations regarding the ways in which animals, such as a spider, living in the classroom participates in the daily life of pupils and teachers (Affifi, 2011). Likewise, Gannon (2015) has argued for "open-ended interdisciplinary inquiries" enabling a range of modes of response, such as rap songs, picture books, and dances.

Our concept of withling(s) is one further attempt in this direction. Our argument is not so much that treatment of worms in particular should be our main interest in answering the issues related to the Anthropocene and sustainable futures. Rather, we have taken pupil-worm-teacher assemblages as an example of the way in which nature-culture divide is being performed in material-discursive science education practices in kindergarten and ask, whether conceptualizing such encounters as withling(s) might contribute to developing responsible, respectful, and attuned encounter between humans and their supposed others. We hope this will inspire and invite further analyses and experimentations as well as contribute to "animalizing" educational practices while not forgetting the child, teacher, technologies, and the striating histories they all may bring along.

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Insect and Human Flourishing in Early Childhood Education: Learning and Crawling Together

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Elizabeth Y. S. Boileau and Constance Russell

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Abstract

Insects and children cohabit common worlds, both subjects of their own lives and active agents. Their encounters may be characterized by mutual curiosity, indifference, or fear and can lead to multiple outcomes. Some children will be bitten or stung while others will be unhurt; some insects will not survive an encounter while others will be cared for as friends. The literature on insect/human relations indicates that many people have negative perceptions of most insects, which can have profound material consequences; consider the many challenges insects face at the individual, population, and species level due to human activity. Insects feature in various ways in early years and elementary education, from highly anthropomorphized charismatic microfauna in children's media and literature to pinned collections of dead bodies, from captives in classroom terrariums and in insectariums to encounters inside and outside the classroom both planned and serendipitous. Drawing on our own teaching experiences and writing in critical animal studies, environmental and interspecies education that focuses on our

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relationships with other animals, and common world pedagogies, we question the anthropocentric nature of many of these encounters and ask how we might offer young children opportunities to develop ethical and caring relationships with insects, including those who are commonly feared, disliked, or simply overlooked. We argue that intersubjective learning that goes beyond the human and that recognizes the messiness and complexity of insect/human relations holds promise for multispecies flourishing.

Keywords
Insects · Insect/human relations · Early childhood education · Common world pedagogy · Interspecies education · Environmental education · Critical animal studies

Introduction

> Insects are reminders that we are ecologically entangled in ways we often only dimly perceive and are impacting the environment and other species in damaging ways we frequently ignore. (Loo & Sellbach, 2015, p. 80)

Why do some children stomp on insects while others treat them as friends or pets? How might attending to young children's lived experiences with, and perceptions of, insects help us better understand the common worlds that humans and insects share so that we can offer children opportunities to develop respect and care not only for charismatic insects like butterflies but also those who more typically evoke fear or disgust? How might an early childhood educator make the most of chance encounters with insects? What are the pedagogical and ethical implications of going outside to purposely seek out insects, taking a field trip to an insectarium, keeping captive insects in the classroom, or displaying dead insect bodies? In what ways might these various pedagogical interventions contribute to protecting ecologically vulnerable insect species as well as other creatures facing extinction, extirpation, or harm? To help us explore these questions, we draw on writing on human/insect relations, common world pedagogies, and environmental and interspecies education to argue that attending to and encouraging young children's relationships with other animals, particularly the "creeping crawling critters disdained by others" (Haraway, 2016, p. 151) and the overlooked ones "deemed unworthy of consideration" (Bell & Russell, 1999, p. 74), holds much potential.

We also are drawing on our professional experiences in Canada. Elizabeth has worked as a preschool teacher, instructed preservice early childhood education courses at the community college level, and for 3 years was a scientific interpreter at the Montreal Insectarium. Constance has been involved in environmental and interspecies education for close to 30 years, working with children and adults in both formal and informal learning environments, some of which has included pedagogical explorations of insect/human relations. In all our work, we seek to help create

conditions for humans, other life, and the land to thrive, that is, for multispecies flourishing (Ginn, Beisel, & Barua, 2014; Haraway, 2016).

In this chapter, we begin by offering a rationale for the inclusion of insects in early childhood environmental education then turn our attention to research on insect/human relations to provide some context. We then review the growing literature on insect encounters in education before wrapping up with a call for educators to work towards both insect and human flourishing.

Why Insects?

First and foremost, insects matter intrinsically. They are subjects of their own lives, and as with all members of the more-than-human world, their existence need not be justified on human terms (Bell & Russell, 1999, 2000). Alas, we live in profoundly anthropocentric times, so regular reminders that humans are not the center of the universe nor inherently superior to and entitled to dominate other life appear to be necessary. Insects appeared approximately 400 million years ago. Their long history of adaptation on earth in almost every terrestrial ecosystem makes them a hugely diverse group of animals today. There are more than 925,000 named species, although there could be five to ten times more species that have yet to be scientifically observed (Bourassa, 2011). Indeed, the majority of species yet to be identified are probably insects (Bernhardt, n.d.).

Insects are greatly affected by human activity such as "destruction of both wintering and breeding habitats, heavy use of pesticides, shortage of natural insect and plant food, and artificial light pollution causing errors in migratory navigation" (Wilson, 2016, p. 60), leading many species to extinction. Cardoso, Erwin, Borges, and New (2011) note that "when corrected for knowledge bias, data from invertebrates show even higher extinction rates and proportions of threatened species than those of well-known taxa such as birds and mammals" (p. 2648). Insects are disappearing before our eyes, and it feels like a race against time to build sufficient knowledge about how we might help them, especially given underfunding of research on insects and other invertebrates (Cardoso et al., 2011) and limited attention to human relationships with most insects (Lemelin, 2013; Lloro-Bidart, in press; Loo & Sellbach, 2015), especially the "unloved others" (Beisel, Kelly, & Tousignant, 2013, p. 114). Even though more attention is being paid to insects than in previous decades, there is still a long way to go in understanding insect distribution, abundance, ways of life, and sensitivity to habitat changes (Stewart, 2012). In Canada, for example, of the 1001 species currently found on the official wildlife species at risk list, there are about twice as many birds (131 species) and mammals (144 species) as there are arthropods (68 species) (Environment Canada, 2017) despite the fact that arthropods outnumber other species significantly (Biological Survey of Canada, 2014).

Essential to sustaining ecosystem balance vital to the survival of other life, including humans, insects make contributions as pollinators, decomposers, prey, and predators. Without the "service" of insects and other arthropods, it is highly

likely that major food webs on earth would collapse (Wagler & Wagler, 2014). Insects have also been considered important as a source of food and medicine, a focus of scientific and leisure interest, and an inspiration for art and music (Kellert, 1993; Lemelin, 2013; Wagler & Wagler, 2014).

Insects also can play a significant role in the lives of young children. They can be observed with curiosity or as subjects of study, cared for as pets, feared, or simply ignored as insignificant creatures. Conversely, children also can play a major role in insects' lives as they have the power to kill or protect these small creatures. Given the many challenges insects face at an individual, population, and species level at the hands (or feet) of humans and given that the tenor of insect/human relations is thought to be established early, we argue that it would benefit insects if children developed respect for and a desire to protect them. Or, at the least, in recognition that some insects do bite or sting or threaten other life and that there are no innocent moves in multispecies flourishing (Haraway, 2016), to not despise and wish to eradicate them entirely.

Since insects and young children encounter each other daily, both indoors and outdoors, how they affect each other merits examining and a number of early childhood educational researchers, notably those interested in common world pedagogies, have done so. Indeed, besides companion animals, insects appear to be the most commonly researched animals other than humans in common world pedagogies (e.g., Atkinson, 2015; Blaise, Hamm, & Iorio, 2017; Nxumalo & Pacini-Ketchabaw, 2017; Taylor & Pacini-Ketchabaw, 2015), and they also feature in other writing on environmental education with younger children (e.g., Bell & Russell, 1999; Blenkinsop, Piersol, & De Danann Sitka-Sage, In press; Edwards, Moore, & Cutter-Mackenzie, 2012; Guyton & Connington, 2013; Lyman, 2014). That insects are often readily available to young children as well as to the researchers observing them partially explains their presence in this work, but some educators offer other rationales for their inclusion that we consider even more compelling.

Bell and Russell (1999), for example, are concerned about creatures who seem to rarely merit consideration and who find themselves facing "another form of discrimination – a sort of intolerance by omission" (p. 74), a phenomenon they argue has implications far beyond insect/human relations. We also think there is much to be learned by "considering how multispecies flourishing works when the creatures are awkward, when togetherness is difficult, when vulnerability is in the making, and death is at hand" (Ginn et al., p. 114). As Ginn et al. (2014) observe, "Many nonhumans we consider unpleasant or disgusting are our companions—consider for instance ant colonies in our kitchen, water bugs in the shower, or slugs in the vegetable patch" (pp. 115–116). Such insects and other invertebrates are typically labeled *pests* and *vermin,* which can "set fatal contours to our relationships with creatures so designated" (Bell & Russell, 1999, p. 73). Mayo (2016) asserts that "our relationships with animals or any kind of vermin need not be pleasant in order to be ethical. Indeed, ethical relationships that happen to be pleasant, we know, are the easiest sort" (p. 191). We agree with Haraway (2016) who suggests that we must learn how to "stay with the naturalcultural multispecies trouble on earth" (p. 40) that insect/human relationships can so powerfully evoke.

Insect/Human Relations

It is argued that one of the main challenges facing insect conservation is that many people do not appreciate insects. Early research conducted by Kellert (1993) on perceptions of invertebrates suggested that adults generally have a "negativistic attitude" (i.e., fear, dislike, indifference) towards them and that the "most infrequently encountered attitudes toward invertebrates included affection, ethical concern, or scientific curiosity" (p. 850). In the same vein, Davey (1994) found that invertebrates evoked fear responses more than other types of animals. Lockwood (2013) suggests that humans tend to fear insects due to their quick unpredictable movements, their ability to invade what we consider to be our space, and that some insects bite or sting us. They also can be perceived as disgusting because some are vectors of infection and disease, contaminants in our food, or are found in garbage dumps and sewage as well as on carcasses (Lockwood, 2013). Some researchers rationalize such negative reactions to insects on the grounds of "biological preparedness," arguing that humans are prone to an aversion of insects and other invertebrates such as spiders because these are potentially hazardous to human survival (Breuer, Schlegel, Kauf, & Rupf, 2015; Gerdes, Uhl, & Alpers, 2009). Others assert that insects cannot cross the "neoteny barrier," referring to the characteristics that some mammals share with human youngsters, like large eyes, a small nose, a round body shape, and short appendages (Borgi & Cirulli, 2015; Estren, 2012), implying that few insects invoke human empathy simply through their morphology.

Lemelin (2013), however, questions much of the research on insect/human relations, asserting that it "has tended to support a human–animal binary of humans vs. animals, pest vs. friend, biophilia (the love of living things) vs. biophobia (the fear of living things), entomophilia (the love of insects) vs. entomophobia (the fear of insects)" (p. 155). He criticizes such research for being simplistic as well as for reinforcing speciesism and entomophobia. Instead, he has found that ethnographic studies have offered more nuanced understandings, revealing that "the fear of insects is not universal, nor does it always result in disgust and the fright response. Indeed, some of these encounters are met with indifference and apathy while others can actually result in awe, jouissance, and epiphanies" (p. 157). The universalizing discourse about generalized humans in much of the research on insect/human relations is indeed problematic and would benefit from engagement with writing that seeks to decolonize animal studies (e.g., Lloro-Bidart, 2017) as well as with multispecies ethnographies that feature insects and other critters alongside humans (e.g., Atkinson, 2015; Lloro-Bidart, in press; Nxumalo & Pacini-Ketchabaw, 2017; Taylor & Pacini-Ketchabaw, 2015).

A common refrain in studies of insect/human relations is that our perceptions of insects are formed early (e.g., Borgi & Cirulli, 2015; Schlegel, Breuer, & Rupf, 2015). As an example, Elizabeth shares this recent encounter with one of her nephews, aged 4:

> Working on a craft project, he cut out animal pictures from National Geographic magazines, carefully categorizing them and gluing them on a large cardboard to create a visual representation of his views of animals. He had a section for what he called the "cutest" and the "not cute" which he then subdivided into "ugly" and "scary" (although it should be noted that he said that he did not find many of them scary himself but was imagining which animals other people would find scary). According to him, "cute" animals are those who look like babies and that are small like mice, rats, frogs, birds, and his current favourite, tapirs. Viewing his final creation, I noticed a brightly coloured butterfly in the "cutest" section. All other invertebrates (scorpion, mantis, centipede) were seen to be ugly or scary.

Indeed, butterflies seem to be an exception to the generally negative perception of insects. Often adored as a symbol of beauty and grace and more easily tolerated because of their perceived harmlessness to humans, butterflies have been collected since the nineteenth century and their popularity continues as demonstrated by the recent growth in butterfly gardens and monarch conservation efforts (Lemelin, 2013). It was clear to Elizabeth from her experience working at the Insectarium that, for many of the visitors, butterflies are not *really* considered insects.

Few other insects appear to be as generally well liked in Western society as butterflies, but even they elicit mixed responses. For example, Elizabeth recalls from her time working in the Insectarium that some children, mainly young girls, became suddenly terrified upon entering the live butterfly exhibit. The only way to calm their panic was to escort them out of the exhibit and attempt to talk to them out of their fear, illustrating an important role educators can play in helping children (re)interpret their experiences. In short, then, responses to insects are complex and a number of factors are in play. Lemelin, Harper, Dampier, Bowles, and Balika (2016) list direct experiences in childhood as an important influence on insect/human relations. For example, wasp and bee stings can be quite painful and may even be life threatening in the case of allergic reactions. Therefore, getting stung can be "individual conditioning experiences" (Davey, 1994, p. 553) that might lead someone to associate those insects with pain and develop phobias (King, Ollendick, Murphy, & Muris, 2000).

Still, it is important to remember that not all children react in fear towards insects that bite or sting. Consider this observation from Taylor and Pacini-Ketchabaw (2015) of children interacting with ants:

> Sometimes, ants run up the children's legs or into their clothing and bite them. This is usually a form of retaliation against the children's provocations, or when the children simply do not notice that they are standing in the middle of a swarming ant nest. There have been some highly charged moments when frenzied ants scurry and bite and panicked children scream and squash. These fight and flight, life and death moments are marked by the rush of alarm pheromones and adrenalin and by the smell of formic acid. But the children who calmly observe the ants rarely get bitten. (p. 524)

It is not only direct experiences such as these that influence future insect-human relations. Lemelin et al. (2016) suggest that the portrayal of insects in popular culture, media, and scientific discourse also has an impact. In a study by Snaddon and Turner (2007), children were asked to draw a picture of their favorite insect and

these correlated with the insect's general popularity rather than the local abundance of a particular insect.

Timmerman and Ostertag (2011) point out that from the time they are newborns, children encounter representations of animals in books, toys, and wooden puzzles, and on clothing and bedsheets. Idealized charismatic megafauna and farm animals dominate whereas local invertebrates rarely feature, or when they do, barely resemble any creature actually in existence. Research by Claessen (2015) found that the portrayal of five invertebrates (ants, beetles, spiders, wasps, worms) in children's fiction, nonfiction, and comics were generally highly anthropomorphized. As Lemelin (2013) puts it, "even when we do incorporate insects into our popular culture (Bugs Life, Fern Gully, Bee Movie), we anthropomorphise these creatures into human-like protagonists, thereby reinforcing the notion that we can only admire those creatures most like us" (p. 157). While we share these authors' concerns, we also recognize that anthropomorphizing is not necessarily always a bad thing. Rautio (2013) suggests that it can open up imaginative encounters that can lead to befriending of other animals. Fawcett (2014), who conducted research on 5- and 10-year old children's perceptions of bats (who, like insects, are often feared and reviled), shared:

> One of the more startling results was that the younger children thought of the animals as their friends and were rarely afraid of them. . . The kindergarten children's stories contained the acknowledgement of difference, alongside elements of reciprocity, playfulness, empathy, and imagination between human beings and other animals. In their stories, the younger children described the animals as other subjects, both like and unlike themselves. (p. 265)

Describing what she called a "kinship ontology," she found that the "children's storied experiences transgress in authentic and irreverent ways the boundaries between humans and other animals, and productively play with Western ideas about friendship, kinship, and anthropomorphism" (p. 262).

Given the sheer numbers of insects and the fact that many of them co-occupy ground-level territory with children who are small, children and insects have the opportunity to share many moments together. Melson (2001) posits that "each creature presents a new vitality, a distinct form of aliveness, for the child to consider" (p. 82). For some, as Lemelin (2013) notes, this includes "the appeal of the negative sublime (the attraction of 'creepy-crawlers' and the 'yuck' factor)" (p. 157). While some young children may be content to merely observe the fascinating comings and goings of insects, many want to engage more actively. Some do so in caring ways. For example, Askerlund and Almers (2016) note that in their research on young children's relationships with nature in a forest garden, "the most prominent feature of the children's descriptions of the relationships was how they cared for the organisms in the forest garden, not least the insects" (p. 195). Still, as Atkinson (2015) observed in her research, one day children might be found caring for a slug and another day be killing ants. Indeed, many young children have stomped on bugs, pulled wings off insects, or roughly handled a small animal (Melson, 2001).

▶ Chap. 53, "Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective," suggests a variety of reasons for this behavior, including children struggling with aggressive urges or replicating family violence. Further, she argues that there is an important power dynamic at play since small animals might be the first living creatures children feel power over: "when those in power are inexperienced, with uncertain dominion over their own rages, and carrying the history of their own utter dependency … the probability of cruelty, casual mistreatment, and neglect increases" (p. 162). Although ▶ Chap. 53, "Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective," focuses more on children's relationship with pets, this power discrepancy is also evident with insects. A young child can easily crush an insect and feel a rush of power in deciding which creatures will live or die. A haunting example of this dynamic can be found in Loo and Sellbach's (2015) analysis of a story from Le Clezio's novel, *Terra Amata*. In the original story, a young boy examines a group of potato bugs, first observing them with curiosity. The tone of the encounter soon changes, however. Naming himself the potato bug god, he imposes order by containing them in small individual enclosures. When one refuses to stay put, the boy pulls off the legs of one of his "subjects" as punishment and eventually crushes it to death.

Developmentally, young children are exploring their environment, engaging with all their senses, and testing out their predictions of how the world functions. Children pulling legs off an insect may not always realize that they are causing the ants to suffer (Carruthers, 2007), but sometimes they are very much aware of what they are doing and stories of deadly encounters litter the literature on insect-child interactions. For example, Blaise et al. (2017) describe a young boy stomping on a wasp while shouting, "I don't like bugs!" (p. 41). And Blenkinsop et al. (2017) share a powerful anecdote of a young boy squashing two ants in direct response to another boy and a female teacher showing interest in and affection for ants in an act of what they call "splash violence" (p. 2). Wondering if the boy doing the killing is testing boundaries of power or showing "the beginnings of an estranged relationship with the other" (p. 5), they state that:

> Our intention here is not to convict David for being a malicious child – that would go beyond the evidence, the developmental realities of a six year-old, and the whole *truth* of the matter – but simply to situate David's behaviour as what is considered perfectly innocuous and "normal" in modern Western culture for a "boy." So normal, in fact, that such violence is all too quickly and easily dismissed as just "boys being boys." (p. 5)

Several studies on children and insects show that there can be a marked gender differences. For example, Snaddon and Turner (2007) found that boys indicated a greater preference for beetles and spiders whereas girls preferred butterflies and ladybirds. Borgi and Cirulli (2015) found that "in comparison with girls of the same age, boys show a higher appreciation of animals which evoke fear, such as alligators, snakes, and sharks, and biting and stinging invertebrates (e.g. scorpion, spider, beetle, bee)" (p. 55). These findings are echoed in Schlegel et al.'s (2015) study that found girls were less favorably inclined towards invertebrate species that they perceived as threatening. The reasons for these gender differences are not yet well

researched, but gender seems to play a role in insect-child relations and, in line with calls for greater attention to gender in environmental education research (Gough, Russell, & Whitehouse, 2017), merit further attention.

Cruel behavior towards insects is usually reprimanded by adults (Carruthers, 2007). Still, a child may get scolded for crushing an ant on the sidewalk but not in the house, may watch adults running from bees outside but then be read books about cute honeybees, and be encouraged to catch and release butterflies with a small net but learn to be disgusted by tent caterpillars busy defoliating a tree. Children receive ambiguous and conflicting messages, and it is no doubt a challenging task for them to determine what "appropriate" relationships with insects might look like. Some educators have attempted to influence these relationships to which we turn our attention next.

Insect Encounters in Education

Insects are not uncommon presences in young children's early years and elementary education. Some insects live in terrariums in classrooms while others are ghosts, their dead bodies pinned to display collections. Still others are encountered inside and outside the classroom in both planned and unexpected ways.

A most disturbing way young children can learn about insects is through constructing pinned collections. Writing in *Green Teacher*, Guyton and Connington (2013) advise teachers that they can help children develop their motor skills and become "young scientists" by capturing, freezing, and mounting or pinning insects. We argue that the hidden curriculum of such practices is not unlike that of dissection in higher grades, which as Oakley (2009) suggests, positions them as mere resources for human use and fosters "a decreased sensitivity to other life" (p. 61). At the Montreal Insectarium, exhibits of pinned scientific collections are shared with visitors with the goal of promoting appreciation for insect biodiversity, adaptation, and conservation, but private collecting is discouraged, given these do not contribute to scientific research. Several alternatives exist to needless insect killing, such as digital photography and observing and then releasing insects. The irony of promoting conservation through the display of dead bodies appears to be lost in most museums (Pedersen, 2010). Indeed, in many edutainment venues where dead or captive animals are on display, it appears that, "There is very little attention to them as individual subjects of their own lives; rather, they act as representatives of their kin or their ecosystems, martyred in the name of conservation" (Lloro-Bidart & Russell, 2017, p. 48).

Keeping live insects in the classroom is recommended by some researchers and practitioners. Wagler and Wagler (2014), for example, argue that using living arthropods (e.g., insects, spiders) in the elementary classroom can be an effective way of decreasing fear and disgust and can promote support for their conservation. Insects are, in fact, quite popular classroom pets in North America with ants, crickets, cockroaches, praying mantises, and walking sticks/stick insects recommended to teachers seeking "low maintenance" pets. But as Nxumalo and

Pacini-Ketchabaw's (2017) research illustrates, caring for animal others of any sort is not as straightforward as some suggest. They offer a sophisticated analysis of teachers' and children's experiences with Vietnamese walking stick insects that had been part of an early childhood education center for years until they became so "unmanageable" (p. 1) that they were given to children's families to take home, donated to an entomology lab, or killed. Noting the anthropocentric, colonizing, and racializing dimensions of the ethical and pedagogical issues that arose (e.g., keeping the insects in captivity, the impact of the globalized pet trade on the species, the fear of the insects becoming invasive species, the need to control the insects' reproduction, culling), they observed the teacher's affective struggles: "They questioned who these acts of caring benefitted – the children? the stick insects? themselves?" (p. 10).

There are alternatives to keeping insects captive in the classroom, of course, although these too can raise ethical issues and the specter of death. Lyman's (2014) experience with a spider who became "an excellent team teacher" (p. 48) in her economically, racially, and linguistically diverse grade 3 classroom is illustrative (even if spiders are not insects but arachnids). One of her students found the spider in the bushes outside the classroom, brought her in, and Lyman placed the spider on a bookcase. The next morning, Lyman and the students arrived to find that the spider had stayed put, built a web, and soon they were watching her eat a grasshopper she had caught: "'Awesome!' soon overtook 'ewwww!' as the students watched the spider feast" (p. 48). The spider was named Charlotte and the students treated her as an individual with particular needs and likes. When Charlotte laid an egg sac, the class discussed the best way to proceed, settling on donating the sac to a local nature center they had visited on a field trip. As anticipated given what they knew about the life cycle of this spider, not long after laying her egg sac, students witnessed Charlotte dying, held a funeral service, and buried her under the bushes where she was found.

Lyman (2014) felt the opportunity to witness, talk, and write about Charlotte's death opened up an important pedagogical opportunity, which resonates well with Russell's (2017) research on animal death and pedagogies of remembrance. Similarly, Taylor and Pacini-Ketchabaw (2015) share a story of a worm who was inadvertently broken in two by a child attempting to rescue it, concluding that: "No easy response exists for either the earthworm or the children in these ordinary encounters. This is a case of learning to live with each other for survival and to always be mindful of each other's vulnerabilities" (p. 520). Such is the case for all early childhood educators whose charges interact with insects outside, whether in planned or serendipitous encounters. The writing on common world pedagogies abound with stories of young children learning with insects in myriad ways and with diverse outcomes (e.g., Atkinson, 2015; Blaise et al., 2017; Nxumalo & Pacini-Ketchabaw, 2017; Taylor & Pacini-Ketchabaw, 2015).

Searching for insects and other invertebrates outside and small conservation projects such as butterfly gardens and building insect hotels can provide opportunities for children to attend to local insect species. Given research that indicates that many children lack knowledge of local insect species and that children who can name insects have been found to have a higher affinity towards them

(Schlegel et al., 2015), engaging in natural history practices with children may be an effective strategy. This may be particularly so for disliked or demonized insects (Bell & Russell, 1999; Lemelin, 2013) as well as the common and familiar (Fawcett, 2014), the mundane and ordinary (Atkinson, 2015; Taylor & Pacini-Ketchabaw, 2015). That is not to say that the practice of natural history is some sort of magic solution for improving insect-human relations. As Russell (1999) argued, the easy linearity often implied in much of the outdoor education literature is simplistic; nature experience does not automatically lead to knowledge and then to caring and then to action, and we educators need to be more humble and more cognizant of the complexity of these encounters.

There are encouraging signs in recent literature that indicates more careful attention is being paid to the complexity of pedagogical efforts to facilitate multi-species flourishing, including with insects. For example, in a recent research project with early childhood educators (Edwards et al., 2012), some activities were found to be more useful than other in terms of educating young children about the biodiversity around their center. Although child-initiated play is commonly accepted as an important part of an early years curriculum, offering children the opportunity to dig in the soil and look for insects and other invertebrates does not result in as much learning as when the teacher guides children towards an understanding of these creatures and how to respectfully observe them. One educator in the study noted how her students went from screaming, pretending to be scared, or wanting to kill insects to being more curious following what the authors call a *purposefully framed play* session (Edwards et al., 2012). Similarly, Askerlund and Almers (2016) reported the positive impacts of teachers framing the experience of children learning in a forest garden in nonanthropocentric terms: "Rather than asking what these organisms can do for me/us, they pose the question: What can I/we do for the bugs/plants/bees?" (p. 187). And Atkinson (2015) shares an anecdote about young children initially reacting with squealing at finding a wasp nest and how the educator, Cara, responds calmly and quietly: "She asks the children to move slowly, to closely watch how the wasps move, to use quiet voices. The children are calmed by her voice, her stillness. They watch as the wasps disperse. No one is stung" (p. 70). As Atkinson observes, "In this moment Cara shifted away from conventional notions of protecting children from wasps, in which wasps are identified as dangerous creatures to be feared. Instead Cara recognized mutual vulnerabilities, that both wasps and children were affected" (p. 71).

Not all educators, however, are quite so skilled in negotiating insect-child interactions. Even in well-meaning educators, fear or disgust may send a stronger message than any activity they facilitate. Writing about spiders, Lemelin and Yen (2015) suggest:

> Educators can have a significant influence on children, but there is a problem if the teachers are scared of spiders themselves. Researchers have noted that educators and naturalists can be in a tenuous position if they possess the same negativity toward invertebrates as the general public but have been employed to teach their students about the very invertebrates they dislike. (p. 222)

Teacher education therefore is important, but there has been very little written on this topic related to insects. An exception is Wagler and Wagler (2011) who provided preservice elementary teachers with "frequent direct contact with Madagascar hissing cockroaches" (p. 243) and found that their attitude towards these insects changed from extremely negative to positive and that they were more willing to consider including these insects in their future teaching. This newfound interest did not extend to any other type of insect, however.

It is clear that early childhood education for insect and human flourishing is challenging, yet it is also clear that we must try. Urging environmental educators to incorporate "interspecies articulation" into our work, Rautio (2013) argues that we need to acknowledge "how humans and nonhuman animals continually create the conditions for each other's existence" (pp. 446–447). Intersubjective learning that goes beyond the human holds promise for diverse outcomes (Bell & Russell, 2000; Lloro-Bidart, in press). As Taylor and Pacini-Ketchabaw (2015) write,

> It seems the children are on a number of different routes towards responding to the risks and vulnerabilities they share when they bodily engage with these small creatures. Their actions portend different kinds of learnings. The children who goad ants might learn that there are consequences to their actions and that even small creatures can become formidable foes. Those children whose feet inadvertently get in the way might learn the consequences of not paying attention to the lifeworlds of smaller creatures. Those who carefully seek intimacy with the ants might learn about the precarity of life through (literally) holding the responsibility for another life, and at the same time, through risking making themselves vulnerable to another species. (pp. 524–555)

Conclusion: Towards Insect and Human Flourishing

In concluding this chapter, we do not intend to offer pedagogical recipes or tidy solutions to the problems currently facing insects, humans, and other life. We have pointed to a few promising approaches above that warrant further attention. As well, Bell and Russell (1999) offer a number of general pedagogical suggestions that may help educators strengthen "life ties":

- Call into question the us/them, human/nature divide
- Work from and convey an understanding of the ways the oppressions are connected
- Draw attention to the ways that words shape our understandings and experiences
- Help students to recognize and move beyond stereotypes [about both people and other animals]
- Acknowledge diverse cultural perspectives and the fact that all cultures have not interacted with nature in the same way
- Anticipate and try to mitigate the trauma that children may experience as they delve into [these] issues
- Work from and convey an understanding of others as experiencing subjects of a life, in some ways similar to and in some ways different from us
- Encourage students to remember their deep-seated connections with other life
- Bring more fully embodied, sensual experiences into the . . . curriculum (pp. 75–81)

Further, like Rautio (2013), we also want to "embrace the thought that teachers – those who invite, guide, support, and steer us – can also be other than human beings" (p. 454). We end this chapter, then, with a reminder that children are not the only actors in pedagogical encounters with insects. Just as children react, so too do the insects who may approach, flee, hide, squirm, sting, or sit calmly. Atkinson (2015) wonders in reflecting on an encounter between a boy and a bee:

> We often notice children playing with small creatures, carrying worms, poking at ants. But what might emerge if we were to consider this moment differently? What if we put aside the notion of playing and consider that Carter is relating to the bee and the bee is responding to Carter? What if we think of Carter as learning, along with the bee, how to be together? Why did the bee land on Carter? Was there a mutual curiosity? (p. 74)

Atkinson reminds us that, like us, insects learn about the world through sensory experiences and they are materially impacted by insect-human encounters encouraged in the name of educating humans. The following final vignette attempts to capture the experience of a walking stick living in captivity at the Insectarium when Elizabeth worked there:

> The walking stick is disturbed from her rest – they are nocturnal animals – when the museum interpreter removes her from the vivarium and places her on a plant on a cart. She takes a few bites of the newfound leaf then rests upside down, hanging from a branch in camouflage. Wheeled out to the museum floor for an opportunity to "meet" visitors, the educator gently coaxes the walking stick onto her fingers to demonstrate how harmless the creature is despite her spiky appearance. Disturbed once again, the insect starts to walk, searching for a branch and a chance to rest. As the fingers, hands, and arms of various humans are encountered, she senses different temperatures, scents, and textures, which takes energy to process. After walking for what seems like ages, she is finally placed back on a branch in the cart and wheeled back behind the scenes, gently placed back in her vivarium. Despite what her name might imply, she is not a stick, but a living creature with needs and preferences that she finds her captors sometimes ignore in their efforts to education humans about the plight of her kin. She returns to her rest until next time.

These walking sticks, like the other insects described in the preceding pages, have found themselves enrolled in educational activities of one sort or another. Let us not forget that they too are subjects of their own lives. And let us continue to seek ways to flourish together in this complex, messy world.

Cross-References

- ▶ Children in the Anthropocene: How Are They Implicated?
- ▶ Re-examining the Human-Nonhuman Animal Relationship Through Humane Education
- ▶ Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective

► Unearthing Withling(s): Children, Tweezers, and Worms and the Emergence of Joy and Suffering in a Kindergarten Yard

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Childhood Animalness: Relationality, Vulnerabilities, and Conviviality

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Abstract

This paper traces how animals have been and are reduced to mere objects for use in child development, examining historical and contemporary trends in developmental literature. We alternatively present scholarship that delves into children's and animals' subjective encounters and intersecting worldhoods as critical of more anthropocentric developmental psychology models. We utilize continuity as a model that emerges from our field work in order to make various suggestions about the ethics that emerge from children's embodied experiences with animals, including felt senses of vulnerability, death, and precarity. Finally, we finish the chapter by outlining potential pedagogical directions that encourage deeper reflections about the precariousness of childhood lives, lived differently and together on this planet. Key to this is the consideration of interspecies,

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intergenerational conviviality – emphasizing the shared joys, pleasures, and problems of multispecies living.

Keywords
Developmental psychology · Animalness · Vulnerability · Human-animal relations · Childhood · Conviviality

Introduction

While interviewing a 13-year-old girl named Sabrina, Joshua asked a question about the differences between the death of beloved companion animals and the deaths of animals in the wild or on farms. Sabrina thought for a moment before offering the following response:

> Um, well I feel like pets is different because you have like, a connection with them and like specific people will like, be sad about it and stuff, but I try not to think about like, the animals that are killed for food and stuff and then like the wild and stuff you don't really notice as much when they're killed because you don't really watch them die or anything and so then you kind of, its like not the same because you don't really think about it you don't really like notice, cuz I'm sure there's like lots of animals who have died like, really recently, like in the past hour or something but you just like don't, you don't know cuz you don't know specifically each animal.

As scholars working at the crossroads of environmental education, environmental philosophy, and human-animal relations, we are interested in the kinds of experiential curiosities that Sabrina outlines in her thoughtful response above. We wonder how children's lived experiences converge and diverge with wider sociocultural and political practices and discourses about multispecies cohabitation, and we believe that critical and caring research on child-animal relationships can provide insights that counter hegemonic practices and promote nonviolent coexistence. In this chapter, we outline a theoretical framework built on relational ontologies and ethics, as well as bodily experiences – ranging from felt desires to mutual vulnerabilities – that we argue illustrates the significance and implications of child-animal relationships. By using the phrase childhood animalness, we mean to reclaim the continuities and differences across animals from the tight anthropocentric hold that has existed in schooling. We use our framework to build a pedagogical vision of conviviality, albeit an interspecies living and learning together that embraces interdependence and ethical comingling.

Throughout our framing, we employ a range of phenomenological, evolutionary, and feminist materialist approaches as well as examples from our research with children, to identify the ethical, political implications of the intersubjective, bodily phenomena that are central to child-animal relationships. Drawing from an array of discourses, we turn our critical eyes toward the persistence of anthropocentric views of childhood (often Western, Eurocentric views too) and of animal life that encourage a hegemonic hyper-separation of "the adult human" as contra to "the animal" or

"the child." These are the same views that posit "culture" as dominant over nature, as outlined in the important work of Val Plumwood, Donna Haraway, and others. In place of these limiting and damaging human-centric models of child-animal-nature, we trace various ecological lines of thought that emphasize relationality, complexity, and material interconnections as foundational ontological realities.

In addition, we challenge both political and educational habits that emerge from ontologies of separation and human exceptionalism, which perpetuate existing violent and destructive human-animal relations driven by varieties of anthropocentrism. Such practices rely on speciesism and long-standing generalizations about (white, privileged) adulthood as the pinnacle of human development. We align with non-anthropocentric philosopher Matthew Calarco as we try to disrupt and "shrink the influence of the institutional and economic practices that limit animal potentiality and to create other ways of life that allow for both human beings and animals to flourish" (2015, p. 5). Our goal is to highlight bodily experiences that emerge from child-animal relations – in particular experiences of shared, bodily vulnerabilities across species lines – as a starting point for decentering privileged, anthropocentric visions of individual development. In its place, we offer our thoughts on a living and dynamic pedagogy of conviviality that aligns with the vision of childhoodnature that reminds us that human children, more-than-human animals, and human adults are all materially and ethically embedded in relational, naturalcultural spaces. We are using the linguistically awkward term more-than-human (Abram, 1996) to signal the enormous array of living beings other than human beings. We chose not to use the common term nonhuman as it reproduces a binary negation. Some Indigenous scholars, such as Haudenosaunee elder Paul Williams (1999), talk about animals and plant as our brothers and sisters, as our relatives (p. 2); we find this environmental philosophy much more suitable, especially given the lands we are on, but we do not wish to misappropriate it or use it disrespectfully, as we do not speak the language.

Tracing the Divisions of Childhood, Animality, and Adulthood

It is likely that anyone formally trained to work with children has at some point become familiar with the work of Swiss biologist Jean Piaget. Piaget was originally trained as a zoologist, and his particular interest in children actually arose from a deep curiosity about the development of rational, scientific cognition in humans. Piaget's work is described as establishing a "strong" model of human development (Damon, 1983). Piaget – along with Erik Erikson, Lawrence Kohlberg, and many others – portrays human development as a sequence of qualitatively distinct, holistic, and universal stages. Piaget notably outlined four stages of *cognitive* development:

1. The sensorimotor stage (newborns to infants of 2)
2. The preoperational stage (roughly ages 2–7)
3. The concrete operational stage (ages 7–12)
4. The formal operational stage (ages 12 and beyond)

These stages are part of Piaget's overall epigenetic theory of child cognition (Damon, 1983; Piaget and Inhelder, 2013). That is, Piaget held that children are born with a genetic disposition or map for cognitive development, social meaning making, and self-recognition. Included in any child's journey through these four stages and into adulthood are mastery over cognitive concepts like object permanence, intentionality, egocentrism, inductive reasoning, abstract thought, and rational problem-solving.

In his research, Piaget generally followed two categorical lines of growth in human beings: individuation, referring to a person's distinguishing of self from others, defining one's direction, and finding a position in society, and socialization, referring to the self's ability to integrate into society and dealing with others and the world at large (Damon, 1983). As a result of Piaget's foundational work, children, as research subjects, are often described in abstraction from their specific familial and social environments so as to maintain a dispassionate and universal view of their individuation and, ironically, their socialization (Damon, 1983; Burman, 1993). Piaget's empiricist approach not only abstracts children from their environment and universalizes this pattern of growth, but as Erica Burman (1993) notes, his actual tools of measurement work to produce children as both research objects and research subjects, thereby failing to theorize the contexts they inhabit. Of interest to us, Piaget conducted only limited research into child-animal relations, and much of that was focused upon children's categorical understanding of animals as animate and their cognitive ability to separate living from nonliving objects. For example, Piaget (2004) draws attention to the stage of development wherein children recognize that the moon, stars, and sun are objects separate from the free, self-motivated, and animate objects present in the animal kingdom, but this is the extent of his foray into children's interactions with animal others.

Research on childhood covers a significant amount of disciplinary ground, from developmental psychology and psychoanalysis to cultural, historical, and sociological research on childhood as a phenomenon (Jenks, 2005). Investigations of the roles and experiences of animals in childhood remain rooted mostly in critical and cultural studies of symbolic animals – especially those drawing on psychoanalysis – and in psychological research surrounding children's development in the presence of real animal others (Taylor, 2016). Gail Melson notes that child-animal relationships have rarely been given serious attention within research and scholarly literature, save for a few exemplary studies that tended toward an anthropocentric bias, studies which have "impeded both theory and research into the developmental significance of animals, especially companion animals, for children" (2003, p. 32). Given the disciplinary breadth of interest, however, researchers that do take up child-animal relationships vary widely in their scope and focus. What such work often shares, however, is an attentiveness to the ways in which animals play a key role in children's attainment of some contextually specific vision of "adulthood." At times, this emphasis on a predetermined achievement of adulthood diminishes children's knowledge and likewise erases other animals as subjects, agents, and active, meaningful participants in relational spaces alongside of children and adults. Still, it is useful to trace some of the ways in which researchers have sought to

explore children's relationships with animals as predominantly aligned with an anthropocentric, becoming-adult vision of development.

Several researchers have approached the study of child-animal relations as a way of understanding the development of empathy or morality. Lori Gruen (2009) outlines empathy's varied use within the psychological literature; it is typically described as knowing, feeling, or responding to another being's (typically a person's) own feelings. There is a historical precedent for thinking that relationships with companion animals contribute to children's empathic abilties (Grier, 1999). Several contemporary, developmental studies suggest that higher empathy "scores" are correlative to relationships with pets (Daly & Morton, 2006; Wynne, Dorey & Udell, 2011). What such scores *mean*, however, is debatable. As Gail Melson notes (2003), there is no indication that the presence or introduction of cats or dogs into the family home produces the effect of higher empathic understanding; it may be just as likely that sensitive, empathic children ask their parents for a pet. Still, when asked about the connections between children and animals, almost 70% of adults reported a belief that it is "good for a kid's development to grow up with pets" (Ipsos-Reid, 2001, p. 33). In a recent *Time* special edition on "The Science of Childhood," psychologist Michele Borba advocates teaching children empathy and how pets can assist with those teachings: "watch the puppy's tail, and you will know when she's happy" (2017, p. 63).

Another psychologist interested in what child-animal relationships reveals about children's affective and moral development, Frank Ascione similarly draws upon notions of empathy (see Ascione, 1992); although, his most prominent research tends to consider children's animal relationships as indicative of future affective capacities or psychopathologies. In *Children and Animals: Exploring the Roots of Kindness and Cruelty*, Ascione (2005) investigates various case studies and conducts new research into the correlations between domestic abuse, child abuse, and animal abuse. He argues that children who are abused by caretakers are more likely to abuse animals when young and spouses, family members, or other children when older. Ascione cites humane education programs as important steps toward improving children's empathic capabilities, not only toward companion animals but toward other human beings as well (1992, 2005). He also describes various social work programs and strategies as critical methods of intervention for an otherwise predictable turn from childhood animal abuse to future psychopathology and criminality.

Stephen Kellert's developmental research focuses upon the role of biophilia, as well as experiences with animals and nature, in children's "personality formation and character development" (2002, p. 117). Kellert distinguishes between three kinds of experiences children have in natural environments or with nonhuman beings: direct, indirect, and symbolic experience. Direct experiences involve physical contact "largely outside and independent of the human built environment," experiences that are unplanned or unstructured (Kellert, 2002, p. 118). Indirect experiences involve physical contact with "natural habitats and nonhuman creatures" that is the "result of regulated and contrived human activity" (Kellert, 2002, p. 119). Examples include visits to zoos or aquariums, animal visits to classrooms, and even experiences with pets in the home. Symbolic experiences, also referred to as "mediated"

experiences (Fawcett, 2002), occur outside of physical contact with nature, where children encounter "representations or depicted scenes of nature that sometimes are realistic but that also, depending on circumstance, can be highly symbolic, metaphorical, or stylized characterizations" (Kellert, 2002, p. 119). Children, for example, may have symbolic experiences while watching nature documentaries, YouTube videos, or reading books with animal characters. Each of these experiential modes, Kellert argues, enhances the development of various cognitive, affective, and moral abilities within childhood, a finding which Kellert describes as unfortunate, given the decline in natural spaces and species as a result of modern capitalist culture.

Recent developmental research builds upon the concept of biophilia in establishing young children and infants' tendency to "monitor the environment for the presence and location of animals and other humans," known as the "animate-monitoring hypothesis" (DeLoache, Pickard, & LoBue, 2011, p. 87). An overview of research in this area indicates that even in infancy, human beings are drawn to animate stimuli and in particular animals. Both dynamic and static features of animals are attended to, including facial features, body shapes, animal movement patterns, "self-initiation, and apparent agency and intentionality" (DeLoache et al., 2011, p. 94). Arguably, this perceptual attendance to animate and animal objects in an infant's lifeworld builds a foundation for children's future epistemic investigations, including categorization, names, identities, and typical behavior of animals. Furthermore, tracking the presence and location of individual and recognizable animals in early childhood figures to be key in establishing interspecies relationships, bonds, or even friendships (Fawcett, 2014).

Kahn and Kellert's (2002) exposition of biophilia overlooks the experience and meaning of child-pet relationships. Kellert suggests that direct experiences in nature are preferable to, and indeed more beneficial than, indirect and symbolic experiences. With this idea we largely concur. As a result, he puts studies of "pets" on a lower tier of interest. Ecological feminists have a lengthy history of critiquing the tendency to focus only on populations of wild animals and not include individual animals, such as pets. Erica Fudge notes similar trends within animal studies, citing a widely held belief that pets are "degraded animals," since the "truly animal qualities of wildness and self-sufficiency have been removed from – bred out of – the pet and replaced with tameness and dependency" (2008, p. 8). Fudge instead suggests that pets provide much to think about regarding globalization, the destruction of natural spaces, and the human-animal divide, particularly, she argues, within literary explorations of human-pet relationships. We would add that pets are good to think *with*, especially about the development of interdependence and empathy in childhood and throughout human lives.

What Ascione, Kellert, and the others have in common with Piaget and more traditional developmental thinkers is the anthropocentric and adult-centric framework they use in thinking through the process and endpoints of development. While there is more emphasis placed on relationships outside of the human realm, other animals are reduced to bystanders or passive participants in the nexus of childhood. In some extreme instances, animals become objects for contemplation, consideration, or moral and affective experimentation on children's journey to

fuller participation in a human-centered world, full of adults and their grown-up concerns.

Children, Adults, and Other Animals in Continuity

Challenging Western psychology's anthropocentric approach, a variety of other researchers have argued that children's relationships to animals and to the larger ecology of multispecies assemblages are important for nourishing development, not as an endpoint for human adults but as a continuous process of *becoming-with* (Fawcett, 2014; Livingston, 1994; Malone 2016; Myers, 2007; Russell, 2016; Shepard, 1982, 1997; Taylor & Pacini-Ketchawbaw, 2015; etc.). Gene Myers provides one of the earliest empirical studies of child-animal relations that embraces participation across species lines. Drawing on his year-long study of preschool children's interactions with animals in the classroom (2007), Myers' work is built around a belief that nonhuman animals are real, subjective, and vital figures in children's lives:

> Partly because we do not see animals as fundamentally important to human life, we have dispersed them to the official domains of child psychology – here in conceptual development, a bat that is not a bird; over there in psychoanalysis the horse that is the father. . . But in the actual lives of children, the animal is a whole and compelling presence. We can recover that animal by identifying the biases that have led us to marginalize other creatures and, most importantly, by going directly to the source – to children and their experience of animals. (2007, p. 2)

Myers firmly places humans within the sphere of animality, arguing that we are first and foremost relational selves within an ecology of subjects (Evernden, 1993). Such an expression of human embeddedness and creaturely existence echoes Donna Haraway's suggestion that "beings do not pre-exist their relatings" (2004, p. 6).

Myers' observations of children led to a wide range of findings regarding the significance of child-animal relationships and the self-other relations more broadly. While there is not enough room here to summarize each of his developmentally significant findings, a few stand out as particularly relevant for the project at hand. First, Myers presents several examples of child-animal interactions that display children's ability to recognize animals as possessing unique and significantly different minds, developing what is known as a "theory of mind." Theory of mind "holds that people have beliefs and desires, which can lead to intentions and actions, and which interact with situations in the real world and with emotions in the self" (Myers, 2007, p. 101). In essence, theory of mind is the ability to recognize subjective and affective states in other beings. Recent cognitive and consciousness studies indicate that theory of mind is present in varying degrees in humans, primates, and possibly other animals and may be attributed to the possession of mirror neurons. Mirror neurons are unique in that they "fire" as a result of both action *and* observation:

> They constitute, therefore, a specific neural system matching action observation and execution. The observed action produces in the observer's premotor cortex an activation pattern resembling that occurring when the observer actively executes the same action. (Gallese, 2001, p. 36)

We experience the effects of mirror neuron activation when we witness others being injured and reach for our own uninjured body part; the effect is similar when witnessing others act in ways that reveal a particular emotional response. It is possible that mirror neurons are actually at the root of some empathic understanding (Gallese, 2001). Children articulating a theory of mind regarding animals challenge the outdated Cartesian notion that animals are merely instinctual beings. Myers reveals that while children tended to attribute wants and desires to animals rather than more complex thoughts, the foundation for further development is laid in early childhood (2007).

Myers also emphasizes the interaction between theory of mind and children's development of language use. He describes several examples of children speaking to animals or speaking about animal language. One particularly interesting conclusion Myers makes is that children both make assumptions about animals' ability to recognize their intentions through verbal communication – typically through high-pitched, upward inflected questions – and that children can distinguish between their own use of language and the animals' modes of communication. Myers shares an interaction between the classroom teacher and the children during a visit with a dog as evidence:

> Mr. Grier: "If I'm up in my apartment and he's out in this park by himself, I've got to know when to go get him, right, when he's ready to come in. So you know what he does?" A child barks. Mr. Grier: "Exactly, who said that?" Ms. Tanner and Drew indicate it was Joe. Mr. Grier: "exactly, I'll be up in my apartment, maybe reading or something, and I'll hear from outside 'Woof, woof woof' just a couple of times, and that means he's waiting right by the door outside and he's ready to come on." (2007, p. 112)

Myers interprets 5-year-old Joe's barking as evidence that Joe recognizes the meaning conveyed by the dog's communicative action. Language use around animals shifts according to the contexts, moods, and desires of the children, revealing shifting experiences of self-awareness and relationality in a more-than-human. According to Myers, "language is essential in making us the creature that connects" (2007, p. 91). Myers' description of humans as *the* creature that connects belies a humanistic, psychological tendency to differentiate between humans and animals on the basis of some cognitive capacity, including language use (Calarco, 2008). David Abram, drawing on Merleau-Ponty's exploration of the embodiment of language, suggests that language is not just a matter of grammar or speech but is embodied:

> In the *Phenomenology of Perception,* Merleau-Ponty had begun to work out a notion of human language as a profoundly carnal phenomenon, rooted in our sensorial experience of each other and the world. (1996, p. 74)

Abram further suggests that language and meaning emerge within a sensory, affective world of embodied encounter with others and even with entire landscapes.

Understanding language in this way reveals that humans are one of the many social beings who make connections, both within and across species boundaries.

The highlight of Myers' study is perhaps his exploration of various intersubjective experiences and states. Intersubjectivity is multiply defined, but through outlining the phenomenological work of Edmund Husserl, David Abram concludes that intersubjectivity is, at heart, the experience of specific phenomena "by a multiplicity of sensing subjects" (1996, p. 38). Such shared experiences can be embodied, cognitive, imaginative, theoretical, and even affective or emotional. Myers outlines several modes of shared experience that he observed between children and animals to varying degrees, notably the sharing of affects (interaffectivity), shared attention, and shared intentionality. When different animals were brought into the classroom, Myers described the children's behaviors as often aligned with the vitality affects of the animal: a hyper monkey entered the classroom and the children became hyper, a turtle's presence made the children move slowly and even take the hunched over shape of a turtle in its shell, and so on. He notes that these "vitality affects" may have been unconscious on some level, but that children were often actively interpreting an animal's behavior as representative of her emotions and intentions (2007). While he warns that little evidence was found in his studies to suggest that animals aligned their own affects or intentions with the children's, Myers does acknowledge the possibility and suggests that children and adults may actually learn to interpret animal actions interaffectively. He provides the example of animals "liking" children:

> The turtle crawls toward Dawn, who declares: "He likes me." Mr. Lloyd: "He likes you? He's going to crawl right under you there, huh?" Dawn backs up, spreads her knees on floor, and laughs. (Myers, 2007, p. 93)

Myers' work reveals a promising foundation for a shift in developmental focus on child-animal relationships, one that takes animal agency and children's animality as a starting point. It is important to recognize the interplay of cognitive, linguistic, and embodied developments in the real and imagined relational spaces of childhood to obtain a larger picture of children's experiences, without predetermining what children "ought" to become as adults. Following in similar footsteps as Edith Cobb (1959) and John Livingston (1994), Myers draws attention to the ecological and intersubjective contexts of childhood. The rational, dispassionate, apex adult that epigenetic models of development portray as the endpoint of proper child development are so often removed from the more-than-human world. Models of development built on relational, ecological concepts offer new possibilities for thinking about not only childhood but the human animal's place in various contexts (Code, 2006).

As indicated in the previous section, many studies of child-animal relationships tend to focus on the impacts of those bonds on children's cognitive, emotional, and moral development, with little consideration to the agency, well-being, or subjective experiences of the animals themselves. This is a common trend within much academic literature, one that has become the focus of human-animal studies (HAS)

and anthrozoology. These interdisciplinary fields have risen in popularity among academics in fields as diverse as ethology, literary studies, science and technology studies, education, philosophy, political studies, and sociology (DeMello, 2010). We use the phrase human-animal studies broadly, to cover a wide range of scholars who may choose to label their work as "posthumanist," "post-Cartesian," "critical," or otherwise (see Castricano, 2009; DeMello, 2010; Wolfe, 2010).

Like others in human-animal studies, we espouse the post-Cartesian view that the oppressive dualisms of mind/body, human/animal, and culture/nature are both deeply embedded within Western culture (Plumwood, 2002) and also work to create unnecessary separations, suffering, and loss. Many of our colleagues in human-animal studies and environmental studies have developed strong research orientations toward what they see as a problematic and violent understanding of animals within their various research projects and publications (Castricano, 2009). Traci Warkentin, for example, articulates an approach that is rooted in phenomenological biology and ecological psychology for exploring human-whale interactions. Drawing in particular on the work of Jakob von Uexküll, Warkentin (2007) suggests that it is possible to imaginatively envision another being's sensory lifeworld – including the sights, sounds, scents, flavors, textures, and even their sense of time. Uexküll's famous concept of the *umwelt* – translated as "environment" or, more roughly, "surrounding world" – was radical in that it extended the possibility of worldhood and multiple realities to all living things. According to Uexküll, no singular being's reality is more truthful or accurate than another's; they are different yet complementary. This ontological coupling of animal being with environment is the foundation of an *umwelt*, the closed perceptual world of an individual organism. Uexküll's most famous example is that of the tick, an organism that can lie for years in an almost catatonic state until it perceives the scent of mammalian blood, when it will then drop down for a meal. Our perceptual worlds do not overlap; our reliance upon vision and sound is perhaps nonsensical to the tick. Its perceptual capacity for smelling blood and sensing body heat is largely unknown to humans. A tick's *umwelt* can be imagined, but never truly known or experienced, yet it is no less materially present in the world and "real" (Evernden, 1993; Warkentin, 2007).

Interspecies Ethics Within Children's Embodied Experiences

Recently, while watching a young seated child of 9 months exuberantly kicking his feet in every direction and simultaneously dancing his hands in the air as he made numerous sounds, Leesa was struck by the child's enthralled embodiment and the surrounding adults' enchantment. This was a scene of delight, especially when the child paused suddenly, looked down at his leaping feet, seemed surprised, stopped moving, and simply watched his feet as if to wonder whose they were. To be in awe about one's own bodily extensions and expressions into the world is part of childhood development. This child had dogs wandering underfoot, dogs with active legs and feet. For a child to discover their own feet and then see the feet

of a dog (or cat or squirrel, etc.) gives them the opportunity to witness the similarities and differences across physical forms and functions of legs, feet, and movement. Is it possible that children's discovery of their own bodies is abetted by seeing other animals' bodies?

Individuals are not alive alone. We are embedded in relationships with humans and a multitude of other species, daily. Searching for a nonviolent ethics (from a humanistic perspective), Judith Butler (2004) discusses a "common human vulnerability, one that emerges with life itself" (31) and that calls forth our collective responsibilities to each other. Butler carefully questions how some humans are made unhuman and their lives made unreal and how violence accompanies that unreality (2004, p. 33). To extend Butler's notion, for example, to the lives of animals in the animal-industrial complex is not unthinkable; indeed, Stanescu (2012) has done just that. The critical questioning of the wholly autonomous self is necessary to understand the circulation of recognition and reciprocity in social lives. As Butler acknowledges, "I am not fully known to myself, because part of what I am is the enigmatic traces of others" (46). These others need not be human others only. Although, her life's work is from a humanistic standpoint, Butler has recognized the importance of human-animal relationships (Stanescu, 2012). Butler asks us: "Is there a way that we might struggle for autonomy in many spheres, yet also consider the demands that are imposed upon us by living in a world of beings who are, by definition, physically dependent on one another, physically vulnerable to one another?" (2004, 27). When Leesa asked a 10-year-old about nature, they replied: "Nature is the same as people sort of. If people think they have the right to kill animals then they have the right to kill people, and it shouldn't be either one." In Butler's argument that all bodies are differently and inequitably vulnerable, we are reminded of children and animal's corporeal vulnerability and (inter)dependence, and we agree with both the 10-year-old child above and with Butler that we have a communal responsibility for the interdependence of our physical, emotional lives.

Key to Butler's response is her description of "recognizability," a Hegelian concept which she defines as "the more general conditions that prepare or shape a subject for recognition – the general terms, conventions, and norms "act" in their own way, crafting a living being into a recognizable subject, though not without errancy or, indeed, unanticipated results" (Butler, 2009, p. 5). Butler's descriptions align with a wider sense that others have meaningful lives, worthy of recognition. She provides an epistemic framework that echoes the animal rights philosopher Tom Regan's (1983) notion of moral subjects – including certain "higher" animals – as being "subjects of a life." Regan's metaphysical argument for animal rights suggests that beings capable of individual beliefs, desires, and a sense of self that extends both into the past and into the future are "subjects of a life" and hence deserve moral recognition. The children in our studies often recognize that this is the case and often express those observations while describing death, pain, and suffering of other creatures. Thirteen-year old Neville provides such a perspective, when asked about his thoughts about animals:

> Neville: . . . if we were just to call them [animals] like, an object, I don't think that would be um, too specific to them, I think they should be. . . all animals should be called like, uh, have feelings and, um, really to show you um, not to like, because yeah I have a microphone and a watch and, they're things (I: Yeah) I mean, a cat, I mean, living animals aren't (I: Yeah) if you know what I'm saying?

For Neville, this recognition of the vitality of other animals separates them from the world of "mere" objects. His description was particularly tied to various discussions about animal suffering and his experiences with the death of a cat.

Why might recognition of animals' lives and subjectivity coincide with the witnessing of their suffering or death? Butler (2004) claims that human beings' fundamental relationality and existential awareness of vulnerability leads to the possibility of recognizing others' lives as "precarious." Butler describes precariousness as built upon affective apprehension of life's fundamental relationality, the fact that we emerge from social conditions and attachments. This affective knowledge surfaces in the experience and expression of grief:

> It is not as if an "I" exists independently over here and then simply loses a "you" over there, especially if the *attachment* to "you" is part of what composes who "I" am. If I lose you, under these conditions, then I not only mourn the loss, but I become inscrutable to myself. Who "am" I, without you?. . . What grief displays. . . is the thrall in which our relations with others hold us, in ways that we cannot always recount or explain, in ways that often interrupt the self-conscious account of ourselves we might try to provide, in ways that challenge the very notion of ourselves as autonomous and in control. (Butler, 2004, pp. 22–23, emphasis ours)

Is it possible then to recognize precariousness in other kinds of beings? While Butler maintains an anthropocentric focus, concerned with how human lives are subject to the production of normative frames, she does acknowledge briefly that precariousness is "a condition that links human and non-human animals" (2009, p. 13). Butler has been criticized for establishing a line of inquiry and argument that maintains and reinforces the primacy of "humanness" (Iveson, 2012), but we suggest that Butler's arguments encourage a hermeneutic, phenomenological line of inquiry into the experience and meaning of interspecies relationality. In previous work, Joshua argues that mutuality and intersubjectivity between humans and more-than-human animals – and perhaps even landscapes – often leads to a sense of narrativity experienced in relational spaces between subjects (Russell, 2016). This phenomenon, referred to as "animal narrativity," acknowledges that other beings' lives are often perceived as stories both in and of themselves, but even more significantly, that other life stories converge and diverge with our own personal histories or those of our wider communities.

Children have provided us with various narratives, anecdotes, and descriptions highlighting the potential for recognizing other animals as having meaningful lives that are interdependent with human being(s) and subject to the same conditions of life. Building on Butler's descriptions of recognizability and precariousness, we argue that the children often recognize vulnerability in their

relationships with animals in several, mutually significant ways. During research interviews with Joshua, several children described euthanasia as a responsible choice made by members of the family out of care and concern for their pet's perceived suffering. One child even referred to prolonging a cat's perceived suffering as "animal cruelty." Extending Butler's terms, companion animal lives become "grievable" because of what is profoundly shared with others: space, time, bodily awareness and touch, and shared affects such as care, love, joy, and even sorrow. The children we have worked with throughout our studies seem to recognize precariousness as a shared state of existence among all living things and that personally significant relationships are the locus of the most deeply felt ethical and emotional connections. Children may recognize that part of the pain of losing a pet, for example, comes from a lost connection within a wider set of relations among family, friends, and other animals. As a result of one being's death, the structure of the community left behind can become significantly altered.

Yet ethical challenges persist, and through our conversations with children, we are often reminded about the complexities of sharing lives and worlds with other animals. Children have expressed difficulties in recognizing the vastness of loss, death, and suffering felt by other animals around the world. This was encapsulated in Sabrina's interview with Joshua about animal death:

> Sabrina: I feel like pets is different because you have like, a connection with them and like specific people will like, be sad about it and stuff, but I try not to think about like, the animals that are killed for food and stuff and then (p) then like the wild and stuff you don't really notice as much when they're killed because you don't really watch them die or anything and so then you kind of, its like not the same because you don't really think about it. You don't really like notice, cuz I'm sure there's like lots of animals who have died like, really recently, like in the past hour or something but you just like don't, you don't know cuz you don't know specifically each animal.

Sabrina's thoughts about all of the unseen, unknown animal deaths echo ecological feminist's concerns about the invisibility of individual animal suffering.

Conclusion: Toward an Interspecies Pedagogy of Conviviality

Charles Darwin (1936) understood the coextension of humans with other animals as a lineage of bodily and emotional similarities. Darwin was and is still reviled for suggesting the animality of human beings. Yet, many children are cognizant of their animalness. A grade five student told Leesa that they knew they were an animal because: "I'm alive. Because we live, eat, breath and grow and we're alive and if you do that you're either a plant or an animal and we're certainly not plants, so we're animals" (#111, 2002). In his nursery school research, Myers (2007) outlined how children felt vital and alive with other animals, and this was demonstrated in their actions. In a beautiful example, one young girl who enjoyed watching the classroom

doves and was intrigued by flight was videotaped gesturing, moving, and dancing silently in from of the doves (Myers, 2007). Myers believed that the animal's subjective qualities confirmed the child's own sense of self, deepened the child's self-other differentiation, and created special symbolism from the shared animacy. Myers identified four core traits of relatedness exhibited between children and animals: (1) agency, animals move on their own; (2) coherence, animals are each experienced as an organized whole; (3) affectivity, animals show emotions; and (4) continuity, animals exist over time. These traits of relatedness offer a stark contrast to human exceptionalism, reinforce Darwin's hunches, and give educators tangible teachable moments to work with.

Critical animal studies scholars, like Helena Pedersen (2010), have interrogated the lack of curricular attention to animal lives in public schools, despite student interest. Previously, philosopher Anthony Weston (2004) went so far as to call for deschooling environmental education, urging teachers to go against the patterns of the dominant culture and to examine the permeability of the human/other-than-human boundary beyond the classroom walls. Weston was drawing on Ivan Illich's ideas about how schools reproduce the established order of society and treat learning as a commodity to be produced for the benefit of an elite – instead of the learner's "inalienable right to learn what he likes rather than what is useful to someone else" (Illich,1973, p. 2). Illich railed against schools that "made teachers into administrators of programs of manpower *(sic)* capitalization through directed, planned, behavioural changes" while tying students into "unending consumption and dependence" (1973, p. 20). Illich believed in "the social structure necessary to facilitate learning, to encourage independence and interrelationship and to overcome alienation" (1973, p. 22). Despite, lively critiques of Illich's gender politics and his albeit humanist interests, we find his focus on capitalist systems of schooling and the importance of interrelationships vital to pedagogies of childhoodnature and animal relationality.

Conscious throughout his work of natural limits and scales, Illich envisioned: "A convivial society would be the result of social arrangements that guarantee for each member the most ample and free access to tools of the community" (1985, p. 12). Tools for Illich had a very broad meaning, as he maintained "schools were losing their claim to be effective tools to provide education" (1985, p. 8). Illich (1985) chose the term "*conviviality* to designate the opposite of industrial productivity" (people being much more than plain consumers) and for it "to mean autonomous and creative intercourse among persons, and the intercourse of persons with their environment," and he believed "conviviality was an individual freedom realized in personal interdependence and, as such, an intrinsic ethical value" (p. 11). Recognizing the agency and interconnectedness of emotional lives, one of Leesa's grade five students said: "If my Dad or Mom is in a bad mood he (the dog) runs away from them, jumps a fence." We would like to jump over the fence of anthropocentrism in childhood animal relations. To learn and teach from such an ethical, convivial standpoint – children in creative conversation with each other and their animal environments, realizing their interdependence – is a vision worth realizing on our collective pedagogical horizon.

Cross-References

- Children's Imaginative Play Environments and Ecological Narrative Inquiry
- Experiences of Pet Death in Childhood Memories
- Eye-to-Eye with Otherness: A Childhoodnature Figuration
- Phenomenology with Children: My Salamander Brother
- Rethinking Children's Connections with Other Animals: A Childhoodnature Perspective

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"I Don't Know What's Gotten into Me, but I'm Guessing It's Snake Germs": Becoming Beasts in the Early Years Classroom

61

Casey Y. Myers

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Abstract

Within the United States, taken-for-granted curricular priorities and practices sanction child-animal relations within specific cognitive and socio-developmental perspectives. This chapter presents an onto-epistemological departure, drawing upon a yearlong post-qualitative classroom inquiry with 4- to 6-year-old children in order to map the various ways in which children were entangled within the process of becoming more-than-human animals. Adopting a materialist perspective on relationships, this work specifically highlights the ways in which children and everyday acts of becoming animal were mobilized within what the children referred to as "the beast" – an imbroglio of physical transformations,

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environmental limitations, adult expectations, material affordances, and children's conceptions of and relationships to various animal actors. Through narrative and visual data (re)constructed with children, the chapter argues that (1) young child-animal hybrids (i.e., beasts) emerge within and through highly particular and dependent material-discursive circumstances and (2) attending to and honoring these "beasts" present opportunities for generative departures from the ways in which animals are typically conceptualized, valued, or otherwise recognized within early years curriculum.

Keywords
Post-qualitative · Posthuman · Child-animal relations · Early years · Entanglement

Introduction

Within the early years context of the United States, taken-for-granted curricular priorities and practices generally wed the child-animal classroom relations to specific social and cognitive constructivist perspectives. For example, classroom pets have a long and favorable history within US education – to the point where they have become a commonsense avenue for supporting children's socio-emotional competencies, such as compassion and responsibility, as well as improving children's abilities to cope and reducing the occurrence of unwanted behaviors (see, e.g., Meadan & Jegatheesan, 2010). Beyond the use of classroom pets to support children's socio-emotional growth, animals also serve a variety of more traditionally "academic" roles within young children's classrooms. Both living and deceased/preserved animals are commonly utilized within early years science curricula as engaging physical specimens that can support "children's progressively more complex approaches to understanding the world" (Hamlin & Wisneski, 2012) by facilitating scientific skills, like questioning, observing, predicting, categorizing, and classifying, as well as the development of conceptual understandings of habitats, life cycles, and health (see, e.g., Cohen & Tunick, 1997; Harlan & Rivkin, 2012; Seefeldt, Galper, & Jones, 2012).

This chapter presents an onto-epistemological departure from these perspectives that position the presence of animals within classrooms as "objects for human utility, onto which humans project meaning or symbolic value" (Tipper, 2011, p. 149). Adopting a new materialist perspective on relationships, this work specifically highlights the ways in which children and their everyday acts of becoming animal were mobilized within what the children came to call "the beast" – an imbroglio of physical transformations, environmental limitations, adult expectations, material affordances, and children's conceptions of and relationships to various animal actors. It is worth noting that this research does partially align with Jane Bone's (2010) work on children's acts of becoming animal through play. Bone theorizes that a spiritual kind of intersubjectivity drives the metamorphoses of children into other animals.

That is, she interprets children's animal play as collapsing the human/nonhuman animal binary through children's spiritual, ethical, and emotional attunement to animals – what she calls "deep empathy" (Bone, 2010, p. 411). Her work and the relational becomings explored in this cartography are similar, as both give shape to the ways in which children were entangled in acts of becoming "more than one but less than two" (Haraway, 2008, p. 244). However, the chapter differs in that it attends to how "matter feels, converses, suffers, desires, yearns and remembers" (Barad, in Dolphijn & van der Tuin, 2012, p. 59) and how the children themselves articulate the material-discursive particulars of becoming (with) animals within everyday acts of classroom living.

Through narrative and visual data (re)constructed by and with young children, this chapter argues that (1) young child-animal hybrids (i.e., "beasts") emerge within and through highly particular and dependent material-discursive circumstances and (2) attending to and honoring these beasts present opportunities for generative departures from the ways in which animals are typically conceptualized, valued, or otherwise recognized within early years curriculum.

Methodological Context

From September 2013 to May 2014, I spent 3 days per week researching the material-discursive entanglements (Barad, 2003, 2007) of 16 kindergarten children, aged 4–6 years, at a university-affiliated laboratory early childcare and education center in the United States. I explicitly undertook this inquiry from/with a new materialist perspective, which seeks to highlight the ways in which humans and nonhumans engage each other and emerge differently from those engagements (Barad, 2003, 2007; Bennett, 2010; Lenz Taguchi, 2010, 2013). With relational intra-dependency, complexity, and nonlinearity as theoretical framings, my main focus throughout the inquiry was to recognize and map the ways in which the children, myself, and the multiple non-elements/actors of the classroom were bound together in the everyday events of classroom life and how these events were perceived, articulated, and re-presented by the children.

In keeping with my focus on the complexity of relationships, I employed a post-qualitative approach, attempting to reconfigure what Lather (2013, p. 642) calls the "settled places in our work." Not unlike many researchers who work with young children, this inquiry entailed a revision of adult researcher-child roles and data collection methods (e.g., Albon & Rosen, 2014; Clark, Kjørholt, & Moss, 2008). However, the ways in which the children and I "did" research focused less on finding out and representing what children already "knew" and more on mapping what emerged from our being together in the material-discursive flows of the classroom (see also Myers, 2014, 2017). To this end, I worked with the children to (re)shape the execution of more traditional visual ethnographic methods of observing, interviewing, and photographing. Within our *method assemblage*, "a tentative and hesitant unfolding, that is at most only very partially under any deliberate form of control" (Law, 2004, p. 41), we developed three interrelated processes – "being

with," "doing photos," and "becoming cameras." Within these movements of *being*, *doing*, and *becoming*, the children and I would spend our time together discussing, writing, drawing, and making photographs about the "important things" in their classroom. Within these processes, illustrations and photos were not treated as simply symbolic artifacts that might aid discussion. Instead, these assemblages of talking, writing, and imaging functioned as sites of productive entanglement (Lenz Taguchi, 2010), creating new layers of material-discursive action through which we attempted to re-present the complex relationships between children, adults, objects, things, materials, and animals.

Classroom Context

Like many early childhood classrooms, nonhuman animals populated this particular classroom landscape and were intended by adults to be subjects of study or tools for discovery (Bone, 2010). For example, live spiders or worms were temporarily held in glass and examined with magnifiers, several dried specimens (e.g., a mummified toad, a mouse carcass, a cicada shell) resided in small plastic jars in the "science area," and animals that were encountered on field trips or walks outdoors often became the subject of journal entries or classroom discussions. More abstractly, nonhuman animals were often present as plastic figurines meant for children to use as dramatic play props; in the illustrated pages of picture books, as line drawings on worksheets; or in photographs in the reference books in the science area.

In the data mappings the children and I constructed, however, the adult-sanctioned roles of classroom animals did not figure as "important things" of classroom life. What the children did highlight were the ways in which different more-than-human animals emerged *between* children and these more "official" nonhuman elements of curriculum. What follows are cartographies – presented in no particular order – in which I and several children attempt to visualize and narrate the complexities of the (im)proper classroom animal, the more-than-human *beast*, as it emerged within and through particular material-discursive circumstances of this classroom.

Child-Crab-as-Beast

The Crab Story originated when Paige meticulously chewed two pretzels into the shape of a turtle and a crab, respectively, one morning during snack time. As we sat in a small conference room – talking, drawing, and examining the photos we had taken in the classroom – Paige would tell the final version of the Crab Story, articulating what it meant to become a *beast* and how these beastly, more-than-human ways of knowing and being might emerge and retreat:

> Paige: *I think everyone should know the Crab Story. Put that in (the research). Once there was a turtle named Shelby. And he found a big island and he had it all to himself. But there*

was also a crab. And they fighted. And the crab said, "This is my island!" and Shelby said, "This is my island! I saw it with my own huge eyes before you were even a crab." Paige came and said, "I'm going to stop this argument right now!" So she chomped the crab and he went right into

her tummy. But then she had a spell on her and she turned into a little crab and walked all around the sand. And then a giant wave came and BOOM. . .washed away.

Casey: *Did you. . .I mean, the crab. . .get washed away?*

Paige: *I did, but. . .I'm not a real crab, like for real.*

Casey: *You were a crab in the story or. . .?*

Paige: *Because I just know. . .you can't turn into a whole animal. Like, when I was a crab, I was just being a crab with a spell. Not all the way.*

Casey: *So, just walking like a crab?*

Paige: *Well. . .you know Beauty and the Beast? Beast is a man inside and it's a spell.*

Casey: *Didn't a witch cast a spell on him or something?*

Paige: *Something. . . so he is a man and then a beast and then a man. But he was still a man while he was the Beast. . .because he would talk and wear clothes.*

Casey: *So he just looked like a beast?*

Paige: *I don't know. . .he did beast stuff. He was mean and I think he ate people. . .because he had really sharp teeth. He did some beast stuff and some man stuff at*

the same time because he remembered being a man. But he had to turn back into a whole man because the spell was broken. That's a beast.

Casey: *So. . .were you. . .a beast?*

Paige: *I'm pretty sure I was because I was still a girl, but I was moving like a crab after I ate him up. I was like a crab but not a WHOLE crab. Like. . .I knew how to be a crab and how to be a human. At the same time.*

When we returned to the classroom, the rest of the children were outside on the playground. With the classroom to herself, Paige took the opportunity to show me how she could become a beast – part crab, part girl. She sat down on the carpet and lifted herself off the ground with her hands and feet. As she "crab-walked" around the carpet, I took her photo and she asked me to come closer. As I approached her, she raised one arm like a pincer and reached for my ankle, grasping at me with her "claw" and making a chomping sound with her mouth. I let out a yelp and I jumped back; Paige giggled, collapsed out of her crab posture onto her back, and called to me. "Case-Case! Get over here!" She crawled over to me on all fours and pinched me playfully on my leg. At that moment two children arrived in the classroom and invited her outside to play chase. She got up quickly and followed them outside (on two legs).

Paige's explanation and demonstration of becoming crab indeed mirrored Disney's animated version of *Beauty and the Beast* (Trousdale & Wise, 1991) – the French fairytale in which an arrogant young man transformed into a human-animal hybrid until the spell is broken by true love. In Paige-Crab's case, when the specific material-discursive conditions are right for a *spell* – be it ingesting a crab-shaped pretzel or having an empty classroom in order to play rough on the

carpet – she was able to become a *beast*, doing both Paige stuff and crab stuff. As all of the children has some familiarity with the animated tale, the beast became the way in which we conceptualized the many lines of connection that emerged throughout children's animal becomings – the material-discursive entanglements from which these beastly spells emerge, what child and animal "stuff" makes itself known therein, and the conditions under which these hybrid beasts retreat.

Child-Butterfly-as-Beast

Rosa closely examined several series of photos I had taken of her engaged with plastic insect figures. I noticed she frequently chose to play with the basket of plastic insects during morning exploration time; I had taken several photos that (re)constructed her engagement with a particular blue and purple butterfly.

While examining these photos closely, she gave the following account:

Rosa: *That's my butterfly. . .my favorite one. There is another purple and blue (butterfly) that looks like mine, but it has little spots on it. I don't like that one as much.*

Casey: *Why not?*

Rosa: *Um. . .I just like this one better. I think I actually rubbed the spots off because I like to hold it and rub it. Purple and blue are my favorite colors. Do you know why? My blanket that I've had since I was a baby is purple and white and it smells like cotton candy. It is made with holes in every spot. Do you know that kind?*

Casey: Crochet? Is it made of yarn?

Rosa: Yes, I think. But it smells so good! I rub, rub, rub and then wait a little bit.

Casey: *What are you waiting for?*

Rosa: *I'm just thinking. . .about cotton candy, actually, and my blanket and my mom and dad. Then I jump! And fly over to the next thing I'm going to do. You didn't take a picture of that part. See how. . .I land in the plant for a while and rest. I put my butterfly in the branches and get inside. And do like. . .a butterfly rest*. [Zooming in to examine the leaves of the plant more closely in the photo] *I can't see my butterfly in there. . .I did put her in there though. Butterflies are really fragile so they need to rest*. [Laughing] *I look just like a butterfly in that plant! That's funny to me.*

Casey: *I remember that you asked me to take that photo.*

Rosa: *I wanted to see if I really looked like a butterfly.*

Casey*: Because you're resting?*

Rosa*: Yes, but. . .you know what? You didn't even notice me flying! I can flap really fast and go pretty far, actually.*

Casey: *I need to watch more carefully. Are you going to fly again sometime soon?*

Rosa: [Spreading her arms wide] *This is how butterflies say, "yes."*

After our first discussion about becoming a butterfly, I did notice instances of Rosa "flying" around the classroom, usually during the morning exploration period. Becoming butterfly began with a search for "her" purple and blue butterfly. If her butterfly was used for "decoration" on another child's structure, as many insect

figures often were, she would broker a trade or switch her butterfly out without notice. Once she had her butterfly in hand, she held it tight for a few minutes and then allowed it to rest in one of the sturdier leaves of the classroom plant. Next, she would step onto the building platform and launch herself into the air.

In an effort to document her flight patterns, Rosa-as-butterfly would tug gently on my shirt or tap my shoulder to let me know she was about to fly. I'd feel the familiar tap or tug and turn around to just in time to snap a photo of her in flight. When viewing these photographs, she delighted in the blurred image she imparted upon the screen and narrated the ways in which her flight patterns were influenced.

Rosa: *I'm so fast! I'm flying. . .you can barely see!*

Casey: *You're blurry. . .The camera has a hard time making a clear photo when you fly that fast.*

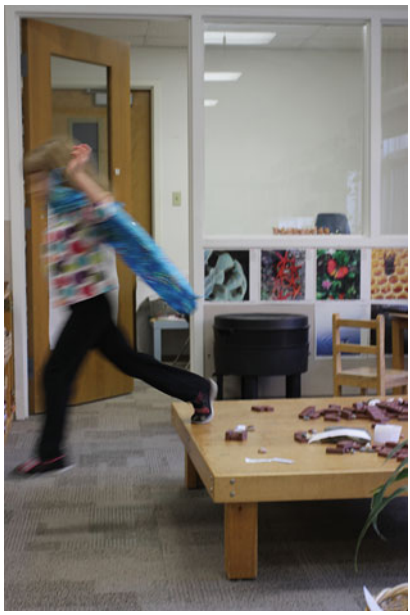
Rosa: *Well, the platform is the best spot. I like to take off from the platform mostly because it is just the right size. It's my. . .a butterfly surface. If I tried to fly from on top of the table or something it wouldn't be. . .you could get in trouble.*

Casey: *Why?*

Rosa: *I just try to fly really fast so no one sees me. You aren't allowed to run around the classroom, but I know how to fly so I won't get hurt. And I don't really want to touch the actual ground, so I fly from surface to surface if I can, but some blocks you can't land on or they will break. But I don't even think [other people] can see me. . .I'm so blurry.*

Rosa-as-butterfly's flight was entangled, not only with the plastic butterfly figure, the sense memories it imparted, and her knowledge of butterflies and the classroom plants but also with classroom spaces and materials, the rules for their use, and my camera's ability to reconstruct the flight visually. Her patterns of flight

were further complicated when a basket of fabrics was introduced to the classroom. These fabrics, particularly ones with blue and purple patterns, allowed Rosa to become more butterfly than before, thus presenting challenges to the human classroom space.



Rosa: *I like this one because I have butterfly wings on.*

Casey*: What do those do?*

Rosa: *Well, I usually try to get this blue one. . .or one with blue and purple when I am ready to do butterfly, um, flying.*

Casey*: And then what?*

Rosa: *I tie it around like this [motions around her neck with her hands] and, well, sometimes I need a teacher to help with that part and then I flutter. . .and that means move like. . .the wing part. It makes it like a fan almost. Like. . .*[fanning me with her hands]

Casey: *Oh, right. I can feel a little breeze from you right now. That's how your wings work?*

Rosa: *The wings make a breeze and that helps you to fly. My mom even told me.*

Casey: *So fabrics make your wings and that helps with your flying.*

Rosa: *It makes me faster, but sometimes I have to wait if someone else is using it. Or if someone wants what you have. . .your fabric. . .then it can be a disagreement because I just want these ones for the butterfly.*

Casey*: What happens if there is a disagreement?*

Rosa: *The fabrics get put away in the office and then no one gets to use them. Or if someone says, "You can jump off of there!" then I have to stop. . .just take off the fabric and make a good choice.*

Casey: *Being a butterfly isn't a good choice? Or flying isn't. . .*

Rosa: *Not really. It's fine for me, but that's why I have to be really fast. So no one can say, "stop!"*

The fabric wings not only allowed her to become more butterfly in color, but also in movement ("flutter") and effect ("breeze"). But there were instances that I observed in which Rosa was told to stop flying, either by other children or adults. As she said, having to stop flying was often the result of either a disagreement between children or when she wasn't fast enough to not be seen by adults who disapproved of her using the wooden platform as a launch pad/butterfly surface. In these instances, removing the fabric and, thus, becoming less butterfly were positioned as the better choice.

Given constraints of space, material resources, and adult idea(l)s about acceptable movement, Rosa would sometimes fly without the plastic figure, her plant resting place, the wooden platform, or the fabric wings. For example, several large boulders were partially buried in a small grassy slope on the playground. Rosa would often ask me watch her while she "flew" from rock to rock during the morning outdoors time. While engaged with these photos later, she commented on what was lost and gained when flying in this different way.

Rosa: *Going from rock to rock is. . .a better choice.*
You don't get in trouble for the flying part. But it's not really. . .it's less good.
Casey: *Why less good?*
Rosa: *I can't go high and land on the wood. See how my hands are wrapped up?*
Casey: *Inside your sleeves.*
Rosa: In case I fall on a rock. And you can't take the [plastic] butterflies outside or the fabrics! And there isn't a tree rest. But there are flowers for butterflies outside, but not for a long time. You can fly, but it's not so real, actually.

Jumping from rock to rock was a more proper way to become butterfly, at least according to adults. But this "better choice" for a human student was "less good" for a beastly butterfly. Rosa was a "less good" version of her butterfly-self without the smell of cotton candy, the press of the plastic figure in her hand, the flutter of fabric around her shoulders, and the wooden platform under her feet.

Child-Snake-as-Beast

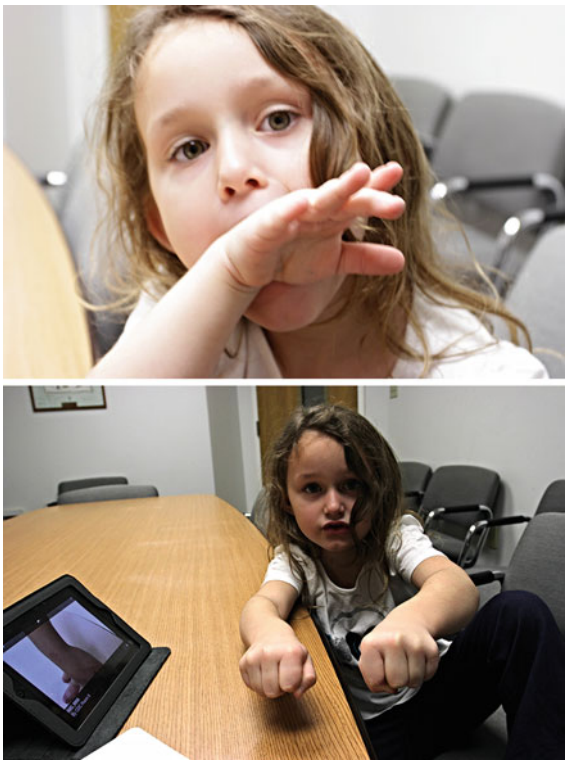
Two distinct ways of becoming snake emerged within the classroom. Although each of these child-snakes emerged through quite different material-discursive events, each would be understood through movements toward and enactments of inhabitation – of something or someone getting *inside*.

Nia Becomes Snake

I arrived in the classroom one morning in mid-September to news that a small snake had bitten Nia while the she played on the playground the day before. Nia was quick

to show me the oval pattern of marks the snake's jaws had left on her skin and allowed me to photograph her wrist with my camera. For several weeks afterward, many children engaged in various retellings of the events leading up to the moment of the snakebite and Nia often corrected their version of the story. Nia offered this retelling of what happened when she engaged with the snake:

> Nia: *This is how the story goes: I was on the Playground and I saw this baby snake. I picked him up and I wasn't even afraid. I've known how to hold a snake since I was three because I've done it before. And then some kids came over. I held the snake out for them to see they all started screaming. And I said, "Stop! Be quiet!" But they didn't stop. The snake put his head up in the air and opened his mouth three times. And then another time. He dove down and put his mouth right onto my wrist. I shook and shook and shook him off and everyone was still screaming and the snake crawled away. I don't know if I cried or not. I washed it and put a Band-Aid on it. And I don't know what's gotten into me, but I'm guessing it's snake germs. That snakebite. . .I am part snake.* Casey: *Part snake? Why?*
>
> Nia: *Because at night, when my parents think I'm sleeping I get down. . .lay one the floor. And then I* [makes a hissing sound] *all around until I'm done. Because, look* [holding out her arms]. . .*those two dots are scar dots. It, like, irritated my veins. See how they are green?*



Nia's transformation into a human-snake hybrid not only urged her to behave in a certain way but also imparted her with a certain fund of expertise – a kind of snake wisdom – that others would call upon for various purposes. For example, she was asked by the outdoor education teacher to talk with children from other classrooms

about "what happened with the snake." The purpose of these meetings was twofold: to give other children advice on keeping their distance from wild animals, both for their own safety and the safety of the animal, and to instruct children on how to properly hold a snake should the opportunity arise. During these meetings, Nia's expertise was framed as the result of her social history (e.g., the *choices* she made that allowed her to be bitten and the *lessons* she had since learned). In less structured human-snake engagements, such as when a small group of children encountered a small lifeless snake during an excursion just outside the playground fence, Nia's peers called upon her to be the *first* one to touch the snake because "she knew about snakes."

However, in our photo-doings, Nia noted that her previous social experiences as a child-among-snakes couldn't be separated from her current beastly self that was inhabited by snake germs. She also didn't simply see her expertise as a consequence of interacting with the snake incorrectly and, thus, learning important lessons about snake handling, nor did she view her familial relationship to snakes as uniformly positive.

> Nia: *You know what? This bite made me remember that when I was three, I found a snake egg on the playground and I carried it all over. And then I put a bunch of, like, sticks and grass on it to keep it warm and then I hid it. I think maybe (the snake that bit me) was that snake just as a grown up. And I think it remembered me. I didn't want him to bite me,*

but he didn't listen to me because I wasn't even a snake then. And he was afraid. And I was afraid because everyone was screaming. So it was both of us. This is making my wrist itch from the inside!

Casey: Where the snake bit you?

Nia: Oh, yeah...like you know when we found the little dead snake? I poked with the stick and flipped it over. And Matar and Petal were scared and I wasn't scared because it was dead and just laying there. But, like...my wrist was itching and itching and that can be a...little problem.

Casey: *The itching is the problem?*

Nia: *It does itch...but, like, I have snake on the inside, so whenever I see snakes, think about snakes, it keeps itching.*

According to Nia, becoming part snake endowed her with abilities, sensations, and memories, and both she and the snake were responsible for these things in various ways. While Nia was seen as some kind of snake expert, the snake continued to make itself known to Nia through physical sensations. To Nia, these sensations meant not that she was simply constructing knowledge from the outside in, but, since she now had "snake on the inside," she was becoming more snake from the inside out.

Elizabeth Becomes Snake

I often photographed the children engaging with baskets of fabrics during morning exploration time. A group of children would typically call me over, not only to allow me photograph their engagements with the fabrics but also to request my help in their efforts to tie fabrics around their waists or shoulders if their play necessitated it. With these particular animal-printed fabrics tied around their shoulders and waists or draped around their heads, Elizabeth, Lauren, Petal, Krissa, Clara, and Paige engaged in various animal enactments, such as growling, crawling on all fours, mooing, meowing, oinking, hissing, etc. Children who wanted to engage in this, but found themselves without a fabric to wear, would often take on roles of humans, specifically the "pet owners" of the various fabric-clad animals.

Elizabeth in particular created elaborate animal plays with these fabrics, often becoming more animal than kindergartener – spending the entire morning exploration period under spell of the fabric. When she examined images of these beastly events later, she remarked on the ways in which she emerged as a snake.

Elizabeth: *See what I'm doing with that fabric? Ssss! That's how they smell. They don't have a nose, so that's how they smell.*

Casey: *By hissing?*

Elizabeth: Yeah. I can do that really good. Really good because of these missing teeth... [She slides her tongue in and out of the space where her primary teeth used to be.]

Casey: *I've seen snakes do that with their tongue.*

Elizabeth: *And they...like, they have a tail that, like, shatters.*

Casey: *What's shatter?*

Elizabeth: *That means when they are scared they shatter their tail to say, "Get away from me!" They have a special shatter tail* [moving hand back and forth to simulate a rattling motion]. *And I could just do that.*

Casey: *Shatter like a snake tail?*

Elizabeth: *Well, we were playing a game and I became the pet with that fabric…* [Laughing] *and I was the worst pet they ever had! I shattered my tail all over…I was very scary. I would not like a pet snake or a pet alligator but being one is okay. I would not like to have a lake house, but I don't even do so it's not really a problem. But anyway, the fabric…it flattens out very easily and silky, so it's a…I love that it feels like a snake on my body. I could actually sleep with it.*

Casey: *Sleep with a snake?*

Elizabeth: *Not a sleep with a snake…be a snake and sleep IN it. Like, when stuff is so soft, I love it so much. And I could curl up, stay asleep…it's so cozy. But if you slept with a snake it would always be "Sss!" and it would be waking me up all the time. But if you were a snake it wouldn't even matter to you. Like, do you have a pet?*

Casey: *I have a dog and a cat.*

Elizabeth: *Well, then sometimes you know if you have a crack in your door your cat will come in, and just bother you? Or, like, scratching at the door?*

Casey: *Oh, yeah! My cat does that a lot at night.*

Elizabeth: *That's how pets can bother you. If you are a snake you don't care because you're just "Ssss!" all night long and you love it!*

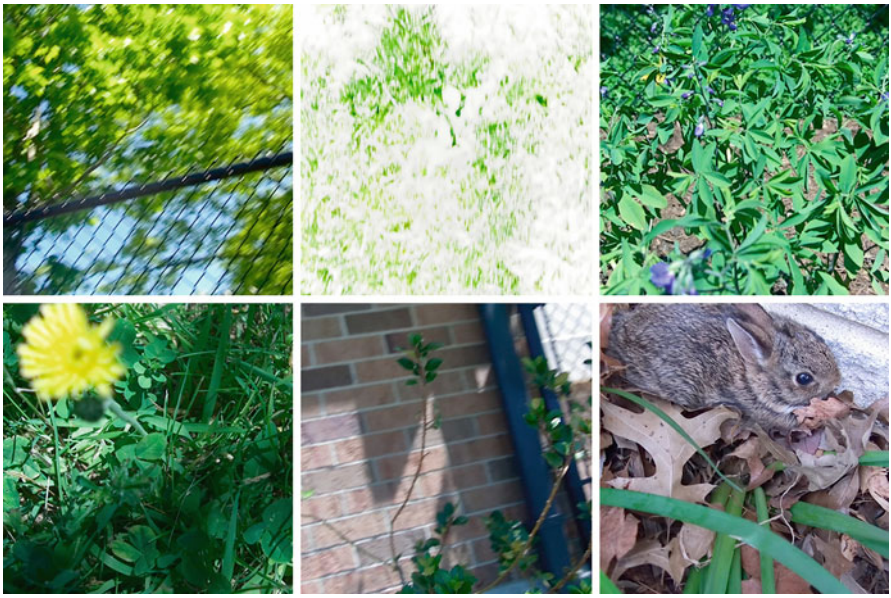
Casey: *You love being a snake…*

Elizabeth: *I do not! Just inside a fabric. A snake fabric is like being a snake inside a snakeskin that's a cozy feeling to a snake. I could shatter my tail and just get really cozy!*

For Elizabeth, becoming more snake than human was the key tolerating snake behavior. Elizabeth didn't particularly want to be in the company of a snake and recognized that Elizabeth-snake was the "worst" kind of pet, but she did enjoy *being* a snake in many ways. Becoming cozy inside the fabric snakeskin afforded a kind of comfort with snake behavior – hissing without feeling annoyed, shattering one's tail – that would otherwise be impossible. Just as Nia had become a snake "from the inside" due to "germs," Elizabeth also became a snake when the introduction of animal-print fabrics to the classroom allowed a kind of *interiority* to materialize. In this case, the properties of the fabric gave Elizabeth the opportunity to "get inside" and feel "cozy," which mobilized her beastly snake becomings.

Child-Bunny-As-Beast

One morning in April, I heard several shrieks and unintelligible, hurried talking coming from the small courtyard just outside the classroom. As Lauren rushed inside to grab the cameras, she told me there were two baby bunnies in the flowers. When I arrived in the courtyard, several children were in crouched positions near the beds, lifting the layers of dead leaves and carefully peeking to see if baby bunnies were hiding underneath, while others were talking loudly, either trying to tell others to come and see the bunnies or warning younger children to stay away. One tan bunny about the size of a teacup darted away through the courtyard, across the grassy area, and under the perimeter fence. A few children chased after, pointing their cameras wildly and clicking the shutters over and over again, trying to "catch" the bunny's image as it disappeared from sight. The other bunny remained – wide-eyed and still in the leaves of the flowerbed.



Teachers calmly convinced most children to keep their distance so as not to stress the animal any further. In spite of these warnings, Matar and Nia returned to the beds several times to take photos of the remaining bunny. Each time, they would squat low to the ground and approach the flowerbed as quietly as possible, shuffling on all fours; it struck me in that moment how much the tiny bunny impacted the girls' motion and how their movements. They had emerged somewhere in-between "child" and "bunny," and this had a dual effect. They were less likely to be noticed by teachers as they defied the orders that the other children had to obey and they were also less likely to scare the bunny into fleeing the flowerbed as the other children had done.

While other children were given warnings and chastised for getting too close or being too loud near the frightened animal, Matar and Nia moved stealthily in

and out of the bunny's territory – taking photos, avoiding adults' verbal corrections. I sketched them quickly in my notebook until the call of the morning bell began the official school day, breaking the spell.

A few days later, while Matar and I were examining the photos that had been taken during the bunny event, I showed her the drawings in my notebook.

Matar: *What? Is that me? Why?*

Casey: *Yes. . .I was really trying to notice how you moved toward the bunny. You're crouching . . .it seemed like that was a good way to move.*

Matar: *Move how?*

Casey: *Like, crouching. . .*

I try to make myself smaller in my seat, ducking my head and pulling my arms and legs to midline.

Matar: *Crouching. . .when you. . . crouching, you are more small to the ground, so the bunny is not so scared because you are not such a scary person to him. Like, so you won't kill him, you won't hurt him, he's not scared.*

Casey: *You were being very careful and quiet.*

Matar: *A bunny is so quiet, so you can be quiet.*

She giggles and pulls her hands up near her face, mimicking the ways bunnies clean their faces and ears with their paws.

Casey: *Ah! A little bunny! I've seen them move just like that.*

She takes a soft lead pencil and adds ears and paws to the drawing in my notebook and holds it up for me to see.

Matar: *You say, "Are you a little bunny now?" and I say* [putting her hands on her head, fingers up, mimicking the small ears of a bunny, laughing]. . .*okay, that's it.*

Just as Matar had done, Lauren and Nia explored this kind of beastly bunny movement as we assembled our data. During one particular event, Nia and Lauren

had created lists of important classroom events and were debating with each other whether or not those events were represented within the many photos that the children had taken with their cameras and how these might be arranged within the cartographies of the research "book." As they began to discuss the morning on the playground that the bunnies appeared and the images that were constructed of that event, they grappled with the ways in which bunny movement was constructed in/as images.

Nia: [Writing] *Okay, now, the most important thing to me lately is the baby bunny. I can't write that so I am just going to. . .*

She stops writing conventionally and draws a tiny bunny as an item on her list.

Casey: *That was important to Matar, too.*

Nia*: It was so cute. I think it was really scared of us, so it was just afraid to move even though we were trying to be quiet.*

Casey: *We talked about that. . .how it was important to stay very quiet around the bunny.*

Nia: *It was like. . .froze.*

Lauren: *But the cool thing is. . .it didn't even move. Bunnies never do that!*

Casey: *Do you think it was because you were moving so slowly and quietly?*

Lauren: *I think that the thing. . .what's important is that it was staying still and not hopping around so I could even take that photo. Because I tried to get a photo of the other one and all I got was like blurry. . .like grass.*

Nia: *Well, look at it now. . .it's going to hop all over our list!*

She draws some jagged lines at the top of the paper. Her hand bounces up and down wildly, mimicking the quick and unpredictable movements of the baby bunny.

Nia: *I'm making you, Lauren, and you're a little. . .little bunny.*

She draws Lauren and then continues the jagged lines into her body and down her legs. Both girls begin to laugh.

Lauren: *Ah! Why did you do that? That's weird!*

Nia: [Crossing her arms, smirking] *Well, if you're going to be a bunny, you are going to hop around on your legs!*

After we finished the list, the girls and I walked back to the classroom and arrived just in time for the daily patterning activity. Each morning, one or two children would assist the teacher in leading the class through a sequence of movements while counting up to the present day of the month. For example, if the date was the 15th, the children might choose a "two pattern" of "clap, jump" and then proceed to see if the pattern could fit evenly into the number 15. On this particular day, the child who was creating the pattern with the teacher was having trouble deciding on which movements to choose. Eager to begin, many children shouted suggestions.

Margaret: *Spin!*

Rosa: *Stomp!*

Nia: *Bunny hop! Bunny hop!*

Some of the children laugh and then join in her request, chanting until "bunny hop" is chosen as the third movement in the pattern. The children count aloud, bunny-hopping in unison.

Nia: [To me] *Make sure you take a picture of this.*

After the morning meeting had ended, Nia asked to view the photos I had taken of the bunny hop. As she viewed them on the camera's screen, we engaged in an

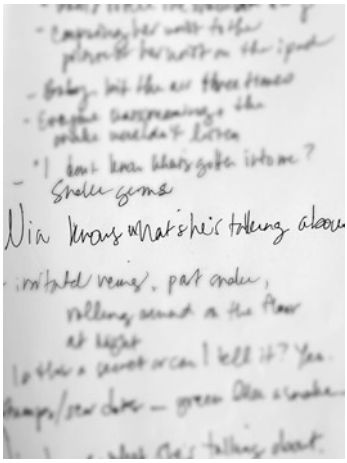
impromptu event of photo-doing, while the other children were busying themselves with transitioning to their morning work choices. While engaging with the images, Nia remarked on the limitations of our methods – the difficulties of constructing and critiquing static images of these kindergarten "beasts" when movement was a crucial way being-becoming – as well as the ways in which these more-than-human animals emerged within a variety of bodily desires, material forces, curricular constraints, and social expectations.

Nia: *It's blurry...this one, not so much.*
Casey: *You were moving pretty fast, so it's hard for the camera to make a clear photo.*
Nia: *I was trying to really hop like a bunny because never had a picture of that part.*
Casey: *Right – you said the bunny being able to hop was important, so...*
Nia: *But actually... if we wanted to really be a bunny, we shouldn't have been up so much*. [She crouches, pulling her arms and legs in] *But you can't crawl around in the classroom because that's not okay to do. That would be too...crazy. But it's more down.*
Casey: *It didn't feel like a bunny to do it that way? Up?*
Nia: [Popping up to a standing position] *It really felt like a bunny to hop like that...but it doesn't look like it. You can't really see it on there.*

Being-becoming bunnies – and all kindergarten beasts – was paradoxical in this way. Our means of rendering beasts visible was never adequate, as the kindergarten beast was always somewhere in-between, never still nor static, as classroom forces and the processes of our research, in various ways, caused beasts to emerge and retreat.

Conclusion (or Taking the Beast Seriously)

Imperative to inquiry grounded in a new materialist onto-epistemology is that children's ideas are not necessarily fantastical misunderstandings or egocentric projections, but articulations of classroom life that are tuned in to material-discursive entanglement. I found that entertaining this possibility required engaging with what children *said* seriously and affirmatively. This posthuman orientation toward their perspectives on relationships, events, bodies, and feelings of significance required an acceptance that children know what they're talking about. Despite positioning myself within a posthuman worldview, this was not a task that came easily, and the pull toward overinterpreting and analyzing what children "actually meant" during these moments was strong; All of these beastly emergences pulled me toward humanist interpretation. As a countermeasure to (and out of frustration with) my humanist interpretive tendencies, I began writing "(child) knows what he's/she's talking about" in my notebook whenever I noticed myself considering that a child's perspective might be borne out of their ignorance and inexperience rather than their expertise and astute awareness.



As simple as this tactic seems, materializing this affirmation on the page was generative in two important ways. First, it caused me to pause and literally do/become something different when I might have otherwise assumed, interrupted, or asked an unnecessary question. This practice pulled me onto the page. Second, it helped me to confront children's ways of knowing that were troubling and alerted me to the complex and confounding nature of their entanglements with animals. These would become touchstone moments of rupture – the very "patterns of differences that make a difference" (Barad, 2012, p. 49 in Dolphijn & van der Tuin). These very becomings ended up being the "important things" that children wanted included in the research. What they needed from me as a researcher was for me "to take seriously the things and actions with which they encounter their worlds. . ." (Rautio, 2013, p. 4).

How might engaging with classroom beasts as a complex, real-life event for young children allow us to consider alternatives to the traditional roles allocated for animals within early years curriculum? I argue that taking children at their word and engaging *seriously* and *affirmatively* with these child-animal hybrids – these *beasts* – may open generative spaces for animals within the early years curriculum. With regard to children's socio-emotional development, there are ways in which animals might be both included and reconsidered. For example, classroom beasts may afford a different perspective on the ways in which children work against, around, and within adult rules and expectations. In beastly events wherein Rosa-butterfly, Nia-bunny, and Matar-bunny emerged, their beastly movements and choices came up against the idea(l)s of teachers, though it was never clear if these adults understood the complex animal forces at work. From adults' perspective, it was the children alone who were either complying with the rules or not. Additionally, the commonsense understandings of the ways in which animals impact the socio-emotional landscape of classrooms might shift, allowing us consider that a uniformly positive view of animals in the classroom is an oversimplification of children's experiences. For both Nia and Elizabeth, the complex emotions, sensations, and identities around snakes were neither uniformly positive nor negative. With regard to

children's intellectual development, the popular use of animals as specimens within this classroom didn't figure into children's discussions, drawings, or photos of "important things." What mattered to children seemed to be the ways in which child-animal relations entered into their everyday academic practices, such as when a bunny upended the use of conventional writing to create a list or when a few children convinced the entire class to hop like bunnies during their patterning exercises. Moreover, just as Nia noted in the final movements of her bunny becomings, what emerges between children and animals in the classroom may not be available for neat capture – neither through taxonomies and hierarchies of scientific thinking nor through the static images of a digital camera.

Beyond animal's supposed utility for social and intellectual growth, children are living classroom lives intimately enmeshed with animals in delightful and disturbing ways. I acknowledge that is an impossible task to "to fully understand, organize or capture the essence of these material-discursive intra-activities" (Hultman & Lenz Taguchi, 2010, p. 540). Even so, it seems a worthwhile endeavor to allow the things that matter to children to move those of us who engage in early years work toward unthought-of possibilities and potentials. To this end, I can't conclude this beastly work with answers, only questions that might push our thinking-doing with young children in new and multiple directions. Does the notion of "child-animal relations" itself need rethinking, as the beasts that emerged through these research assemblages suggest a hybridity that overruns the stable categories of "child" and "animal"? Furthermore, how might saying "yes" to the complex ways in which children articulate their experiences, relationships, and everyday encounters in their classroom worlds reaffirm the agential force of children, and of all things in their midst – living, nonliving, human, animal, or whatever more-than-human beastly configuration that emerges in between?

Cross-References

- ▶ Challenging Taken-for-Granted Ideas in Early Childhood Education: A Critique of Bronfenbrenner's Ecological Systems Theory in the Age of Post-humanism
- ▶ Unearthing Withling(s): Children, Tweezers, and Worms and the Emergence of Joy and Suffering in a Kindergarten Yard

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Troubling Intersections of Childhood/Animals/Education: Narratives of Love, Life, and Death

62

Tracy Young and Jane Bone

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Abstract

Mapping not only the entanglements in which animals are situated but also our own positions within tangled skeins of humans relationships can be a method of coming to understand the workings of that daunting term intersectionality. (jones, 2015, p. 99)

pattrice jones (2015) entreats us to not only map the entanglements in which animals and humans are situated but to interrogate the intersections of human-animal boundaries and that which demarcates the former from the latter, to see how they support and prop each other up. In this chapter, we trouble the

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intersections of childhood/animal/education seeking to circulate and disrupt the normalizing ideologies of speciesism that reinforce human exceptionalism and dominion. This chapter contributes to political and ethical conversations in early childhood education (ECE), as we argue that the commodification of nonhuman animals infiltrates educational praxis, in ways that contribute to our epistemological uncertainty as we search for possibilities of animal liberation and the desire to live without places of injustice and violence (White, 2015).

Research with children and their families in an Australian ECE context uncovered stories about life, love, and death. The impression given by these stories is that humanist thinking and anthropocentric viewpoints dominate what parents and teachers share with children and the way they talk about their children's experiences and retell their own childhood stories that concern relationships with animals. Redefining the human species as one among many offers the potential to not only challenge anthropocentric systems but also attempt to move beyond humanist principles and human-centered ways of relating ethically to the other (human or animal) (Kendall-Morwick, J Mod Lit 36:100–119, 2013; Lévinas, Entre-Nous: On thinking of the other. Columbia University Press, New York, 1997). Theoretical borders are also being tested here as we roam in and out of human, posthuman, and critical theoretical realms playing with old and new ontologies in our search for pedagogical resistance, anarchy, and places without violence. Specifically, we engage "post" methodologies and theories, to pay epistemological and theoretical attention to animal species (Hamilton, Taylor, Ethnography after humanism: Power, politics and method in multi-species research. Palgrave Macmillan, London, 2017).

Keywords
Human-animal relations · Early childhood education · Speciesism · Intersectionality · War against animals · Multispecies ethnography · Earth roamer · Critical posthuman · Pedadog and roaming pedagogy

Introduction

We the authors open the chapter by troubling the intersections of childhood, animals and education and continue with a description of our theoretical roaming's, before providing a brief overview of the territory where children and animals dwell in this Australian study. By exploring the everyday practices of animal and human bodies in an early childhood education space we test the boundaries that separate human and animal, seeking blueprints that uncover permeable spaces to roam through. A rescue dog called Kosi, a pedadog, helps to sniff out border crossings, revealing immanent possibilities for child/animal/educational roamings that (re)imagine relational ecologies of education. The chapter concludes with a conceptualistion of 'roaming pedagogy' that offers possibilities to disrupt the normalizing borders and boundaries that pervade the discourse of human and animal relations in early childhood.

The term 'Earth roamers' was prompted by an early childhood pre-service teacher Djycah Sarroza, as she explored notions of human interconnectedness and relationality with plants, animals, people and also elements of air, sunlight, life, water and soil in a university subject about environmental sustainability. The concept of roaming for Djycah articulates the movement and flow of material and ecological movement that travel in and out of material and ecological worlds with unseen, elusive and often unknown fluidity. The concept of 'roaming' has been put to work in this chapter wondering and wandering over unsettling and complex terrain, especially as prompted by restlessness and curiosity. We invite the reader to roam with us, as we walk the borders of human-animal as children do with uncertain configurations, through the restless and curious wonderings of childhood.

Troubling Childhood-Animal Relations

We question the position of the animal in early childhood. As researchers, early childhood educators, and animal activists, we notice the animal is everywhere but absent except in a certain way, as representation. The animal is materially and discursively embodied in children's books, emblazoned on the clothes and bedroom walls of the newborn human, softened and miniaturized as toys to play with, and sometimes found in their hearts as pets but not often as "kin animals" or the animals that secretly disappear on their plates. The inclusion of the nonhuman-animal in childhood has historic and pedagogical significance where animals are coopted into childhood projects (Cole & Stewart, 2014), and their bodies, habitats, and territorial spaces are enmeshed into narratives of violence, education, entertainment, and speciesism. Animal bodies are also commodified in the production of knowledge as cultural tools that teach children about life and death and what it means to be a good human. This representation in Western culture supports the objectification of the nonhuman-animal whose dead or alive body becomes a fetishized commodity and children and animals become "sentimentalized subjects" that validate a natural bond "as well as the fantasy of reconnecting with the primordial and the innocent" (Pedersen, 2011, p. 13).

Troubling Education-Animal Relations

We question the position of the animal in early childhood education. The cultural and pedagogical normalization of human-animal binaries is so entrenched in Western minority world childhoods and in early childhood pedagogy that speciesist practices are subverted through a naturalized order of experience and hegemonic structure that consistently reinforces human dominance. Although animals feature heavily in pedagogy and practice, they can become epistemologically erased as objects of study and not holders of knowledge. Bone (2013) notes how early childhood teachers stick to familiar scripts about pets, farm, and exotic animals with children's literature but not the violent and contained lives of farmed animals. Industrialized

animal production practices gloss over the violence inflicted on farmed/hunted animals, perpetuating human-animal separation through difference where they become invisible, and the human act of consuming such astonishing numbers of animals is hidden, subverted, and denied, especially with young children (Cole & Stewart, 2014; Stewart & Cole, 2009).

Birke asks "What's in it for the animals and how do we know they are being taken seriously and that the human viewpoint is not dominant" (Birke, 2009, p. 1)? We share unsettling narratives of animals in ECE who become expendable products appointed as pedagogical aids to teach children about biology, relationships, and how to care for a living creature and dispose of a dead one. Bone (2013) observed how educators make jokes about flushing dead goldfish in the toilet, and the following narratives recognize that the "condition of being tamed is not always a happy one for animals" (Bone, 2013, p. 60):

> A lamb is brought into the preschool, it is very small and spindly. The children do not treat it kindly. The lamb leaves pools of yellow runny shit. I ask the teacher what the point is and she says well it's fun for the children and he will probably die in the night.
>
> I look at a glass tank. There are black jellyfish shapes. The teacher looks and says oh no, the fish must have died ages ago. Well, yes!
>
> One of my friends say that the guinea pig was 'loved to death'. I ask her what she means and she says that one child just would not leave it alone and squeezed it so hard that it died. She said that they had to shield the child from being upset. Nothing was said about the right of the animal to be respected and cared for.

The material, discursive, and institutional practices that take place in early childhood education exploit animals while concurrently teaching discourses of speciesism. For example, the common practice of chicken incubation programs is heavily promoted by commercial businesses that provide fertile eggs and incubators for children to learn about the life cycle and embryonic development of chickens, with little awareness for the socialization process of young chicks when the mother hen is removed or responsibility taken for the chickens when they are returned to the hatching company or end up as unwanted roosters in family homes (Young, Clancy, & Ahern, 2015). Young (2010) also recalls seeing a live Siamese fighting fish in a decorative bowl as part of the design aesthetic of a low table setting in an ECE home corner and noticed the way hermit crabs were introduced as classroom animals in cold climates in the tiny flat, plastic prisons that slowly suffocate them, with little understanding of the care, nutrition, and habitats required to keep these sensitive and complex, tropical creatures alive. Hermit crabs can live for over 30 years and enjoy climbing and foraging in large colonies, where they often sleep piled up together and collaborate in teams to find food (Weis, 2012).

These brief examples of animal (dis)integration in ECE signify how education is always political as pedagogies, curricula, policy, and governance are formed by epistemologies of what we think we know, what is valued to pass onto future generations, and how this knowledge frames what is possible. MacCormack (2014) recognizes that human exceptionalism is reinforced through the dichotomy of thinking-through our ethical encounters with animals and the critique of our

violent treatment of them. Any consideration of animal others she insists must involve a radical deconstruction of what is meant to be human and animal. MacCormack (2013) describes how systems like education provide the institutional framework that foster relations with animal species as a war where the bifurcation of nature contributes to pervasive exploitation and exclusion and "language, discourse, pedagogy, and the will to know are 'acts of war' that the nonhuman other can neither win not participate in" (p. 13). This war can be thought of in different ways. Adams (2014) refers to this as a "war of compassion" where "conditions for violence flourish when the world is structured hierarchically, in a false Darwinian progression that places humans at the top" (p. 19). Wadiwel (2015) also adopts the terminology of battle, referring to the "war against animals" as a sovereign claim of superiority founded on violence where animals are the spoils of war. An example of warfare, as the mass slaughter of animals in education, can be observed in animal dissection practices. Dissection rarely takes place in early childhood education settings, although Bone (2013) recalls an occasion where young children were watching a parent armed with a knife, dissecting a dead animal, that was praised as an excellent "scientific" learning opportunity. Dissection as an educational practice is a reminder of the staggering markers of war that degrade and objectify animal life where "in the United States alone an estimated 20 million animals per year are killed for the purpose of dissection in biology class laboratories" (Wallin, 2014, p. 149).

The war on animals marginalizes species through categorization and regimes of truth by measuring perceived intelligence and an absence of mind. Murris (2016) identifies how children are also positioned through particular regimes of truth in early childhood as being ontologically and epistemically inferior, and Osgood (2017) describes how regimes of truth shape ECE and childhood. "Post" approaches offer possibilities to disrupt default thinking and practices; explore and expose power imbalances of class, gender, race, and ability; and position children as key actors with expert knowledge. We extend these ideas to nonhuman animals, particularly by exploring and exposing speciesist regimes of truth that shape "how knowledge and practice are produced by whom, for whom, for what interests and for what purposes" (Payne, 2017, p. 138). Foucault defines "regimes of truth" through the types of discourse that become dominant and sanctioned as practice, framing particular stories of what is said and unsaid and how we see and understand the world, by "those who are charged with saying what counts as true" (Foucault, 1980, p. 131). An example of widespread epistemology in Western ECE is the dominant discourse of nature as a teacher and font of knowledge for young children, where children and animals are described as having a "natural bond or affinity" with each other. These ideas can be traced to early childhood pedagogues like Froebel who created the concept of the kindergarten (child's garden) as both a garden of children and garden for children (Elliott & Young, 2015, p. 2) and philosophers like Rousseau who supported the "romantic coupling of childhood with nature" (Taylor, 2013, p. 4). Early childhood education is bound by dominant discursive and capitalist boundaries that reproduce factory models of children as consumers and workers, where academic knowledge, cultural values, and economic wants and desires are transferred to the next generation through humanist pedagogies and practices.

Intersections of Humanism and Speciesism

Humanist theories of learning emerged from the enlightenment period where the scientific movement appeared in Europe referred to as "the age of reason" (Pederson, 2010b) and also attends to human personhood, subjectivity, self-discovery, and the teaching of values and ethics that maintain civic unity. The human as a rational, knowing being is positioned center stage throughout childhood, and the scripted curricula of social and material histories form the humanist plot that is saturated by developmental, psychological, and sociological storylines. Fellow Earth dwellers are not the main story here as our relatives through evolution are estranged, violated, or relegated to environmental sidelines with designated bit parts and roles that never capture the vitality of their inner lives. In staging the ethical question of traditional concepts of humanizing education (Snaza, 2015a), we commence our roaming by prodding at the intersections of child-animal boundaries.

Intersections indicate crossing point place where two entities are caught in the act of crossing. The notion of intersectionality is a humanist concept that emerged out of a concern for social justice with an aim to understand the intersections of classed, raced, and gendered power relations (Crenshaw, 1989). Ecofeminist and critical human-animal studies extend these injustices to the more-than-human and ecological justice attributed to nature and animal species (Twine, 2010). These intersections of injustice are cultural, historical, and philosophical manifestations of relationships of dominion, largely based on processes of hierarchy and commodification, where the struggle to attain justice for animal species becomes confused by how the animal is categorized as pet, pest, or product. The intersections of humanist and posthumanist theory disclose aspects of speciesism where species difference is normalized and naturalized, to sustain human privilege, and where decentering the human can enable thinking with animality. For example, anthropocentric belief systems position human beings as ontologically superior and capable of making worlds based on human abilities of reasoning, self-determination, and self-worth (Weitzenfeld & Joy, 2014). Posthuman ontoepistemology enables the exploration of alternative worldviews and knowledges, and we wondered, for example, what this world-making might look like for bees. Would apoidea(bee)centric systems position bees as ontologically superior and capable of making worlds based on bee abilities of reasoning, advanced social division of labor, cohesive work ethic, and navigation and communication skills (Wohlleben, 2017).

Richard Ryder (1970) developed the term "speciesism" to describe the warfare against other species and to make comparisons with other prejudices like racism and sexism. In a video recording from this time, he emphasized the relational aspects of this ideology. "The point I was trying to make is that we are all related. All species are related biologically and through evolution. And instead of treating the other species like objects, we should be treating them like evolutionary cousins" (Ryder, 2013). Speciesist beliefs and practices construct, legitimize, and reproduce a desired social order in ECE that works to render "assumptions and values invisible, turn subjective perspectives and understandings into apparently objective truths, and determine that some things are self-evident and realistic while others are dubious

and impractical" (Dahlberg & Moss, 2005, p. 17). How we generate knowledge therefore aligns with what we see, where we are, and what is valued. Education embraces humanist and scientific animal-focused scholarship because of an entrenched belief that humans matter more. We turn our attention to theoretical roamings in the following section to wonder how animal species enter these ontoepistomogical spaces and consider how matterings of care, concern, and fact shift from studying human attitudes to animals to including the animals as stakeholders in learning (Taylor, 2017b).

Theoretical Roamings

Posthuman and critical animal studies analyze human relationship with animals, in an attempt to unhinge the ingrained human-centered view toward complex understandings of human-nonhuman-animal relationships. From an ethical perspective, it is important to consider the intersections of eating an animal to loving an animal and to using an animal as an educational tool. Critical posthuman theory offers insights for challenging culturally embedded anthropocentric attitudes and practices relating to the nonhuman-animal "other" in education. Critical animal studies and critical posthuman scholars (MacCormack, 2013; Pederson, 2010a, 2017; Rowe, 2012, 2016; Snaza, 2013; Snaza & Weaver, 2015) challenge and disrupt humanist principles of hierarchical dominion, contending that teachers can no longer remain silent, oblivious, or indifferent to the power structures of human-animal-nature relations, as they must become politicized, political, activist, or advocacy oriented (Taylor, 2017b):

> Delinking education from the structures of humanizing education, detaching it from the anthropological machine, requires radical educators to connect the dehumanizations enabled by state– administered compulsory educational institutions (segregated in so many, many ways) to the ways in which "we" humans pass over in silence the extraordinary violence "humans" do to animals, to ecosystems, to whole species, and, of course, to each other. These violences are inextricably linked. (Snaza, 2015b, p. 21)

Posthuman theory attempts to rethink and unhinge the privileged human in education, so the human child is no longer viewed within places of humanist privileged dominion. Posthuman relational approaches have helped us to think, sense, and feel how Earth roamers wander through the "ontological gap" as interspecies entanglements challenge the "places, times, matters and meanings" (Haraway, 2016, p. 1) of how humans engage with animals and animals with humans (Braidotti, 2013; Haraway, 2003, 2006, 2012; Latour, 2011). Relational approaches have also ventured into ECE research through common world perspectives that adopt multispecies ethnography (Nxumalo & Pacini-Ketchabaw, 2017; Pacini-Ketchabaw & Taylor, 2015, 2015b; Rooney, 2016; Taylor, 2014, 2017a; Taylor & Blaise, 2014). A critical posthuman ontology that we are proposing in this chapter has a point of difference to those described above, with the acknowledgment that human-animal relationships are formed with violence and the war on animals (Wadiwel, 2015) starts in early childhood.

Ecological feminist philosophies also provide critical scholarship and tools to challenge the hierarchical dualisms and binaries and expand complex ontologies of gender, race, culture, and ableism. Ecofeminists such as Valerie Plumwood (1993) exposed connections between different forms of oppression and exploitation of women and nature and how they are intimately connected and mutually reinforcing, specifically between patriarchy and environmental degradation. Ecofeminism and critical animal studies eventually aligned with other forms of injustice including animal exploitation to "connect the dots of oppression, and attack all of them simultaneously to liberate and protect, among other things, animals and our much-beleaguered earth" (Kemmerer, 2015, p. 1). It is these researchers and activists (Adams, 1990; Adams & Gruen, 2014; Donovon, 2006; Gruen, 2015; Kemmerer, 2011b; Warren, 1999) that reveal how forces and material effects have been purposefully obscured through everyday practices of what we eat, what we say, and what we do. Ecological degradation, sexism, speciesism, and homophobia are entwined, because all are connected within systems of patriarchal domination and oppression that overlap within each of the "isms." Kheel (2007) argues that an ecofeminist ethic must sever the connections that historically bind the environmental movement, including environmental education, to a practice of violence by finding ways to embrace contextualized ethics of concern and relationality. Kim (2015) eloquently theorizes multifaceted examples of dangerous borderlands between race and species where she adapts concepts of intersectionality, by renaming dualisms as taxonomies to appreciate multiple, complex, hierarchal ordering that are less didactic and more synergistic, rather than interlocking. This fits with our concept of roaming across multiple spaces in human-animal borders that we find are porous, fluid, and nonlinear. The following research study illustrates some of these multispecies roamings.

The Territory Where Children and Animals Dwell

An assemblage of teachers, families, children, animal species and researcher dwell within a doctoral study that takes place in a small independent school and early learning centre set on four hectares of land in the south-eastern region of Melbourne, Australia. The early childhood teacher suggests four families who live with pet animals, to engage with the research. The larger school community enables further inquiry with animal species including, wild animals such as water birds, rabbits, foxes, cows, sheep, birds and alpacas and stick insects, where chickens, yabbies, and turtles were some of the early childhood classroom animals. A dog named Kosi was also part of the school, community although as we will soon illustrate, Kosi sits outside the category of classroom animal. Post-qualitative methodologies were adopted to bring into question modernist assumptions about knowledge production, where practices of human rationalism order and reduce human and animal participants with categorical claims and meaning. Data was generated with a kindergarten group of children aged five-six years, through an assemblage of practices and entanglements with four focus families, in their homes and an education setting. Field studies took place over a six-month period with practices of walking, roaming, talking, observing,

sensing, taking part in daily curricula, and writing. Post methodologies and practices are important aspects of posthuman research as they seek to embrace messiness, complexity and boundary crossing. Rautio (2013) asks researchers to create space for spontaneity during field studies and to become grounded in the present. She urges "Join in. interrupt yourself as a researcher, stay on your toes, change methods in the middle of your data collecting phase if that is what it takes (Rautio, 2013 p. 404). Myers (2007) also identifies the need for new approaches with human-animal research that do not invisibly marginalise connections with animals:

> Research on human-animal interaction is fertile ground for new discoveries because animals present variations on the characteristics of a social interactant. To be open to these discoveries, we have to grant that unique phenomena may be present, and we have to be willing to assume, at least provisionally, that the animal contributes to the interactions in equal measure as the person or child. (p. 44)

The current eagerness to include animals in ethnography is part of the "species turn" in academia that "reflects posthumanism's claim that humans and animals inhabit the same social spaces with overlapping agencies and experiences, which challenges extant sociological ways of seeing culture and specifically the "affected ignorance" towards animals" (Hamilton & Taylor, 2017, p. 80). Multispecies ethnography practices illuminate how we live and learn together through multifarious, complex relations with other animals in ways that acknowledge the connections and disjunctions of these relatings. Children and animals were observed within their shared domestic and educational spaces, paying attention to how together they construct their world(s). In our search for cracks in the structural fault lines and intersections of the human-animal binary, the following narrative about Kosi the resident school dog offers an example of how mammals like humans and canines learn together.

Kosi the Pedadog

> We begin each day inside at the regular morning meeting place, seated cross-legged on the mat. The children gather in a circle as they centre their collective energies, to greet each other with the term for welcome, from the Indigenous Boonwurrung nation, the land of the two bays that surround Melbourne city (Briggs, 2015). "Womenjika" they say. It's Wednesday so Mr D, the outdoor education teacher arrives and sits on a chair next to the group and Kosi the resident dog who accompanies the children each week on their walks licks his face as he settles on the floor next to him. Kosi is restrained by a leash inside the early childhood classroom, where he knows he has to perform in a certain way and is not a part of this performance. As the discussion progresses however, Kosi makes his presence felt with a large howl and moves to a standing position, pointing towards the door with his snout leading the way. The children turn their heads in Kosi's direction and the teacher asks them "What do you think Kosi is saying to us"? Without hesitation, the children chant in unison. "He wants to go outside for the walk." We all nod and smile because we know this is exactly what he is communicating in his body and sound making (Fig. 1).
>
> The children and I get ready for the outdoor education walk within the large school landscape that offers unique opportunities for the children as they explore, trees, grasslands,

Fig. 1 Canine and human embodied shared learnings with water, weather and sticks

animal homes, a tall mounded earth hill, fruit trees, a lake and large puddles. As we pull on waterproof pants and gumboots in the midst of winter, Ruby tells the me that she loves Kosi and how she is not scared of him anymore. Kosi is eager to get going, letting us know his position of impatience, with occasional barks to hurry up. Today on the outdoor education walk Kosi is staying with us more than usual and not roaming away as he tends to do. I wonder about this shift of behaviour because he often wonders off in this unleashed space in the way of the wayfarer searching for interesting smells and the opportunity of finding a rabbit in the overgrown areas of blackberries and scrubby uneven bushland, where they have taken up residence. Perhaps it is because today we are venturing over flat terrain and he is less distracted or perhaps he is enjoying staying close with the children. He often mirrors their actions and the children pay close attention to him. As Taylor, one of the children strays from the group and is reminded by a teacher of the rules of staying together, Kosi also disappears and has to be called back.

Today Kosi is taking the lead and some of the children follow him through large muddy puddles as their animal bodies share the joy of unrestrained running and jumping in their gumboots with joy and delight. It is impossible not to share this feeling as Kosi runs through splashing everyone and then suddenly drops in the middle of a large puddle as he lies for a while to cool off. He runs back and forth out into the water puddles, not straying too far as he returns time and again to our group. He finds a stick and his joy is amplified as the children call out to him as he runs back to show us. "Look, look, Kosi has a stick" This stick is a large branch and we have to duck to avoid being scratched. I remind the children "Look Kosi likes to play with sticks like you do." The children start to collect sticks to give to Kosi and he takes them eagerly running off and throwing the smaller ones in the air in his own game of throw and catch.

Analytical Roamings

Kosi is a 2-year-old border collie who lives within the school grounds with Mr. D who has worked and lived at the school for over 20 years. This unique lived situation opens up rare border spaces in education settings where a dog is enabled a level of freedom and privilege that facilitates dog/child/stick/water entanglements. Kosi is free range

and allowed to roam. To roam is linked to being free in terms of domestic animals. To be free to roam is the domain of animals like horses and or chickens that range. The freedom is always implied as "given"; however there are limits to this freedom. Animals who are "free to roam" are usually on land that is owned or subject to roundups, cullings, and restrictions that usually end badly for the animal. The affective materiality of containment installs borders and boundaries between animal and child such as cages, dog and cat beds, aquariums, leashes, and fences that restrict and control animal leakage through the control of movement, mess, parasites, sexuality, "difficult behavior," and in turn animality. We wonder does the child-animal boundary also keep the peace in the war against animals and would there be chaos without it? Who might benefit from the chaos – would it be mutual? At the moment, Kosi is free, while he obeys Mr. D's commands, maintains his presence within the school boundaries, and brings delight to the children. He is young and energetic. If he gets old, incontinent, and snappy, it may well be a different story, but for now, Kosi is an Earth roamer whose position is valued and appreciated. This is unusual.

Kosi was named after an Australian rules footballer and abounds with the energy of this popular local sport. He loves to be in water and has an ability to take his human companions with and through water in ways that seep within relational boundaries in this territory where children and animals dwell. Kosi is an unpredictable roamer who takes every opportunity to swim across the school lake onto the island in the center, urged on by cheering children and parents who catch a glimpse of him. He breaks rules and walks off leash; he is uncaged, not abject; he makes decisions and works with the children and generally fulfills his role as pedadog. He has the starring role in the escapades of his life that proliferate in the school community. He is obviously not a child but an animal species accorded privilege who shows the children a different image of the animal. Foucault did not theorize directly about human-animal relations; however, his theory of biopower (Foucault, 1982) and analysis of power can be applied to this narrative, particularly as Kosi provides moments of resistance from institutional "pastoral power" that regulate and discipline the lives of humans and animals, enabling Kosi to act and resist relationships of domination (Palmer, 2001).

Kosi has always shared his life and school work as a pedadog with a human companion, and his photo at the top of the staff noticeboard is a testament to his position at the school. Kosi is privileged by the children who see him as a friend and playmate, and they relish in his energy and playfulness. He appears in their drawings and conversations with family members. The children take turns at being Kosi in their dramatic play, telling me that there can't be two Kosi's as they take turns asking, "Who is Kosi today?" During research interviews with Tracy, Kate the early childhood teacher identified many ways that Kosi is a pedadog, including helping a 3-year-old Ruby to move through her fear of dogs:

> Kosi has been coming to visit each week since he was a puppy for over a year now. We would be walking as we do each week and he would escape to join us. He was still quite big, but with puppy behaviours where he was "out there" and a bit ratty and would run wild. He would find us on the walks and the children loved it but of course Ruby was terrified and she

> would scream, even when he was on the lead. We noticed how this was a really important learning opportunity for Kosi and Ruby. We suggested to Mr D who is a secondary trained teacher that we trial bringing Kosi to the weekly outdoor education lessons. The surprising part of this practice was not how quickly Ruby got used to Kosi, but how he became a conduit for Mr D to build stronger relationships with the early childhood children who he was previously a little unsure of teaching. Kosi has been really important in developing tangible ways to show Mr D how to communicate with the children in his teachings, such as being more patient with their restlessness. Like he is with Kosi.

Kosi as an earth roamer emerges and is made and remade taking on multiple roles in the school. He challenges the usual hierarchical position of the animal in educational spaces. Despret (2016) attends to convergences and divergences between species demonstrating how human-nonhuman-animal collaborations can work against the oppressions of anthropomorphism, when the right questions are asked, and if positive relations are in place. Kosi shows the power of positive relations and brings delight to children, educators, and parents. What we draw from the closer interpretation of these narratives is the relationality of power afforded to Kosi by the school community who enable this practice to take place, as a being who responds and reacts. He is not trapped or contained all of the time as the object of study, for when animals are "denied the possibility of reaction, they pass from the category of the "reactive other" to being a "thing" over whom capacities are exerted rather than power relations exercised" (Palmer, 2001, p. 354).

Kosi demonstrates a very different integration of animals in early childhood education where the children are presented with an alternative image of the dog. Through his ability and the permission granted for him to roam Kosi reveals ambiguities and contradictions that are very different to the discomforting examples we presented earlier. How encouraging that one of us experienced the possibilities of a free animal in action. The stories we tell lead us to advocate for a pedagogy that unsettles anthropocentric imaginings and human superiority in the classroom. We are critical of the fact that the needs of the human child are always put first, even before the death of the animal. We ask ourselves, is there no limit to the suffering that humans will knowingly cause animals, even when the animal is supporting them, for instance, as a teacher, or as a companion?

Roaming Pedagogy

We conceptualize a critical posthumanist ecology of education as "roaming pedagogy" constantly in movement, becoming ethically unsettling and unsettled with guides who encourage us to wonder (Snaza & Weaver, 2015) and wander in the territory where children and animals dwell. Pederson provides insightful guidance as she asks how human-animal relations, posthumanism, and theories of education "can be reworked within a common realm of critical inquiry (Pederson, 2010b, p. 247). Dinker and Pederson (2016) outline an approach to 'unthink' the human in critical animal pedagogies as 'vegan education' with a shift from learning about animals, to learning with, from, and for them" (p. 420). MacCormack's (2013) abolitionist

stance to educational speciesism is conceptualized as "gracious pedagogy," where the concept of grace as a powerful act of humility enables something else to come in and transmutes a moment to something better, "teaching ways to unthink the self in order to open up the thought of the world" (p. 13). Gabardi (2017) describes this approach as part of the "next social contract" as one that structures "the ethical and political prioritization of animal life on par with that of humans' wellbeing" (p. 2). Despret (2013, 2016) describes these (re)makings of human-animal relations, with examples of mutual attunement, a passionate, bodily *with-ness* that depend on the availability of the bodies to each other, understanding how practices move through affect. Drawing on our theoretical and methodological roamings, we consider educational praxis to imagine multiple perspectives that embrace thoughtful radical departures from normalized ontologies of how we understand the world. Roaming pedagogy enables us to integrate the following three considerations: power relations, an ethical framework, and relational imagination.

Power relations are at the forefront of roaming pedagogies "that materialise in the intra-action between/with the material and discursive" (Jackson & Mazzei, 2012, p. 265). A focus on power relations and a relational (re)making of human-animal relations attempts to unshackle the logic of speciesism, seeking ethical, unknown possibilities of learning and living together. We draw parallels with Braidotti's (2015) nomadic theory that integrates critical theory to trace the landscape of the past, to analyze how practices in the present "adequately account for the brutality and the violence of our times as well as for their creative potential" (Braidotti, 2015, p. 18) in the future. These roamings are fluid and uncertain as we tread carefully through the speciesist minefield of conflicting ideas and actions. Power roamings shift the way the animal is currently represented in education trapped by humanist frames of mind as educational tools and subjects of inquiry, leaving us with uncertainties about favored childhood books or teaching practices we initiated such as inviting animals within the education context. We question if teachers should step aside from animals as an act of grace, where "if we are to encounter the nonhuman without being parasites, the grace can only come from leaving alone" (MacCormack, 2013, p. 15). We wax and wane about how the animal is included, never settling on a clear response to a common asked question "should teachers bring animals into education settings as classroom animals?" We are not proposing we have found a resolution, as neat solutions are not part of our roaming where precarious and slippery crossings abound.

We also become unsettled by notions of roaming in colonizing terms; settling into worlds that humans are taught from birth to conquer, consume, and dominate; acknowledging the difficulties of unsettling; and bringing into question dominant, normalized practices. Animal liberation is not just about the abstinence of animal consumption; it is about the ongoing struggle to identify epistemologies of consumption and take steps that lead to cultural and educational change to impede violence. Roaming pedagogies acknowledge that moving through affect in early childhood education is troubling because the loving and killing of animals take place concurrently and seamlessly, where families and teachers shield young children from the violent conundrum of loving and killing animals. We find Derrida's (1997) "double reading" helpful with the first reading of a dominant, stable practice and

secondly with a critical interpretation of this practice. For example, a tension exists in the common practice of children loving animals as companions in education and family homes where animals are coopted to teach children how to be good humans who care and nurture. Simultaneously animals are being harmed and sometimes killed in this process through disinterest and the lack of care we outlined earlier in the chapter; as being a companion, animal can also become their undoing. The double movement here is one of tracing and deconstructing this tension in the discourse of companion animals or animals under study while at the same time acknowledging the ways in which our understanding of the world is dependent on colonizing and enslaving animal species, even those we love as pets.

Haraway (2012, 2013) urges us to follow and "stay with the trouble of living and dying together on a damaged earth" (Haraway, 2016) in the pursuit of staying present to find new narratives of multispecies cosmopolitics as sympoiesis. Our roaming with pedadogs, like Kosi, analyzes the benefits of multispecies ethnography; however, we become uneasy by the quest for the "new" that rationalizes a familiar tale of privileged human-animal relations, rather than working toward possibilities to minimize the violence that prevails through speciesism. We move with caution as the conceptualization of mutual entanglements described by Dinker and Pederson (2016, p. 27) as "new euphemistic instantiations of human narcissism and desire for knowledge and meaning-making, rather than formations of genuinely ethical relation" between children and animals. Kemmerer (2011a) maintains there is always a problem with the vested interests of human theory and methodology when studying interspecies relationships, as they are never based on equitable relations. For example, posthuman paradigms that entangle the human, machine, and animal as hybrids or chimeras in techno-scientific representations are in danger of homogenizing difference in the metaphor of the "melting pot" that dehumanizes, deanimalizes, and devitalizes in ways that are not conducive to "liberating encounters" (Lorimar, 2010). The practice of imagining alternative shared worlds is helpful; however, there is doubt that they contribute to better worlds for animal species if they only sit as exercises in thinking.

Good intentions are not enough to advance ecological justice, unless an ethical framework is part of a critical process that exposes the connections, disjunctures, and intersections of loving, living, and killing of animals and does not lose animal bodies to theoretical abstraction. Our roaming with Kosi highlights power relations that "move from an ethics of sameness, through an ethics of difference, towards an ethics of relationality and responsivity" (Oliver, 2010, p. 269). Roaming pedagogy embraces multiple theoretical perspectives including an ecofeminist ethic of care as affect, connection, sensitivity, relationships, and nonviolence (Gilligan, 1982) that balance the prevalence of "matters of fact" with matters of concern described by (Latour, 2004). Gruen (2015) conceptualizes entangled empathy as a central skill of ethical relations as ways to "connect with a specific other in their particular circumstance, and to recognise and assess one's place in reference to the other" (p. 67). Roaming pedagogy is reliant on a contextualized ethical framework that embraces Earth roamers as citizens of the biosphere with individual and shared lifeworld experiences and desires while acknowledging the injustice that takes place in these shared communities. "Blended communities of humans and animals real and imagined – are both

the medium and means of posthumanist ethics" (Gabardi, 2017, p. 115), and roaming pedagogy requires imagination that posits animals and other earth entities as vital and vitalized members of a multispecies "community of knowers" (Fawcett, 2005, p. 276).

We suggest that grappling with the knowledge of diverse disciplines including education, human-animal studies, environmental education, ethology, philosophy, and creative writing helps us think with ecologies of knowledge that produce divergent thought. Ursula Le Guin (2009) proposes how "imagination is the instrument of ethics" (p. 7) that cannot be neatly organized or settled into moral tales for children, "because their imaginations are working full time to make sense out of reality, and imaginative story is the best tool for doing just that job" (p. 132). These imaginings are not new versions of moral truth making, as we want to think past the difficulties of imagination to depict such co-affectivity in ways that move beyond anthropocentric replication to envision a remaking of interspecies relations. Animality is therefore questioned even when we are not sure what this could be, by (re)imagining anthropomorphic stories that help to illuminate possibilities of humanlike characteristics of some animal species, like families, play, and attachment, and species-morphic examples highlight animallike characteristics of the human-animallike breathing, joy, pain, or memory. Critical posthuman interpretations of the role played by animal species in telling stories for children enable teachers to imagine animal lifeworlds with speculative and realist narratives, where animals interact with humans, make fun of each other's differences, face the tough unsettling questions about animal-human relations, identify how animal species have unique umwelt (Uexküll, 1934/2010), share lifeworlds with capabilities for flourishing, and depict how humans and animals could and do live in societies that do not artificially separate them. Learning how to cross boundaries helps us to trace the countless ways we relate with Earth roamers, our evolutionary cousins discovering who they are and what they may know and see and sense when they look at us.

Concluding Comments

We contend that the oppression and commodification of animal species in early childhood compel us to not just to (re)imagine common worlds pedagogy or to rethink the basic tenets of our interactions but to take steps to (re)imagine relational ecologies of education by (re)making ways of living together with ecological justice in both mind and action. Our intention is to move beyond the intersections of loving/living/dying where education works in specific ways to bring children, animals, and nature together through difference. Like others, we challenge this logic of separation and describe and suggest how we might learn to live together ecologically with fellow Earth roamers, in educational contexts that explore difference and recognize multifarious lifeworlds though relational imaginings.

Roaming pedagogy enables us to demarcate the borders of child-animal relations that colonize and commodify. It finds porous border spaces that ignite interspecies communication and ways of knowing as a profound political act (Wallin, 2014), where teachers can actively trouble the intersections of species boundaries with children as they co-construct action with and for ecological justice. This requires

more than observing entanglements of children and animals and teaching young humans how to ethically listen and attune with Earth roamers while at the same time seamlessly supporting and condoning speciesism. We know the complexities of the task at hand, and certainties or simple solutions do little to unshackle children, animals, or education from the dominant, humanist knowledges we have described. Such a remaking requires a radical rethinking of the purpose of education, requiring analysis as a process that continually questions humanity and animality. Despret (2016) poses the question "what would animals say if we asked the right questions," and Pederson and Pini (2017) are uncertain if we are capable of listening in this way, as they ask, "what conditions can compose a subject-assemblage capable of listening (p. 1052)? We conclude this chapter as we started with provocations for an alternative ethic for human-animal relations from pattrice jones:

> If we do this, we may hear that the priorities of nonhuman animals differ from our own preoccupations and also that the interests of various nonhuman animals differ from one another. When we listen to animals wellbeing and liberation, we don't get stuck in human-constructed deadlocks and are therefore more free to be their allies. (jones, 2015, p. 98)

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Part IX

Childhoodnature Pedagogies and Place

Childhoodnature Pedagogies and Place: An Overview and Analysis

63

Robert B. Stevenson, Greg Mannion, and Neus (Snowy) Evans

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Abstract

Nature-based experiences have gained increasing attention for their capacity to foster children's connectedness with nature, referred to here as childhoodnature. This chapter explores childhoodnature from a pedagogical perspective of place, beginning with an overview of the conceptual foundations of and distinctions between place-based education and place-responsive and place-conscious pedagogy. We then examine recently emergent posthuman and new materialist

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ontologies and pedagogies for their contributions to new understandings of and approaches to childhoodnature connections. Besides providing a map of the childhoodnature pedagogies and place section of this handbook, we assess the extent to which the theoretical and empirical contributions of the section chapters lay the groundwork for developing the pedagogies of place literature. Despite marked differences in cultural contexts, a number of common themes emerged across the chapters, particularly in relation to the intent and focus of the pedagogies of place. All chapters expand and/or challenge current understandings and/or preconceptions of place, nature, childhoodnature relationships, and pedagogy. A number of chapters highlight the role of agency, embodied learning, and place relations in enabling children to build connectedness with nature. Finally, in considering the chapters as a whole, some implications are offered for future research.

Keywords
Place-conscious pedagogy · Place-responsive pedagogy · Post-humanism · More-than-human · Connectedness with nature · New materialism

Introduction

The children of today will bear the brunt of the impact of the age of the Anthropocene and in particular of climate change (Cutter-Mackenzie, Edwards, Moore, & Boyd, 2014; Stevenson, Nichols & Whitehouse, 2016). At the same time, concerns have been expressed about children's increased physical and emotional distancing from nature (Louv, 2006; Soga & Gaston, 2016). Childhood is increasingly disconnected from nature with more time spent indoors drawing on technology-mediated play than outdoors with nature play activities. Critics emphasize that the growth of technology and the reduction of greenspace in many urban contexts resulting in limited nature-driven play poses a threat for children's wellbeing and development (Corraliza, Collado, & Bethelmy, 2012; Louv, 2016). One question that remains unknown is whether the childhoodnature disconnection will affect children's future capacity to mediate emergent anthropogenic impacts. This disconnection is viewed as an urgent priority to address, given the precariousness of the current state of natural ecosystems on which human survival is dependent.

Nature-based experiences have gained increasing attention for their capacity to foster children's connectedness with nature (Chawla & Derr, 2012; Ward-Smith et al. this volume). Writers over time have focused on the importance of these direct experiences in nature, through emphasizing, for example, the power of silence and solitude in connecting to nature (Knapp, 1996) or sensory immersion to cultivate an emotional attachment to the natural environment (Van Matre, 1990). More recently, the focus has been on these experiences being centered and bounded in the particular place(s) of where children's lives are lived irrespective of its spatial and cultural location. The importance of fostering children's emotional relationships with *place* has also been extended beyond the human environment to interactions with the more-than-human world, to all species and

nonliving things and to *place* itself. This raises the empirical question posed by Tooth and Renshaw in this section: Can children become emotionally interconnected with other living, as well as nonliving, entities?

Authors in this section of the Handbook grapple with the question of what kind of pedagogies of place facilitates the cultivation of children's connections with nature? They explore the theoretical underpinnings and value assumptions of a range of pedagogies of place enacted in diverse educational, cultural, and geographical contexts to enhance children's connections with nature; authors examine the outcomes and impacts of these pedagogies on this connectivity for learning, for individuals and human communities, and for the sustainability of eco-social communities. The chapters present current research and diverse ways of (re)thinking about place-centered pedagogy, supported by case studies and vignettes from these contexts. Contributors also explore the meaning of place in relation to children's interactions, connections, and other entanglements with "nature."

In this introductory Chapter, we first examine theoretical foundations of the broad concept of place-based education and then its limitations as revealed by the subsequent related but more critical or post-critical conceptualizations of place-responsive and place-conscious pedagogy. The relevance of emerging posthuman and new materialist ontologies and pedagogies is examined for their contributions to new understandings of and approaches to childhoodnature interactions and connections. Pedagogies of place that speak to politics and ethics (of Indigeneity and equity) are also briefly addressed. We then draw on selected literature that offers a praxis approach to pedagogies of place in teacher practice to begin to address the question of how might pedagogies of place research contribute to helping educators decide what to do next in a given place? Finally, we outline each of the seven contributing chapters in relation to the place-related frameworks presented and the more recent turns to new materialist and posthuman pedagogies before finally analyzing the theoretical and empirical contributions of these chapters to the pedagogies of place literature.

From Place-Based Education to Place-Conscious/Responsive Pedagogy

Place-based education has been defined as grounding learning in the local or the particular place of students' lived experience (Smith, 2002). Smith argued that place-based education was not a new phenomenon as its approach could be traced back to John Dewey who noted the "disconnection between school and the world and sought to overcome it in the University of Chicago Lab School that he and his colleagues created at the end of the 19th century" (p. 586). Dewey attributed the problem to "the fact that children possess minds that are primarily drawn to actual phenomena rather than to ideas about phenomena" (p. 586). The initial resurgence of interest in place-based education, as further described by Sobel, essentially focused on a pedagogical approach to enhancing student learning of traditional disciplinary concepts in the curriculum as well as connections to the community and the natural world:

> Place-based education is the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. (Sobel, 2004, p. 6)

The primary value of place-based education has been summarized as residing "in the way that it serves to strengthen children's connections to others and to the regions in which they live" (Smith, 2002, p. 594). Bonnett (2013) situates these connections in all human experience. Since we are all emplaced, "we dwell in a world . . .. . .of locales of intimately related things" (p. 264). He further describes:

> the anticipatory and ecstatic nature of emplacement, in which we are always beyond ourselves, with the emplaced things that we encounter. This constitutes a flow of involvements that sustains our sense of who we are and what we are doing . . . In this sense we are (literally) enlivened by encounters with emplaced things, sometimes quite explicitly, as say by the promise of the unknown encounters that are to come as we set off for a walk on a fine spring morning. (p. 266)

These notions of emplacement and presence have important implications for pedagogies of place in illuminating the potential development of enhanced awareness or consciousness. The latter is explicitly foregrounded by the concepts of place-responsive and place-conscious pedagogy. Although often used interchangeably in the literature with place-based, both place-responsive and place-conscious pedagogy represent important theoretical distinctions from the more widely used term and conceptualization. Place-responsive pedagogy has been defined as "explicit teaching by-means-of-an-environment with the aim of understanding and improving human-environment relations" (Mannion, Fenwick, & Lynch, 2013, p. 803). What is important, the authors argue, is that the core process of teaching and learning "is both pedagogically and ontologically linked," whereas "[m]ost conceptions of place-based education lack this ontological understanding and therefore can be distinguished from place-responsive education and pedagogy (Karrow & Fazio, 2010)."

Gruenewald (later Greenwood) (2003a, b) introduced the notion and discourse of critical place-based and place-conscious education by linking critical pedagogy and place-based education through the two important ontological relationships of decolonization and reinhabitation. Sometimes a heightened awareness of place:

> leads to a process of decolonization, that is, coming to understand and resist the ideas and forces that allow for the privileging of some people, and the oppression of others – human and more-than-human. At other times, place-consciousness means learning how to reinhabit our communities and regions in ways that allow for more sustainable relationships now and in the long run. (Gruenewald & Smith, 2008, p. vii)

In *A Critical Theory of Place-Conscious Education*, Greenwood (2013) argues the need for a decolonization of places by revealing "the often contestable nature of the dominant beliefs and motives" (p. 97) that shapes our perspectives of places. This

process of decolonization enables a reinhabitation of these places with "a more open and deeper consciousness" (p. 97).

The conceptualization of decolonization and reinhabitation not only emphasizes an ontological relationship but also "aims to enlist teachers and students in the firsthand experience of local life and in the political process of understanding and shaping what happens there" (Gruenewald, 2003, p. 620). In contrast, other forms of education that are attentive to place (e.g., geographical education or science education) may suffer from a tendency to ignore political dimensions because of a focus on a transmission approach to curriculum delivery and pedagogy designed to address individuals' development of knowledge and skills for self-awareness.

Emerging Poststructural, Posthuman, and New Materialist Pedagogies

In other areas of scholarship related to pedagogies of place, there are recent turns away from a focus on structural developmental views of the child in favor of understanding how children engage with a whole range of entities, relations (including with other species), forces, and materials found in their everyday worlds (for examples see Taylor & Pacini-Ketchabaw, 2015). Both the "material turn" and the "animal turn" are now posing challenges to the perceived limits of the linguistic "turn" and the anthropocentrism of poststructural thinking (Taylor, 2018). Ontological responses to (post)structuralisms and other anthropocentric philosophies have resulted in realist (re)turns in social theory, in particular speculative realism and matter-realism or new materialisms.

Although there are many forms of posthumanism (see Pederson, 2010), they share a perspective that dissolves the separation of nature and culture. Quinn (2013), for example, argues that "fixed distinctions between human and non-human spheres no longer hold . . ... [as] nature and culture are 'mangled' together at every point . . .. as 'the agency of matter is intertwined with human agency' (Hekman, 2010)" (Quinn, 2013, p. 738). Taylor and Pacini-Ketchabaw (2015) credit the boundary-blurring "natureculture" bio-philosophies of Haraway for illuminating "the ways that humans and other species share entangled, cascading and enmeshed pasts, presents and futures" (p. 6). Taylor and Pacini-Ketchabaw argue for moving away from the predominately individual child-centered pedagogies in early childhood education that focus on "learning within an exclusively socio/cultural (in other words, exclusively human) context (Rogoff, 2003)" (Taylor & Pacini-Ketchabaw, 2015, p. 6). Instead Taylor and Pacini-Ketchabaw (2015) argue for focusing:

> on the collective manners and means through which children learn from engaging with other species, entities and forces in their immediate common worlds. We call these collectively engaged modes of learning 'common world pedagogies' (p. 4).

Thus, new kinds of place-responsive pedagogies are emerging, such as multispecies pedagogies and more-than-human pedagogies (see http://common.worlds.net/).

Critics of the posthuman turn, such as Paul James (2017), suggest these kinds of pedagogies may be less well grounded, lack impact when it comes to politics and ethics, and fail to deliver their hope for getting beyond the dualism of nature and culture. James (p. 36) cites Snaza and Weaver's argument that "it is not even remotely possible at the present moment to conceptually or practically lay out a theory of posthumanist education or outline the contours of a posthumanist pedagogy." Perhaps because this field is emerging and nascent, an identifiable tendency in environmental and early childhood research has thus far been not to offer orientations for practice for nature-based posthuman educators but rather to use research to describe the ongoing flow of events for learners in natural settings. Hence one emerging gap in nature-based posthuman pedagogies appears to be a coherent research-based framework for educators to draw upon in the planning and enactment of place-related curricula. Another issue relates to how extant and emerging place-related pedagogies handle the political in their approaches. Without attempting to lay out a theory of posthumanist pedagogy, we briefly examine pedagogies of place that claim to take politics and ethics (of Indigeneity and equity) seriously.

The Political

In a recent study of experience-based place-responsive pedagogy in Environmental Education Centres (EECs) in Queensland, Australia (Renshaw & Tooth, 2018), a political dimension to teachers' work was identified. An analysis of center case studies revealed that the political varied across places from being explicitly articulated to more implicit with different aspects emphasized in different ways (Stevenson & Smith, 2018). For example, Stevenson and Smith (2018) observed that a conceptualization of "pedagogy as advocacy" reflected an explicitly political statement of the environmental goals of one EEC's work, while an "Inspiring Champions" approach at another center encouraged students to model their future behavior as adults on environmental champions of the past. At two other EECs, students are introduced to the work of local environmental activists who have played and are playing significant roles in protecting from development land with ecological and Indigenous cultural history values. Meanwhile, the pedagogy at several other centers is not explicitly political but implicitly addresses the political through not only exposing students to alternative (to the dominant anthropocentric) worldviews but also questioning and critiquing traditional understandings of economic growth, consumption economics, and related cultural values and the environment.

Yet a question that can be asked about the role of politics in pedagogies of place generally is are politics only aspirational at best in these and other educational endeavors? Certainly, the political needs to be more than aspirational while not advocating a particular position on a socio-ecological issue, despite the title of "pedagogy as advocacy" of one center's approach in Tooth and Renshaw's study.

We argue that the pedagogical focus should be on advocating the engagement of young people in first thinking critically about local socio-ecological issues, including unpacking and understanding the politics and ethics that are an inherent part of the different and conflicting interests and perspectives involved in socio-ecological issues. Second, active engagement should be encouraged in the political process in order to respond to such issues.

Others, such as Pederson (2010) and Quinn (2013), encourage a "re"human positioning in accepting that posthumanism works to decenter the human subject, and so the implications for learning are profound if we can develop an "understanding of what it means to learn *with* and *from* rather than *about* non-human animals" (Pederson, 2010, p. 20). Quinn reports on two studies, first referring back to her earlier study with colleagues of finding young people in jobs without training that "animals played a surprisingly large role in the lives of some young people" to the extent that "[i]n some cases, the emotional attachment to animals was far greater than that to humans and ease and comfort with animals contrasted to estrangement from family or peers" (p. 745). However, Quinn, while acknowledging the importance of Barad's (2003) foregrounding the non-human and the potential of such a perspective for liberation, appropriately cautions that:

> going too far down that road hides the fact that the intra-activity of human and nature is still shaped by social positions. We are all composed of matter shared with the non-human, but we are not all equally well placed to deal with any potential problems this may cause. (Quinn, 2013, p. 749)

Quinn's (2013) second study gives a greater sense of what role non-human animals play in young people's everyday outdoor learning:

> Animals teach the young people about the continuum of culture/nature and the necessity of balance and equilibrium. Of course this is very far from being an equal relationship; whilst Bennett might argue that animals have power and agency they do not have guns and traps with which to kill humans. Nevertheless, once the animal is given its due, a different form of knowledge emerges about factors which are key to the survival of humans, such as the chain of production and where our food comes from. (Quinn, 2013, p. 746)

Some poststructural and new materialist researchers take strong and distinctive political stances with respect to nature and place on the basis of new relational ontological framings. As we have seen, positioning animals as beings with whom we relate and learn repositions the natural world away from being something we save or steward as humans to being an entangled set of processes within which we need to interact and respond (see Taylor, 2017). Others take a strong feminist and decolonial stance (Nxumalo, 2015). These kinds of research agendas in effect try to combine critical ideological readings of place and nature while combining them with an ontological turn toward lived experience, process, and relationality. However, there is a tension between critical theory which situates politics and inequalities in social structures and feminist posthuman ontological focus on relational politics.

Pedagogies of Place in Teacher Practice

Posthuman research agendas seek to understand complexity and stay with the "trouble" of our damaged world with our commodified lives and the intricacies of educator-animal-child relations (Nxumalo & Pacini-Ketchabaw, 2017). Less common is practical advice for educators about how to help actualize pedagogies to realize these new relations or ecological and social justice. Quinn argues that the outdoor literature emphasizes practice, but theoretical positions are not very well developed, while "[c]onversely, in post-humanist feminist literature, there is much theoretical discussion about 'nature'. . .. . . Her paper seeks **"**to use post-human ideas to advance theoretical understanding of outdoor learning and to put post-human theory to work with empirical data from outdoor learning, in order to demonstrate post-humanism's analytic capacity. . ... to deepen understanding of outdoor learning" (p. 739).

Mannion et al.'s (2013) theory of place-responsive pedagogy draws on findings from a study they conducted of teachers devising interdisciplinary curricula while based in national parkland in Scotland. They explain:

> We see place-responsive pedagogy is one element in a wider process of curriculum making that emerges through the intra-activity (Barad, 2007) of: (i) educators' own experiences and dispositions to place, (ii) learners' dispositions and experiences of place and (iii) the ongoing contingent events in the place itself (including the presence and activities of other living things). (p. 803)

Five key aspects of an experience-based pedagogy in Queensland state-run EECs in Australia were identified by Ballantyne and Packer (2008, 2009) as learning by doing, being in the environment, addressing authentic tasks, cultivating sensory engagement, and exploring local problems and issues. In a follow-up in-depth study, conducted by Renshaw and Tooth (2018), place-conscious pedagogies were identified as requiring "that educators have an intimate knowledge of the ecology and history of the place, including an acute awareness of the pedagogical affordances of specific sites . . .... (forest or creek or tree or track)" (p. 10). One center educator describes blending the application of systems thinking to the complex patterns and connections among the parts of the forest, with a process of slow pedagogy and a (nonlinear) experience-reflection-representation cycle of engaging students in sharing, questioning, and inquiring into their discoveries of specific inhabitants of the forest (e.g., a leaf or insect). A view of place as a dynamic socially constructed site of "negotiation between related unfolding stories" (Renshaw & Tooth, p.3) underpins this pedagogical content knowledge that links together deep content and pedagogical knowledge (Stevenson & Smith, 2018).

Diverse pedagogies of place, as framed in Tooth and Renshaw's study, represent pedagogical content knowledge in nature-based experiential teaching (Stevenson & Smith, 2018). Specifically, that means knowledge and understanding of "the unique affordances of particular places for learning about, in and for the environment"

(Stevenson & Smith, 2018, p. 195). Such knowledge has been argued by Tooth and Renshaw as involving the intersection of three dimensions of place:

1. The materiality of place itself, its unpredictability, and its unique patterning of inanimate objects, natural features, and animate beings
2. The cultural meanings that have been storied into the place by Indigenous and non-Indigenous people, including the educators at each center
3. The agency of teachers, students, and parents, whose purposes and goals selectively foreground and background what can be experienced and learned in place (Renshaw & Tooth, 2018, p.4)

These illuminations of the pedagogies of place of experienced outdoor educators are consistent with evidence from Mannion et al.'s (2013) study suggesting first that, particularly for "novice outdoor" teachers, collaborative planning visits, extended time in natural settings, and opportunity for reflection were all useful ingredients in planning nature-based excursions. These approaches enabled teachers to find new scope to rework their own perspectives of themselves as educators such that place and material context were not backdrops to their actions but the new socio-material context was implicated in curriculum planning and later in teaching. For these teachers, spending time in the nature reserves involved getting to know the place and themselves better; through this reconnaissance, they looked again at what role the materiality of the world would play in their pedagogies and in their plans for the generation of new meanings with their learners. In part, this may be because of the design of the study in that it asked them to consider place as part of the curriculum design process, but this is expected to be a wider phenomenon common to more than this context. This strand of analysis provides empirical support for the potential of considering curriculum design as a socio-material and embodied practice in places.

A number of scholars have reported that curriculum planning with place in mind was easier for teachers who had spent time accruing a deeper relationship with the natural places visited (see Mannion et al., 2013; Martin, 2004; Renshaw & Tooth, 2018). More expert outdoor teachers were able to explain how they did this more comprehensively, while novice outdoor teachers found they needed to learn new dispositions or orientations to place. Drawing on the work of anthropologist Tim Ingold, evidence is emerging that supports the idea of curriculum making as a coming together of teachers, learners, generations, and places, and, through this coming together, relations are remade (see also Ross & Mannion, 2012). One might suggest that changing the place for education (in this case, from indoors to a natural setting) was a form of interruption in the ways in which the curriculum was normally socio-materially assembled. There is scope, therefore, for understanding curriculum making as requiring a form of interruption through new forms of attention and response to place.

Ross and Mannion conclude that their sense is that place-responsive teachers need to attend explicitly to the role of the places – the socio-material contingent events and relations between humans and other species – in their educational endeavors. In place-responsive pedagogy, teachers (in collaboration with students and others), as historically embodied subjects, explicitly set out to create new place-based practices and

place-based relations. We suggest that this involves learning to dwell or inhabit places differently while accepting our shared immersion in the world (see Ross & Mannion, 2012). In summary of the literature cited, given "the unique affordances of particular places for learning *in*, *about* and *for* the environment" (Renshaw & Tooth, 2018, p. 4) and the significance for teacher pedagogical practice of educators' own experiences and dispositions to place (Mannion et al., 2013), the first essential task for teachers is "being present in and with a place" (Wattchow & Brown, 2011, p. 800) through extended collaborative planning time in natural settings (Mannion et al., 2013). The purpose is for educators to get to know themselves and the materiality of place itself better through reconnaissance; this would include having the opportunity for reflection on what role the materiality, including living things, of place can play in their pedagogies and in creating plans for the generation of new meanings with their learners (Mannion et al., 2013; Renshaw & Tooth, 2018). A particular feature of teacher and student learning is the power of place-based stories and narratives (Wattchow & Brown, 2011) for identifying and creating "cultural meanings that have been storied into the place across time" (Renshaw & Tooth, 2018, p. 4). An enabling condition is for teachers, students, and parents to have the agency to enact the above curriculum and pedagogical planning (Renshaw & Tooth, 2018). This agency is relationally enacted with and through places in order it seems to maintain the necessary attentiveness to one's emplacement.

Introducing the Section Chapters

In any discussion of pedagogies of place, the ultimate important question is what can the educator do? How can research and theory contribute to helping educators decide what to do next in a given place? The authors in this section not only articulate their ontological positioning in relation to the theoretical perspectives outlined above but also generally identify pedagogical approaches that can be taken by educators. Thus, a strength of the following chapters is that they offer guidance or directions for practice that can make a difference. Furthermore, many authors in this Handbook section base their accounts on the empirical as well as the theoretical. As previously mentioned, it is important that the teaching and learning process is pedagogically and ontologically connected.

We now offer a brief overview of each of the seven chapters in this section of the Handbook. The culturally and geopolitically diverse studies that are reported were conducted in seven countries: Australia (2), Germany, Hong Kong, Qatar, South Africa, United Kingdom, and the United States.

Julia Truscott, in her chapter in this section ▶ Chap. 68, "Toward a Pedagogy for Nature-Based Play in Early Childhood Educational Settings," explores *how* young children experience nature through nature-based play and the influences on such experiences, particularly within an early childhood (EC) setting. Drawing on socio-cultural and Csikszentmihalyi's flow theory and qualitative data from preschool children and their educators, educator pedagogy emerged as the strongest and most critical component of Truscott's study of the interplay between children's

experiences and educator pedagogy. Truscott explores the facets of pedagogy – educators' values, beliefs, and behaviors – that appear to best afford children opportunities to become immersed in their nature-based play in EC settings.

Ron Tooth and Peter Renshaw, in ▶ Chap. 64, "Children Becoming Emotionally Attuned to "Nature" Through Diverse Place-Responsive Pedagogies," raise the interesting question, "can children situate themselves as not separated from "nature" but as part of "nature", emotionally interconnected with other living, as well as non-living, entities?" They analyzed children's representations of "nature" and themselves following an excursion to a forest in South East Queensland, Australia, where they were exposed to Ron Tooth's *storythread* designed program of a civic activist in the 1990s who was crucial for establishing the area as a protected reserve. Their connection to *place* is mediated throughout the excursion by an Aboriginal practice of attentiveness to and feeling in *place*. The children shifted toward an understanding of "nature" as agentic, knowledgeable, emotional, and bonded to them. The authors address the implications of this place-responsive pedagogy in the context of neoliberal times and accountability pressures for teachers.

In ▶ Chap. 69, "Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature" by Chesney Ward-Smith, Lausanne Olvitt, and Jacqui Akhurst, the authors explore children's "connectedness-with-nature" in a culturally diverse context in South Africa. They argue that nature-based pedagogies often project Eurocentric environmental values onto children in subtle ways, inadvertently colonizing natural spaces and children's experiences in them. Taking a sociocultural perspective, the chapter draws on a qualitative case study of 37 children from culturally diverse backgrounds at an outdoor education center. The Chapter explores the tensions and resonances between participants' value positions and those of the outdoor education center. Given that this interrelationship mediates the children's developing sense of *connectedness-with-nature*, integrating their values was found to be essential for designing appropriate nature-based pedagogies. Such pedagogies are seen as providing opportunities for more nuanced explorations of sociocultural and socio-material resonances and contradictions and for children to connect with nature in less colonizing ways.

Bob Coulter, in his ▶ Chap 67, "Developing Youth Agency Through Place-Based Education: Challenges and Opportunities," focuses on developing a greater understanding of the challenges and opportunities involved in fostering youth agency. He first examines critically conceptions of agency that are often implicit in descriptions of place-based education and emphasizes the need for better articulation of the ways in which meaningful agency among the participants can be supported. An analytic framework is derived building on both Greenwood's (2013) three questions for grounding place-conscious learning deeply within local ecological and cultural space and Fesmire's (2010, 2012) descriptions of ecological and moral imagination; Coulter argues that Fesmire offers tools through which thoughtful responses to Greenwood's questions can be developed. A series of vignettes are presented to embellish the framework, and a set of educational principles are derived in order to guide the support of children's agency within place-based education. The author

concludes with reflections on the power of a process of grounding our ecological and moral imaginations deeply in our local space when we consider the role of student (and teacher) agency in place-based education.

Sarah Urquhart and Oliver Picton's ▶ Chap. 70, "Third Culture Kids and Experiences of Places" begins by making a case that traditional assumptions and conceptualizations of a singular localized sense of place are incongruent with the experiences of, what they term, "third culture kids" (TCKs) who spend their developmental years in multiple and diverse physical, cultural, and social contexts. They reexamine the concept of sense of place through two case studies in international schools: (1) a quantitative examination in Hong Kong of differences in place attachment and relationships to nature between TCKs and local adolescents and how relocation has influenced TCKs' sense of place and (2) a qualitative exploration of how the "gatedness" of residential contexts in Qatar impacts adolescent TCKs' experiences of place and sense of place. The authors argue that immediate contexts are intrinsically linked to the diversity of places experienced by TCKs which presents both challenges and opportunities for place-based pedagogy in international schools that needs to be undergirded by relational conceptualizations of place and driven by an inclusive and globally minded sense of place for TCKs.

Elsa Lee, Nicola Walshe, Ruth Sapsed, and Joanna Holland in ▶ Chap 65, "Artists as Emplaced Pedagogues: How Does Thinking About Children's Nature Relations Influence Pedagogy?" take a more forthright approach to considering the role of teachers in linking learners to nature. The authors explore within the Chapter how female artists working with children are seen to follow young people's lead, yet also have input in taking children to new kinds of places. For the authors human exceptionalism sits uneasily yet catalytically alongside ecologically integrated views of the human-environment dialogue. Key to the pedagogy here is the link to an ontology that includes the actual and the virtual aspects of becoming – what we are and how we are becoming within nature are in constant dialectical conversation. Into this space, we have a worthy inquiry into what role teachers need to take in striving for new norms for human-environment relations. Part of this work involves imagination of the next generation.

Doerte Martens, Claudia Friede, and Heike Molitor, in ▶ Chap. 66, "Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development", argue that healthy childhood spaces are under threat and "nature" offers a solution. Furthermore, according to the outcomes of their study, childhoods are seen as increasingly less autonomously managed by young people themselves. With urban dwelling on the rise and consequent less contact with nature, there is a decreased time spent in physical activity and more time with technology. In this context, local natural play areas can afford a safe, accessible action space for children's autonomous play wherein they benefit from greenspace experience – in terms of mental wellbeing, physical activity and literacy, social development, and learning through play. Of note is how the play value of natural settings is shown to be more diverse but also significant in the palpable sense that children really enjoyed the opportunities to play in hugely diverse ways; natural settings also provided affordances for fruit picking when in season and finding places for adventurous

activity as well as places to retreat at times from the busyness of the world. Rooted in a quite humanist concern for child development, nature as a key agent is not a lost figure in this chapter.

Advancing the Characteristics of Pedagogies of Place

The seven chapters encompass research studies conducted in seven countries in a diverse range of different kinds of nature-based places, including (declining) natural play areas in urban settings, a park or nature reserve on the outskirts of a major city, nature-based play in early childhood education, a gated residential complex, and an outdoor education center in a culturally diverse context. They share an emphasis on place as a prerequisite for experiencing the non-human world by treating place as a way to understand children's entanglements, connections with and care for the living and non-living world of nature. Table 1 summarizes the characteristics of pedagogies of place identified and discussed in the section chapters. The purpose of this table is to illuminate the materiality of particular places and their unique pedagogical affordances for learning about, in, and for nature (Renshaw & Tooth, 2018).

Despite these differences in context, as well as in age group of children involved (e.g., Coulter 7–12 years, Truscott 2.5–5 years), a number of common themes are evident across the chapters, particularly in regard to the intent and focus of the pedagogies of place. First, however, a not surprising recurring theme is that of the need for connecting (or reconnecting) children to nature (Coulter; Lee, Walshe, Sapsed, & Holland; Martens, Friede, & Molitor; Tooth & Renshaw; Truscott; Ward-Smith, Olvitt, & Akhurst). Notwithstanding the risk of continuing the nature child binary that this handbook sets out to disrupt, an assumption of most authors is that children are disconnected from nature, resulting from fairly recent modern phenomena (of, e.g., urban expansion, loss of community, heightened concerns about children's security) that should be addressed urgently in this time of the Anthropocene by reconnecting children to nature. The benefits for children of pedagogies of place, argue one group of authors (Martens et al.), include mental wellbeing, physical activity, literacy, social development, and cognitive learning.

All chapters expand and/or challenge current understandings and/or preconceptions of place, nature, childhoodnature relationships, and pedagogy. For example, rather than seeing pedagogy as a human-human endeavor, Martens and her co-authors conclude by implying that a more-than-human frame can be used to understand wider place pedagogies (beyond formal education). An example might be how we design public greenspace as a key part of the childhoodnature pedagogy "landscape" (a landscape both literally and metaphorically). The intent would be to harness the non-human into the affordances for play and learning – which fits a place-responsive pedagogy rubric or perspective at a material end of the continuum. Truscott identifies, from her study of nature-based play in early childhood education, children's positioning along a continuum of connections to nature, from immersion to (material) backdrop.

Table 1 Characteristics of pedagogies of place

Author	Tooth and Renshaw	Urquhart and Picton	Coulter	Truscott	Martens et al.	Lee et al.	Ward-Smith et al.
Name of pedagogy (as per author/s)	"Storythread" pedagogy	Global sense of place	Agency-supportive place-based education	Nature-based play	Nature experience as a form of place-responsive pedagogy	Place-responsive participatory pedagogy	Nature-based decolonized pedagogies
Intent of the pedagogy	To engage children's senses and emotions and to build their agency in a place-responsive pedagogy (not treating a natural place as simply a site to conduct nature inquiries)	To be inclusive by concurrently capturing inward/current (local) and outward/previous (global/international) childhoodnature experiences and perspectives of place	To build agency and develop childhoodnature connections	To build children's agency to become fully "immersed" in nature-based play leading to childhoodnature connections	To enhance young children's childhoodnature connections through daily contact with natural environments through play that is embedded in children's learning experiences	To build children's agency and connections to the outdoors and non-human nature	To create transformative nature-based learning processes that lead to the development of childhoodnature connections
Features or characteristics of the pedagogy	Pedagogical storying strategies, especially of emotionality and Indigeneity, to cultivate enduring interconnections with nature	Pedagogies that are inward and outward looking, including local and international perspectives that connect to students' lived experiences	Strategies to build childhoodnature agency and identity development through connection and imagination	Strategies to build childhoodnature connections through nature-based play in early childhood education everyday green spaces	Local natural play areas afford a safe, accessible action space for children's autonomous play wherein they benefit in terms of mental wellbeing, physical activity, literacy, social development, and learning	Posthumanism perspective leads to particular pedagogical strategies: e.g., One Minute Maps, Found Mapping	Pedagogies that are decolonizing, ethics-led, and embodied

What are the new contributions to pedagogies of place?	Storying pedagogies that treat children as having agency, being knowledgeable, and emotionally bonded in relation to nature	Lived experiences of "third culture kids" mean a pedagogical need for an inclusive and globally-minded concept or sense of place for these children	Enhanced understanding of ways to build childhoodnature agency: student (and teacher) agency should enable grounding ecological and moral imaginations deeply in local space	Educators' understanding of how children experience nature-based play and their related pedagogy influences children's positioning along a continuum of connections to nature (from immersion to backdrop)	Expansion of concept/ understanding of place-based pedagogies beyond formal human-human education, e.g., how we design public greenspace is a key part of the childhoodnature pedagogy "landscape" (literally and metaphorically)	Pedagogical role of striving for new norms of human-environment relations, including imagination of the next generation, with a constant dialectical conversation between what we are and how we are becoming within nature	Decolonizing, ethical, and embodied nature-based pedagogies should address potential tensions and resonances between participants' and educators' value positionings

An important reminder of starting from children's lived experience is provided by Urquhart and Picton. A singular localized sense of place is revealed as incongruent with the experiences of "third culture kids" (TCKs) who spend their developmental years in multiple and diverse physical and sociocultural contexts. The authors argue that immediate contexts are intrinsically linked to the diversity of places experienced by TCKs; this presents both challenges and opportunities for place-based pedagogy in international schools that needs to be undergirded by relational conceptualizations of place. More broadly, Urquhart and Picton draw on the work of Somerville and Green (2015) and argue as they do that "as a conceptual framework, place provides a bridge between the local and global, real and representational, indigenous and non-indigenous, and different disciplinary approaches" (p. 36). They also point out the need to move beyond a singular and conventional understanding of sense of place, acknowledging the work of Massey (1994), who has argued in the past that "the character of a place can only be constructed by linking that place to places beyond. . . .. . .What we need, it seems to me, is a global sense of the local, a global sense of place" (p. 156).

Part of lived experience for some children is a cultural history of colonial domination. In their Chapter in this section Ward-Smith, Olvitt and Akhurst propose "a potentially transformative triad of decolonising, ethics-led and embodied nature-based pedagogies to address calls for nature-reconnection in this context." They define *decolonizing pedagogies* as "approaches to teaching and learning that help learners to recognise and disrupt the structure and powers of colonial influences on their lives and in their communities." Drawing on McGregor (2012), Ward Smith et al. argue that the purpose of these pedagogies generally is "to re-centre indigenous ways of knowing, doing and relating, and support change-oriented, agentive responses in the world." Ethics-led pedagogies, the authors explain:

> engage explicitly and reflexively with the values and ethico-moral positions that people bring to each situation and seek to create challenging but safe spaces for learners to have ever-deepening conversations about what matters to them, why, and how that affects others, now and into the future. (Ward-Smith et al.)

One important theme emerging in four of the chapters including those of Tooth and Renshaw, Coulter, Truscott, and Lee et al. is that of agency. There is a consistent current across these four chapters of enabling children the agency to own and collaboratively lead (with teacher guidance) their own learning and that this is critical for building childhoodnature connections. When considering teacher agency, which is key to teachers having the kind of role envisaged in place-responsive pedagogy, Coulter emphasizes the power of a process of grounding students' ecological and moral imaginations deeply in local space. Lee et al. argue that the development of new norms of human-environment relations should include imagination of the next generation with a consistent dialectical conversation between where we are now and how we are becoming within nature.

This grounding in children's imaginations coheres with Somerville (2010) who argues that place exists in both a material and imaginative sense. The role and

importance of imagination can be traced back to Dewey who argued that it is the medium for realizing and appreciating values (Elliott, 2007). Renshaw and Tooth (2018, p. 12) propose that as well as imagining how a place was represented in the past by others, we can consider "how it might be re-inhabited and re-imagined in the present and future through emergent stories."

Embodied learning is identified by several authors as an important characteristic of pedagogies of place. Drawing on Somerville's (2010) notion of embodiment, Tooth and Renshaw argue that we come to know through the body by walking, touching, smelling, hearing, or sensing in place – but embodiment demands openness to the materiality of the landscape and its agency in shaping *what* we come to know. Urquhart and Picton acknowledge aligning with Massey (2005) in their understandings of place as relational and involving an unbounded and negotiated process. They add that the meaning of place to the TCKs they studied, drawing on the work of Cele (2006), revealed an emotional relationship dependent on the body, "an embodiment that is even more significant for children who often experience the landscape in more physical ways than adults through outdoor play and exploration."

In addition to embodiment, our relationship to place is constituted in stories (Somerville, 2010). Tooth and Renshaw, in their Chapter in this section, describe their experiences in using a pedagogical storying strategy, storythread, to evoke children's emotional attachment to non-human species and the materiality of a specific special local place. They emphasize the critical role of children engaging with animals (birds, insects) and landscape (the forest) as a pathway for children to recognize that the animal and non-animal material world has agency along with themselves. Yet the challenge of enabling children's agency, as Martens and her co-authors point out, is exacerbated by childhood being seen as increasingly less autonomously managed by young people themselves, while Ward-Smith and her colleagues argue that nature-based pedagogies often subtly project Eurocentric environmental values onto children. Lee et al. delineate the role of teachers in connecting students to nature from observing the work with children of female artists who "follow young people's lead" but also take initiatives in taking "children to new kinds of places." Expanding on Lee et al.'s approach, four pedagogical design principles to guide the support of children's agency are offered by Coulter: age-appropriate youth control, continuous development of skills and dispositions, nurturing interest and commitment through connection, and fostering depth through enhanced interest.

It could be argued that what is missing explicitly from the chapters is a coherent account of agency that, from a posthumanist perspective, captures a way of seeing agency as shared beyond the human to the other material living and nonliving objects. Further insights could be gained from exploring how such agency plays out when it comes to pedagogy with/in/or through the material/nature. Also omitted is much account of how collective agency might be exercised. Duhn (2012, p. 100), characterizing "pedagogy-of-place-as-assemblage," argues that a de-centered learner and distributed agency based on a posthuman or more-than-human perspective shift attention "from the individual child to the child's entanglement with forces and forms of all sorts, both human and more-than-human" (Duhn, 2012, p. 104). Mulcahy (2012, p. 21) adds that thinking of pedagogy as assemblage opens up a sense of collective responsibility:

> for developing and maintaining them [pedagogical relations] are similarly distributed and heterogeneous. This opens up a range of processes that form possibilities for a variety of elements to participate and create effects. The workings of bodies, technologies, texts and teaching desire come into view.

Bowden (2015) suggests a Deleuzian or "assemblage" conception of agency is compatible with a view that humans do have intentions and act in the world but that this world – we can read natural world – is full of forces and affective relations with nonhuman animals and other things. A cautionary note should be added that relational views of agency do not need to distribute agency to the extent that humans have not got an important pedagogical role to play.

The key point of the posthuman new materialism worldview is that the materiality of the landscape has agency which is intertwined with human agency (Hekman, 2010) and thereby shapes what children learn about/in/for nature. Simply stated, posthumanism brings matter to the forefront in a way that can deepen understanding of outdoor learning (Quinn, 2013). However, the ontological turn asks for something more than a "worldview." For educators, it is not about getting the ideology exposed (akin to critical place-based education/pedagogy of the last century) before you teach about nature experience per se (although materials are important), it is how materials and discourses are attuned to, in and through the pedagogy, in the planning, in the enactment, and in the outcomes of nature-based place learning. In other words, as Somerville (2010) argues, a thoroughly relational ontology is not a view from any "where" that is not a place. What is important, one pair of the contributors argues elsewhere, is that the core process of teaching and learning is both pedagogically and ontologically linked to create a praxis of pedagogies of place (Renshaw & Tooth, 2018).

Conclusion

Much literature over time has argued constructively for why place, especially natural place, is an important pedagogical site in which the child can explore nature, including their own positioning as part of nature. The chapters in this section represent an effort to explore how childhoodnature can be pedagogically enabled with a focus on new materialist approaches that offer a new ontological lens. Further, to some degree, the chapters explain what the outcomes or effects are in embodied ways for lived experiences through encounters with other species and the materiality's of place. In Quinn's (2013, p. 739) words, the contributors to this section have used "post-human ideas to advance theoretical understanding" of nature-based learning," while most have also used these ideas to work with empirical data on this learning, "in order to demonstrate post-humanism's analytic capacity" (op cit, p. 739).

The contributors portray place itself as (re)constructed and experienced by children and teachers in which pedagogies are perhaps best summarily captured by Urquhart and Picton's citation of Ruitenberg's (2005, p. 218) concept of a "radical pedagogy of place" which is "a pedagogy of 'place' under deconstruction, a pedagogy that understands experience as mediated, that understands the 'local' as

producing and being produced by the trans-local, and that understands 'community' as community-to-come." Further, according to Ruitenberg, students are encouraged to see the diversity of conflicts over interpretations of place for which there are no correct answers, as well as the meanings of the place in the past and the openness to future interpretations and constructions of meaning.

Based on our limited review of some of this literature and the contributions of the seven sets of authors, there may remain a need for future empirical research to understand the:

(a) Outcomes and effects for diverse groups of learners experiencing diverse kinds of pedagogies across different kinds of outdoor natural settings
(b) Inputs in particular contexts educators need to provide to facilitate desired outcomes (e.g., sustainable lifestyles, physically active citizens, knowledgeable conservationists)
(c) Planning and policies at a system level for nature-based places (parks, greening, school grounds, etc.) that are needed as the population lives more and more in cities

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Children Becoming Emotionally Attuned to "Nature" Through Diverse Place-Responsive Pedagogies

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Ron Tooth and Peter Renshaw

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Abstract

We theorize children's emotional relationships with *place* in terms of love, care, and solidarity, drawing upon Lynch (2007). However, rather than restricting emotional relationships to human-human interactions, we extend the relational and emotional *other* to the more-than-human world and to *place* itself. Can children situate themselves as interdependent beings with other living and non-living entities in *place*? Can they come to understand that they are not separated from "nature" but are part of "nature," emotionally interconnected with the living systems of Earth?

To investigate children's emotional relationships with *place* and the more-than-human world, we analyzed their representations of "nature" and themselves following an excursion to Karawatha Forest in South-East Queensland, Australia. The children were 11–12 year-old (in Year 6 or 7) and attended four different primary schools in the Brisbane area. The excursion was based on a place-responsive pedagogy that followed the story of Bernice Volz, whose civic action in the 1990s was crucial for establishing Karawatha Forest and lagoons. Ron Tooth and other staff at Pullenvale Environmental Education Centre (PEEC) designed a *storythread* educational program for Karawatha that situates Bernice's story as pivotal in mediating children's experiences. Their connection to *place* is also mediated throughout the excursion by *dadirri*, an Aboriginal practice of attentiveness to, and feeling in *place*. Following the excursion, children shifted toward an understanding of "nature" as agentic, knowledgeable, emotional, and not as separate but as bonded to them. They envisaged relationships of love, care, and solidarity with "nature" in the present and future, and for some the excursion marked a significant change in identity. The implications of this place-responsive pedagogy are considered in the context of neoliberal times and accountability pressures for teachers.

Keywords

Perezhivanie · Place-responsive pedagogy · Love care and solidarity · Dadirri

Introduction

In this chapter we consider how upper primary school children from three schools and a range of social and cultural backgrounds emotionally connect to *place* as they participate in a place-responsive excursion to the Karawatha Forest reserve in South-East Queensland, Australia. Throughout the Chapter we use "nature" to communicate our rejection of binaries between natural and human spheres or between nature and human culture. We use "nature" as a shorthand way of indicating the historically and culturally contested meaning of the "more-than-human" world. In the extract below, Bill Neidjie (Neidjie, Davis & Fox, 1985, p.51) positions "feeling" as central to our relationship with place. He writes from an Indigenous perspective on country but it resonates strongly with the approach explored in this chapter.

I feel it with my body,
with my blood.
Feeling all these trees,
all this country.
When this wind blow you can feel it.
Same for country....
You feel it.
You can look,
but feeling....
that make you.

This decentered sensibility about dialoguing with "nature" and feeling with "nature" is also reflected in our analysis of children's accounts of their excursion to Karawatha (see also, Tooth & Renshaw, 2018). Like Bill Neidjie, we want children to relate to the more-than-human world in loving, caring, and respectful ways, seeing themselves in solidarity with the living systems of the Earth rather than as separate entities. The children's excursion to Karawatha has been designed as a *storythread* based on the actual story of Bernice Volz and her team of local activists who advocated in the 1990s for setting aside 1000 ha of remnant forest and lagoons that became the Karawatha Forest reserve (see Tooth & Renshaw, 2018). Children experience Karawatha's diverse ecological zones and lagoons following in Bernice's footsteps. They are emotionally drawn into the place as they interact with the birds, insects, frogs, trees, rocks, sand, and crystals of Karawatha. The *storythread* pedagogy (Tooth & Renshaw, 2009; Tooth, Wager & Proellocks, 1988) is designed to engage children's senses and emotions in a place-responsive manner, rather than treating Karawatha as a convenient site to conduct inquiries on "nature." Later in the Chapter, we categorize the different types of representations of "nature" that emerged from children during the excursion. As their comments and reflections were collated, we realized that the children had moved beyond a view of "nature" as inert and separate, to a view of "nature" as relational, active, and emotional. Rather than separating themselves apart as "human" set against "nature," they began to represent themselves as related to "nature," equal with "nature," and sharing emotions, thoughts, and destinies with "nature." These insights and sensibilities arise from children through participating in the place-responsive excursion to Karawatha. We turn now to describe our approach to place-responsive pedagogy and to the importance of emotionality within our approach.

Place-Responsive Pedagogy and Emotionality

Place-responsive pedagogy is at the center of our approach to environmental education as outlined in Renshaw and Tooth (2018). Other scholars have influenced our understanding of place-responsive pedagogy, including Greenwood (2014) who foregrounded the importance of the cultural and material entanglements of place and the shared responsibility of people to care for local places in a globalizing world. Mannion et al. (2013) highlighted for us *place-responsive*

pedagogy rather than *place-based* pedagogy and the crucial role of teachers in enabling students to be responsive to the cultural and material affordances of place. But it was the notion of place as theorized by Margaret Somerville (2010) that primarily influenced our understanding of place-responsive pedagogy. Somerville draws upon insights from Gruenewald's (2003) critical place-based pedagogy and the epistemologies and ontologies of Indigenous Australians (Cohen & Somerville, 1990) to propose that place involves processes of embodiment, storying, and contestation in the contact zone between cultural groups and their different forms of knowing and being. Here we expand these three features of place to include emotionality as a key feature of place-responsiveness. We also seek to expand the boundaries of emotionality by considering it as a distributed feature of place rather than as centered in the human person – the place itself, we suggest, is imbued with emotions that are felt and shared by the participants whether they are human or more-than-human actors. Our approach is consistent with the posthuman epistemologies and flattened relational ontologies that inform the chapters in this volume (see also Barad, 2007; Taylor & Pacini-Ketchabaw, 2015; Taylor, Pacini-Ketchabaw & Blaise, 2012). Writing this Chapter has provided us with the opportunity to revisit our approach to place-responsive pedagogy (Renshaw & Tooth, 2018) and to consider how a post-human epistemology, ontology, and a distributed notion of emotionality might further enrich the design of pedagogies that make a difference in children's lives.

Embodiment (Somerville, 2010) suggests that we learn through the relational activity of the body-in-place – through engaging with the materiality of the place with our senses and actions. Pedagogies based on embodiment turn our attention outward to a dialogue with the situated materiality and emotional tonality of place itself. Embodiment is not a detached and objectifying cognitive form of knowing but an emotional and sensorial whole-body form of knowing in place. Rather than thinking of place as an entity to be studied and objectified, embodiment suggests that we relate to place in a highly visceral manner that involves responsiveness from our heads, hearts, and all our sensory systems.

In addition to embodiment, along with Somerville (2010), we theorize place in terms of stories. Massey (2005) defined place itself as a set of overlapping and unfinished stories and through this definition she highlights the inherent emotionality of place. Stories draw us into relationships with characters in place (both human and more-than-human characters) and engage us emotionally with these characters. Storying has been a pedagogical design principle used by Tooth for over three decades (Tooth et al., 1988; Tooth & Renshaw, 2009). He devised the pedagogy of *storythread* to engage students actively and emotionally as they role-played real and fictional characters within a narrative constructed specifically for different places. For example, Bernice Volz's story of environmental advocacy is central to the existence of Karawatha, so children shadow Bernice's journey as they explore the forest and reflect on what it means to be an environmental advocate. Learning through *storythread* transforms the way students can experience a place. As Tooth noted (Tooth, 2018, p. 47), story laid over the landscape imbues the features of place with emotional significance for the students and opens

up imaginative ways for them to make sense of the more-than human world. The professional experience of Tooth and colleagues over many years has demonstrated that students become emotionally involved when living through the events and dilemmas of a *storythread*. While the story is devised and the performance is staged, the emotions are real. Students routinely express strong emotions of love, excitement, caring, or relief as they participate in the unfolding *storythread*. Below we elaborate further the story of Bernice Volz and her relationship with Karawatha that continues to the present day as she grapples with ongoing threats to the place she loves. Bernice's locally situated story, of course, is not unique but one of a myriad other unfolding stories of fragility and love and contest that are occurring simultaneously across the Earth. The local-global significance of storying is important to acknowledge – children are being drawn into local stories, but these are relevant across the world as people everywhere struggle to address adequately local threats to the living systems of the Earth.

Somerville theorizes place, finally, as a cultural contact zone of difference. Place is inevitably the site of contested stories (Massey, 2005) that arise from different agendas, epistemologies, and ontologies that participants bring with them. Contest, negotiation, and conflict are inevitably highly emotional as different interests struggle to be reconciled. In Australia, Indigenous custodianship of place draws students and teachers into stories of historical dispossession and cultural marginalization, as shown by Sue Gibson and Mark Cridland (2018) in their study of an Indigenous educational program conducted at the Barambah Environmental Education Centre in Queensland, Australia. They found that students were moved to reflect on their own cultural assumptions and to shift their perspectives and values as they learned how Indigenous people were able to live productively in the forest at Barambah (Gibson & Cridland, pp. 107–112). The contest between Indigenous notions of place as country, and Minority western notions of place as natural resource, is not brought from outside into Barambah. The contest about country or resource and the emotionally charged historical events of Indigenous dispossession are part of the place itself. This is reflected in the story told by Mark Cridland (Gibson & Cridland, 2018, p. 102) about his sensing the presence of Indigenous people past and present as he walked the tracks of Barambah. It is quite moving for anyone to acknowledge that they are walking where others have walked for millennia or to realize that the trees growing so prominently on the bluff were growing there prior to European colonial occupation. What if they were harvested for timber? These contested considerations are part of the place and will emotionally engage students and teachers as they enter the place and learn about its history.

Emotionality: Love, Care, and Solidarity

In conceptualizing emotionality we adopt and extend the framework of love, care, and solidarity that was initially proposed by Kathleen Lynch (2007) to theorize human labor and especially the work of women. Lynch had critiqued Nancy Fraser's

(1997, 2008) well-known model of social justice (material redistribution, cultural recognition, and political participation) by highlighting that it focussed on public objectified spaces and neglected the interdependent local places that bound people into emotional relationships with others through attachments of love, care, and solidarity. Lynch (2007; Cantillon & Lynch, 2017) developed her critique in the realm of humanity, privileging human-human relationships rather than placing such relationships in the context of the more-than-human world. Her notion of humans as "relational beings within a matrix of social and emotional relations that give meaning and purpose to life" (Lynch & Baker, 2009, p. 227) is a vision that we endorse. However, we would extend the "relational other" to the more-than-human world (Renshaw, 2017). Indeed, Lynch (2017) has begun recently to acknowledge that love, care, and solidarity should encompass the way we ethically relate to each other as well as how we relate to all living creatures and the environment. We extend Lynch's recent thinking about ethical and emotional relationships with living creatures and environment by considering how *place* can be the object of love, care, and solidarity and indeed reciprocate such emotions.

There are key places in our lives that we *love* due to shared (partial) history, intimacy, and familiarity. Such places provide us with a sense of belonging. For example, Linda Venn (Venn & Lazaredes, 2018, pp. 122–123) recounts her relationship with the Paluma Cloud Rainforest in North Queensland, Australia, as one of love – it is the place where she swam with her grandmother, where she played with friends, met her lifelong partner, and where she taught for many years as an environmental educator. Her embodiment of Paluma is emotional and long-lasting, and the Paluma Cloud Forest continues to nurture her wellbeing imaginatively and physically. Noelene Rowntree (Rowntree & Gambino, 2018, p. 74) reports a similar emotional relationship with the Bunyaville Conservation Park where she played and sought solace as a child and where as an adult she shared time with her daughter and eventually became an environmental educator. The intimate knowledge and love that these educators have for such places enables them to tell stories-in-place that routinely beguile and enthral students who come on excursions. In addition to *love*, Lynch (2007) describes relationships of *care* based on an ethic of real concern and mutual responsibility. Caring for a local creek, or a stand of trees, or a community garden entails visiting and being aware of what's happening to that place and concerned to ensure that its well-being is maintained. In turn the place reciprocates by providing the carer with aesthetic pleasure, fresh air, and water as well as food (perhaps). Beyond the more immediate circles of love and care, Lynch (2007) envisages relationships of solidarity which we see as entailing "standing with" and "speaking-up" for places whose integrity is threatened in various ways. Relationships of solidarity are expressed by advocating for places based on ones interconnected relationship with the living systems of the Earth. So we theorize emotionality in this Chapter as a set of relationships in and with place, rather than as an internal personal set of feelings. We further illustrate this relational approach to emotionality by considering a recent incident involving *love*, where the ecosystems at Karawatha were threatened.

Loving Karawatha: "Does This (a Piece of Bitumen) Belong Here?" (Year 6 Girl, Aged 11)

Karawatha is a place set aside, a remnant of different types of forests and freshwater lagoons. Its unique geological features (including porous sandstone ridges) have protected the lagoons from the polluted runoff from nearby motorways and roads, so it is one of the last remaining habitats for a large number of frog species. Its trees provide a food source for endangered glossy black parrots and koalas. But it is not closed to the public. Local residents walk their dogs (by regulation they should be on a leash) and generally explore the whole forest via firebreaks and pathways. Fires have been deliberately started at times and caused considerable damage to the forest. Nonetheless, it remains beautiful and is being promoted as a tourist destination due to its biodiversity and proximity to both the Gold Coast and Brisbane in Queensland Australia. Recently a new Discovery Centre was opened to showcase the unique flora and fauna of Karawatha, and new tracks were constructed to enable access for the increasing number of visitors. Just after the tracks were laid in 2017, Bernice Volz and Ron Tooth visited the new Discovery Centre and later walked up the hill to observe the new tracks. In horror they looked down the hill at newly laid bitumen tracks winding into the forest. The pollutants released from the bitumen would eventually render the lagoons toxic to the endangered frogs that flourish there. The sandstone ridges, that had for millennia filtered the water flowing into the lagoons, were rendered powerless because a contractor had driven over the ridge and spread bitumen throughout the protected side. Bernice loved Karawatha. It was her experience decades earlier of exploring the lagoons that generated her love for the place, and now in one act of unintentional vandalism, the place was threatened. Ron recalls his dismay that council officers he knew and respected could have authorized the bitumen tracks. He and Bernice urgently contacted the council and requested a meeting to try to remedy the situation. It turned out that the officers were stretched for time and resources and had been unaware that bitumen had been laid. They organized for the bitumen tracks to be removed and the track remade with locally sourced sand. About a month later on an excursion to Karawatha, a Year 6 girl found a small piece of the bitumen lying hidden in bushes near the track and asked, "*Does this belong here?*" The bitumen is presented by the surrounding sand and vegetation as not belonging. The materiality of the place itself is rejecting the bitumen by making it so obviously alien in its black shiny stickiness in contrast to the light-colored and dry textured sand.

This recent story about bitumen in Karawatha illustrates how human activity can unwittingly harm places that are loved. In this case, love for Karawatha prevailed. How might we interpret these events from a posthuman and distributed sense of emotionality? The lagoons and frogs could be regarded as active agents in these events through their emotional relationship with Bernice. Over many years they enthralled and nurtured Bernice's love for them. In turn, Bernice's story enthralled Ron Tooth who could envisage a powerful *storythread* about environmental advocacy based on Bernice's emotional connection to Karawatha. It was this distributed love between the place, the frogs, and Bernice (captured in the *storythread* designed by Ron Tooth) that was crucial in convincing the council officers to quickly remove the bitumen. They were very aware that Karawatha was visited by thousands of

students who shared Bernice's love for the place. They also valued Karawatha and were keen to rectify the error of laying bitumen when it was brought to their notice. Their relationship with Karawatha is based on *solidarity*, but their limited resources to micromanage projects, and the competing demands on their time, made solidarity a tenuous way of ensuring that Karawatha would be sustained over time. It was the *love* of Bernice shared with many thousands of children through the *storythread* pedagogy that was crucial in the positive outcome in this instance. Nonetheless the fragility of the place remains palpable, and it calls out for ongoing love, care, and solidarity if it is to be sustained.

It was brought to our attention (Personal communication with Bob Stevenson, 27th November 2017) that one consequence of removing the bitumen and replacing it with sand is that people in regular wheelchairs will be largely excluded from most parts of the forest. The challenge remains of ensuring access for people with disabilities to forest reserves such as Karawatha while maintaining the integrity of the systems that support the diversity of life in the forest. Russell and Fawcett (2013, p. 371) asked the question, "Who is missing even at the margins?" They highlighted the scant research on inclusive practices in environment education and the importance of exposing "ablest" assumptions in how excursions are planned and conducted. Children with disabilities do participate in the Karawatha excursion in adapted wheelchairs provided by the children's family or the school. Children with severe disabilities can be transported by four-wheel drive vehicles to key places in Karawatha such as one section of the lagoons that feature a boardwalk – it was built to ensure that people could access these lagoons without damaging them. So, Karawatha as a place, as a story, provides a poignant example of contested interests between the more-than-human world and the interests of all people. In this case practical solutions have been designed to reconcile these interests, but the site remains fragile, so tensions will remain about access and suitable infrastructure. We consider now the actual place-responsive pedagogy that mediates children's relationships to Karawatha.

Pedagogical Tools That Mediate Children's Emotionality in Place

Prior to their visit to Karawatha, students listen to and discuss extracts from interviews with Bernice about her life as an advocate for Karawatha. They learn about the microclimates of Karawatha and practice attentiveness by silent listening, observing, and reflecting (outdoors) on the features of their school grounds. On the excursion day, students traverse Karawatha imagining themselves walking in Bernice's shoes as well as in the footsteps of the Indigenous custodians of the land. The teachers from Pullenvale Environmental Education Centre (PEEC), who work with Ron Tooth, shape the experiences by deploying micro-pedagogical tools that engage students imaginatively and emotionally with the place.

Dadirri is central to the place-responsive pedagogy at Karawatha. It is an Indigenous practice identified by Miriam-Rose Ungunmerr-Baumann of the Ngangikurungkurr people in the Northern Territory (Ungunmerr-Baumann, 1988, 2002). She describes it as an inner deep listening and quiet still awareness. She offers

dadirri as a practice for everyone (not just Aboriginal people), so on this basis Ron Tooth and his PEEC colleagues created a series of *dadirri* experiences throughout the Karawatha excursion to facilitate children's personal and emotional connections to place. These *dadirri* moments are described below.

White Crystal Dadirri

The journey into Karawatha begins with a protocol of respect and acknowledgment of Aboriginal people that is conducted in silence. The protocol involves students scooping up white crystals from the track at the entrance and allowing the crystals to pour slowly back to the track. Aboriginal people have walked on these crystals for millennia, so by pouring the crystals through their hands and listening to the crunch of the crystals under their feet, the students are given the opportunity to show respect for Karawatha as an Aboriginal place and to make their own sensory and tactile connections to the place. They walk in a single line listening to the sound of the crystals under their feet and observing the forest where the sandstone ridge falls away on each side of the track. They continue to walk the white crystal track in silence until a giant tree comes into view, where their voices return and a different form of *dadirri* is introduced, namely, animal *dadirri*.

Animal Dadirri

The track along the sandstone ridge opens to an area of flat sandstone surrounded by boulders that are partly buried and strewn haphazardly along the ridge. Birds watch from trees as students approach. Goannas, lizards, insects, and beetles can be observed scampering between the rocks to hide in clumps of grass or in leaf litter. *Animal dadirri* invites children to adopt a certain kind of attentiveness to the animals they see – to sense the forest as if they were one of these creatures. To further facilitate this shift in perspective, students are provided with digital cameras that magnify fine details and help them imagine what an ant, lizard, snake, beetle, bird, marsupial mouse, frog, etc. might see. Children are inventive in placing the cameras down in the grass or under logs, or close to leaves or along the trunks of a tree, often facing the sky to simulate an animal's line of sight. Students crawl through grass, slither under rocks and trees, and squeeze their bodies into gaps as they simulate a particular animal's perspective on the world. This is a very tactile and embodied form of *dadirri* that simultaneously allows children to sense emotionally what it might be like to be that animal.

Rock Dadirri

The sandstone ridge provides a vantage point to see the structure of Karawatha's catchment and understand how the water flows downhill through the sandstone to form the system of lagoons that is hidden among the dense bushland in the distance.

Rock *dadirri* (in contrast to animal *dadirri* where children are active and physically inventive) requires students to become totally still as if they've become part of the rock itself. Their hands are in contact with the solidness, grainy texture, and coolness of the sandstone. Being rock they can imagine eons of time and the generations of Aboriginal people who also observed Karawatha from here. By sitting still and quiet, forest creatures and birds often come very close to the children, treating them as if they are actual rock. Children sit frozen in these encounters and soak up the experience as it unfolds. *Rock dadirri* is designed to help children understand the unique features of sandstone as porous material, so this *dadirri* experience is concluded by the group gathering to observe water being poured on to the rocky surface and vanishing almost immediately into the porous sandstone. From this surprising experience of seeing water vanish into apparently hard rock, children can more easily imagine how water is collected and filtered along the sandstone ridge before forming the system of lagoons below.

The emotions that are engendered throughout the excursion to Karawatha by practicing various forms of *dadirri* culminate in the afternoon when students compose a letter to Bernice about their experiences and finally speak to her via mobile phone. The conversation is always emotional as students hear the voice of Bernice and want to tell her about their experiences. They have followed in her footsteps and experienced the place partly through her eyes, and they know Bernice's story of advocacy that was instrumental in the establishment of Karawatha as a forest reserve. It is not surprising, therefore, that during this phone conversation they express a love for Karawatha and a commitment to caring for it in the future. The students continue to talk about their visit to Karawatha after the excursion; they write responses to Bernice and reflect on what it means to live, like Bernice, as environmental advocates in their own school and community.

Categorizing Children's Representations of and Relationship to "Nature"

The literacy-related activities of writing, drawing, and conversing, which are part of the Karawatha excursion, provide a window into understanding how children represent "nature" and how they relate to "nature." Our assumption is that children begin as cautious observers of "nature" and see themselves as separate from "nature." This is expressed clearly by one child in a letter to Bernice after the Karawatha excursion. She writes about her initial phobias,

> I used to hate dirt and mud but after what I have learnt today, it turns out that mud wasn't that bad and now I love it. I naturally had a phobia of bugs but now I'm fascinated by them. Thank you for what you have done.

Rowntree and Gambino (2018, p. 75) likewise recorded a group of youngsters arriving at Bunyaville Environmental Education Centre for an excursion where they expressed fears about wild and unknown creatures in the forest. Venn and Lazaredes (2018, p. 124) found at Paluma Cloud Rainforest that many children initially expressed

apprehension about being alone in the forest and were fearful of perceived dangers like spiders and snakes. Pattison also (2018, p. 142) reported that many students are apprehensive and fearful as they explore the intertidal zone at Nudgee Beach (near Brisbane, Australia). After the Karawatha excursion, we were looking for different responses from the children – responses that suggested an interconnected and relational understanding of "nature." Below we categorize responses that were collected in 2013 from the letters that 108 children (50 girls and 58 boys) composed to Bernice Volz at the end of the excursion. The children were from upper primary school, predominately in Year 7 (about 12 years old) with a few from Year 6 (about 11 years old). They came from four different State Schools and participated in the excursion on separate occasions. The task of writing the letter was described to the children as an opportunity to tell Bernice what had happened to them on the excursion and how they felt about what she and her friends had done to preserve Karawatha. The letters varied in length from a single sentence to a number of paragraphs.

In our initial examination of the text of the letters, we noted the many positive and heartfelt responses from students, as would be expected at the conclusion of their journey through Karawatha following in the footsteps of Bernice. The text below from one 12-year-old girl is typical of numerous similar responses.

> I feel really peaceful, calm and somehow fun in a relaxing way at Karawatha Forest. I actually have never been to a real forest that actually has beautiful butterflies, gorgeous rocks, natural lagoons, rare trees and rare animal species it feels so special.

Her vivid description positions her as calm and "at home" in the forest, in contrast to the fearful children referenced above, but she remains an observer of the "gorgeous" features of the forest. These types of responses from children do not convey a major change in their relationship with "nature," or a new sense of "nature" as agentic, or as intimately interconnected with their own identity and destiny. However, there were many responses from the children that did indicate such changes, and we turn now to consider these.

The first category concerned changes in the children's sense of bonding with "nature" and becoming part of "nature" ("*I feel as if I'm a part of the environment*"). The second category concerned a changed view of "nature" itself where agency and knowledge are represented as simultaneously part of the human *and* the more-than-human world ("*Nature talks to me and it has so many stories to tell*"). The third category concerned changes in children's sense of solidarity with "nature" that motivated them to speak-up for "nature" ("*I learnt that a group of people can save a whole forest it is truly stunning*"). Across these categories an emotionally attuned sensibility to the more-than-human world is evident.

Students' Sense of Bonding with "Nature"

In the following account, a child represents the forest as sharing stories with her. She has entered a conversation with "nature" that is trying to show her the importance of

the Karawatha story. Her response to the grass whistling and the birds singing suggests learning far beyond the purely cognitive. It's a visceral response from the "body-in-nature," rather than a detached appreciation of "nature."

> I really feel the nature coming into me and trying to show me why you had saved Karawatha. The zones and the beautiful tracks have been so inspiring today. I could hear the grass whistling and the birds sing.

The visceral responsiveness of the "body-in-nature" is expressed also by the child below. The student opens her eyes to see the clear sky and dark leaves; her breathing is almost audible, in and out, as she listens to the sounds of the forest. Her words convey embodiment and a clear connection to "nature." She is being changed through her experience in place, and she seems enthralled by it ("an amazing delight").

> As I leaned back on a vine-covered log feeling the banksia flowers brush against my fingertips, then, I close my eyes, relax, and let my imagination take over. When I open my eyes, I look up at the clear sky and dark tree leaves, breathing in and out deeply whilst listening to the variety of bird noises was an amazing delight.

In this next account, the child explicitly reports "feeling part of the environment" as Karawatha Forest has "grown on me." It is the materiality of the place – the lagoons, plants, birds, frogs, and plants, and the richness of her sensory experiences – that is associated with her sense of bonding with the environment.

> I feel that Karawatha forest has grown on me and I feel as if I'm a part of the environment. The lagoons are SO cool. The sounds of the birds and frogs. The plants are in various different sizes and shapes and all the smells.

In the short comment below, this child conveys that they have learned "to bond" with the forest in such a deep way that they know what it needs; it needs to be saved. Embodiment has led to advocacy and the desire to speak for the forest. This is something we have often seen in our environmental programs where students feel compelled to act because they have come to love and care about a place just as Bernice did. We explore such solidarity with "nature" further below.

> I've learnt how to bond into the environment and can tell what the forest needs, it needs saving.

Students View "Nature" as Having Agency and Knowledge

In the text below, animals are given agency: frogs sing as a choir, and fish (tadpoles) love the lagoon as they jump and splash. These are no longer imaginary storybook animals but the living creatures of the forest that the child has seen.

> There is so much wildlife everywhere, I just love listening to the birds . . . sing and the frogs singing as a choir. As we approach the lagoon, I hear all the frogs stop but one, I think it was a warning call or something. I could tell that the fish (tadpoles) loved the lagoon because they were jumping and splashing and they owe it all to you.

In the extract below, the forest is given an agentic "presence" that it shares with Bernice and the child. It doesn't give up even in the face of natural disasters. Human and more-than-human interests are equated here in this representation of the forest. The forest didn't give up, Bernice didn't give up, and the child won't give up. The agency of these three characters (forest, self, and Bernice) has a moral dimension which reflects the pedagogical intent of the Karawatha narrative to move children to understand and practice advocacy for the places that matter in their lives.

> I loved the calmness and spirited feeling in the forest. The best feeling was to watch this amazing divine forest. No matter how much disasters there has been this forest doesn't give up. I have learnt to never give up of what I love and no matter how much people doubt you, you never give up.

This sense of equivalence is captured also below in the child's comment, "we're not the only livings things that live on earth." The surprise and pleasure of this student in realizing that other creatures are "living" in the same way that she is "living" is expressed with vitality and vividness and echoes Bill Neidjie's insight, "you can look, but feeling. . .. that make you" (Neidjie Davis & Foz, 1985, p.51) It's a place where trees glow, the air is fresh, and the world is full of surprise. Everything is animated and full of life. This is not a detached description of space but an emotional response to place. It resonates with the ontological and epistemology stance conveyed in Bill Neidjie's poem that we relate to "nature" through kinship and friendship.

> I think the most important discovery I made today was we're not the only living things that live on the earth. The fresh air surprised me and the trees when I looked up at them against the light sky, looked like they were glowing. I have never had this much experience with nature before.

The pedagogical tool of *dadirri* that mediates children's experience of Karawatha is regarded by some children as central in facilitating their appreciation of "nature" as agentic and knowledgeable. Below a child writes in a decentered way that positions her both inside and outside the experience: "inside," she feels the emotional sensorial connection with the life around her; and "outside," she looks and, in looking, becomes acutely aware of the "lives" of insects, ants, trees, and birds but especially their activity and their agency. Insects are "working" and birds are "chirping," and she knows this because of *dadirri*.

> There were lots of wildlife around and when I did dadirri it helped me sense all my surroundings. There were a lot of little insects and ants working on the trees and birds chirping at the back.

A second child takes this idea further when he recounts that *dadirri* "really works" because animals "don't think you're a threat" and you can come in close, or, as his statement implies, the animals "think" and in "thinking" have their own agency.

> I learnt about dadirri and that it really works. Birds don't think you're a threat and it's a good way to see all the wildlife.

How birds think or feel is not what matters here but rather how this boy's thinking has changed and how he has now entered into a more relational way of explaining "nature." The inference here is that the birds are agentic in deciding whether you are a threat or not and that you will be rewarded if you use *dadirri* because this enables you to "see all the wildlife." Agency is taken to a more emotional level in the next account where a student imagines "nature" talking to them and telling stories, which creates a partnership and conversation that is "deep and meaningful."

> You have helped me learn that nature is more than a flower attached to a branch or a bird in the sky, it is deep and meaningful. It talks to me and it has so many stories to tell.

Students Express Love, Care, and Solidarity with "Nature"

As Somerville (2010) and Massey (2005) proposed, contest is a part of *place* as competing agendas, epistemologies, and ontologies come into contact and struggle to be reconciled. In the following responses from students, we see how they engaged with contestation as part of an experience of love, care, and solidarity with "nature." They encountered contestation through the story of Bernice who lobbied politicians to purchase private properties in order to establish Karawatha but also in their own embodied experiences of Karawatha. In the following account, this student expresses her new found solidarity with nature, and combined with her new knowledge about herself, she repositions herself as an advocate and recognizes that she can do "little things" to help protect the environment.

> I have learnt a lot about myself during my time at Karawatha. I now know that everything I do has an impact on the environment and by doing even just little things, I can help protect it.

In the extract below, another child now wants to care for "nature" because she has been inspired by Bernice. She expresses a strong desire to do "something for nature" because she has seen how Bernice saved the frogs, trees, and bugs from being lost. It's that she "saved them from harm" and "saved lives" that has caught her imagination. It's not "the ecological facts" of Karawatha alone but the love of Bernice for Karawatha that's carried by these words that inspires her to "make memories" and to "do something."

> Being able to be in a place that could have been built into a shopping centre is awesome. Rare frogs trees and bugs live there and you saved them from harm. You saved lives. You

> saved Karawatha. You let us make memories. I feel like I can do something for nature. You inspired me.

In the short account below, a child states that he would "love" to return to Karawatha to tell his parents the "story of how Bernice saved it." This is a simple statement of intent, but his choice of words: "love," "beautiful," and "saved," indicates an undercurrent of emotionality and his desire to share and communicate the "story." This story links his personal relationship of love within "my family" to his sense of solidarity and caring about Karawatha as beautiful and now "saved" through the actions of Bernice. Here we can glimpse how the *storythread* pedagogy provided him with a way to weave together a personal story from the whole emotional experience.

> I would love to come back here again and show my family how beautiful it is and tell them your story on how you saved it.

In the account below, a girl is unambiguous about never wanting to be an advocate for the environment, and yet the experience of the Karawatha story changed all this. She now thinks about how trees "dance in the wind" and loves that the birds and animals are "so free." The aesthetics of *place* has captured her feelings and made her "think" about not dropping litter, yet "think" here conveys more than "detached cognitive thought"; it conveys emotionality in and for *place*, which is facilitating her change of habits and care for the environment beyond Karawatha.

> I never did want to be an environmental advocate, but since I walked through Karawatha it's changed me. I now think more about trees and how they dance in the wind. Birds and other animals how they're so free. I also think more about not dropping litter.

Finally, in the following account, a child explains how *dadirri* allowed her to see the detail of animals actively crawling and gliding and the solidarity she felt with them which she described as so "wonderful listening." You can feel the emotion and wonder in her words for these creatures and how it gives energy and vitality to the idea that "a group of people can save a whole forest." This is something she hadn't thought was possible before she visited Karawatha and heard the story of Bernice and her committed group.

> When we did dadirri it was wonderful listening to all the different bird calls and watching little insects crawl around and the amazing birds swiftly gliding through the trees. I learnt that a group of people can save a whole forest it is truly stunning.

There is an entangled form to the representations of "nature" and "self" in some of the letters to Bernice. The changes children reported in their relationship to "nature" are entangled also with a strong sense of personal change. To examine these entangled changes, we introduce the concept of *perezhivanie* (Vygotsky, 1934) defined as emotional or lived experience in a specific context (see Ramos & Renshaw, 2017) and analyze extracts from children that exemplify this phenomenon.

Perezhivanie: Identities Emerging from Emotional Experience in Place

For some children the whole experience of the excursion is associated with emotionally charged reflections on their past, present, and future and a changing sense of identity. In the following account, a student makes the remarkable claim that she has found herself ("I have found me"). A nascent ecological identity is emerging, and one senses that this child is as surprised as anyone that this is occurring.

> I have found my inner-self, I have found me. The way the birds talk to me . . . words cannot describe the sensation.

In a similar way, the child below sees herself as a "new girl" and a "new person" and notes that this is the "first day" in her transformation.

> It is very hard to say or describe what I feel like. I am a new girl and a new person. . . .. I will always remember this as . . . my first day doing my new favourite hobby, being with nature.

What is remarkable in the extract below is the way the child's reflections center more generally on her life in the past and her emerging sense of identity. She remembers how hard her life has been but also the gifts that life has given her. Her thoughts about the excursion to Karawatha, her emotions, her past life, and her identity are entangled – woven together dynamically in a complex experience in *place*. In the moment of writing to Bernice, situated near the lagoons in Karawatha Forest, her reflections encompass her identity in the past, present, and future within a heightened emotional state. Such significant moments are not uncommon when children participate in place-responsive experiences based on *storythread* pedagogy.

> I now know why you wanted to save this amazing place . . . I found inside this sacred place that all my worries disappeared with the sights and sounds of the city. When we sat still everything that I saw as ordinary I found something so amazing "the extra-in-the–ordinary." Something inside me made me want to stay there forever. Watching the insects and colourful birds swoop and glide through the clean air. I've had a hard life but not as hard as others so in that moment I was reminded of the beautiful things and people that life has given me. [Emphasis added by authors] I want to say thank you from the bottom of my newly environmental heart. Thank you for saving this gorgeous place. Thank you for making that moment possible. Thank you for all the hard work and love you put into protecting this forest. Also, I loved talking to you on 6.6.13. You are the most inspirational lady ever. Yours truly, (Year 6 student)

We have written about this emotional place-entangled phenomenon recently (see Tooth & Renshaw, 2018; Ramos & Renshaw, 2017; Renshaw & Tooth, 2016) deploying the Vygotskian notion of *perezhivanie* (Vygotsky, 1934). *Perezhivanie* is a concrete emotional experience in *place* that is accompanied by a sense that significant change is happening to oneself and reflective awareness of the

process. It has been used by Fleer and Hammer (2013) to investigate early childhood dramatic play and by Fernholt (2015) to research *storyworlds* creatively imagined by young children with adult assistance to explore important events and emotions in children's lives. The events in the *storyworld* are recalled and discussed by children and adults as they revisit the episodes, acting "as if" they are floating above the scene, recalling and evaluating the emotional experiences within and beyond the stories (Tooth & Renshaw, 2018, p. 39). The Karawatha excursion is similar to *storyworld* and dramatic play – it too involves students participating in storying and reflecting on the significance of the story for their lives. In the extract above from the girl's letter to Bernice, we can see: (i) the elements of the story, (ii) the embodied nature of her experiences, and (iii) her awareness of the contest about Karawatha. These elements coalesce in her "newly environmental heart" which points to her future as an environmental advocate. We noted recently (Tooth & Renshaw, 2018, p. 40) that "this is the student's *perezhivanie*, her emotionally lived experience," arising from the story of Bernice, and stories inscribed in the place, and personal moments that were distinct for her as she walked through the forest. Not every student will experience *perezhivanie* on such occasions, but for some the elements of the experience combine to make Karawatha a significant event in their lives as they reflect on their identities and their futures.

Conclusion

In this Chapter we theorized children's emotional relationships with *place* in terms of love, care, and solidarity and presented evidence that children can situate themselves as emotionally entwined with other living and non-living aspects of *place*. They can come to understand that they are not separated from "nature" but are emotionally interconnected with the living systems of Earth. Crucial to the development of these sensibilities was the place-responsive pedagogy at Karawatha that engaged children in reflective experiences as they journeyed in the footsteps of Bernice Volz through the forest and to the lagoons. The children's learning was mediated by Bernice's story of advocacy, her love for Karawatha, and the *dadirri* episodes that heightened children's attentiveness to the more-than-human features of the forest. This is the beginning of change – children have entered a portal into a transformed understanding of their relationship with "nature," but such emotional experiences in place need to be supplemented by other experiences and reflections. What if the context of learning is not the "sacred," "gorgeous" forest "saved" by Bernice and the "amazing" animals including endangered frogs, parrots, and koalas. How might an interconnected sense of "nature" be engendered and emerge in their own backyards far from the magic of a place like Karawatha? This is a pedagogical challenge Ron Tooth and his Pullenvale colleagues have considered for the past 10 years. So we conclude the chapter by examining the possibilities for place-responsive pedagogy in everyday school contexts.

Teacher Knowledge, Love, Care, and Solidarity with Place

Teachers are crucial, especially their knowledge and emotional responsiveness to place. Reviewing the diverse place-responsive pedagogies included in the volume by Renshaw and Tooth (2018), Stevenson and Smith (2018) highlighted the crucial role of teacher knowledge about and dispositions to the more-than-human world. Indeed, each contributor to that volume provided a moving account of their intimate knowledge and emotional connection to the places where they taught as environmental educators. They did not have to pretend to love the place. They also did not need to simulate understanding or knowledge of the place – their deep knowledge of the ecology and history of the place enabled them to support confidently children's own discoveries as they experienced the features of the place firsthand. But teachers working in conventional school settings do not always have an understanding of "nature" as relational and emotional or an understanding of themselves as interconnected with the living systems of the Earth. Ron Tooth and his colleagues at Pullenvale have observed that many teachers who accompany their students on excursion to Karawatha have their own epiphanies regarding "nature." Along with their students, they begin to see "nature" as relational and emotional, and many express the desire to implement a place-responsive pedagogy in their own contexts. This is the first step in adopting a place-responsive pedagogy – developing at least an inkling of the ontological and epistemological stance to "nature" expressed simply by Bill Neidjie (Neidjie Davis & Fox, 1985, p. 51) as, "I feel it with my body, with my blood. Feeling all these trees, all this country."

In further elaborating and adopting a place-responsive pedagogy in conventional school contexts, teachers could consider the general principles arising from Somerville's notions of embodiment, storying, and contestation. Each place has material features that can be experienced and explored through the senses and through activities that enable connections to become visceral and firsthand knowledge, rather than abstracted knowledge gained from a distance. Each place can also be represented as a set of stories constructed through the activities and lives of participants from past generations, including Indigenous stories of country that are relevant locally. Learning about the history of place imbues it with cultural significance that enriches the experiences of children in that place. But stories and histories also reveal contestation and conflicts between different interests, and these need to be included in a place-responsive approach.

Place-Responsive Professional Learning for Teachers

In partnering with a number of schools during the last 10 years to explore place-responsive pedagogy (see Tooth & Renshaw, 2018), Ron Tooth and his colleagues have seen many teachers reimagine themselves and their work as inherently related to place. Each partner school came to recognize that students can connect to "nature" in their own school grounds and that pursuing entwined relationships between people and place can constitute the core of a worthwhile education. The partnership

stories are about teachers finding themselves "in place" and recognizing the truth of what a child articulated at the end of a *storythread* excursion, "today I was the most myself that I have ever been." The teachers at the partner schools gradually recognized the worth and beauty of their local places where even a blade of grass, a garden, a single tree, or a piece of remnant bush on the boundary could become a focus for learning with "nature."

Reflecting on the legacy in each of these schools in the context of contemporary educational policy, we have drawn two conclusions about introducing place-responsive pedagogy. The first relates to the pivotal role of the school leader (Porritt, Hopkins, Birney & Reed, 2009). There are always difficulties associated with introducing innovation into a school, not the least being the competing policy pressures on the principal and teachers. In each of the partner schools, the principal's positive mind-set and enthusiastic support for a place-responsive pedagogy was critical. Working with place-responsiveness was, at times, a courageous choice because it exposed them to risks associated with current neoliberal educational policy and the reductive demands of a competitive and performance-oriented system of education.

The second conclusion relates to the necessity to convince teachers that place-responsive pedagogy was something worthwhile and that it would benefit their students. Teachers are typically pragmatic and if they cannot quickly see that a pedagogy is feasible in their specific context, they will soon lose interest. What allowed the teachers at the partner schools to persevere and move forward with confidence, apart from the drive of their principals, was the positive changes they saw in themselves and in their students as connections to place were explored. As this happened many teachers reported that something "quite amazing" was happening to them and to their students, especially with the reluctant learners.

One interpretation of such amazing change for teachers and students is to consider the emergence and growth of their ecological identity (Thomashow, 1995). It is what enabled teachers to see the importance of emotion and emotionality in their work and to recognize that this is what was drawing disengaged students back into learning. Their effect on disengaged students is what finally convinced teachers of the efficacy of using emotionally engaging stories, like that of Bernice Volz and Bill Neidjie, and then linking these to direct experience in ordinary places as a way of creating an understanding of "nature" as relational and of "humans" as intricately interconnected with and part of "nature."

Cross-References

- ▶ Artists as Emplaced Pedagogues: How Does Thinking About Children's Nature Relations Influence Pedagogy?
- ▶ Developing Youth Agency Through Place-Based Education: Challenges and Opportunities
- ▶ Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development

- ▶ Third Culture Kids and Experiences of Places
- ▶ Toward a Pedagogy for Nature-Based Play in Early Childhood Educational Settings
- ▶ Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature

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Artists as Emplaced Pedagogues: How Does Thinking About Children's Nature Relations Influence Pedagogy?

65

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Abstract

In this Chapter, we explore some of the work of an arts and wellbeing charity in the UK called Cambridge Curiosity and Imagination (CCI), a group of artists, educators, parents, and researchers with an interest in how the arts can transform lives. CCI projects aim to open up spaces for creativity, actively engaging with people of all ages and backgrounds. Much of their work involves connecting children to the outdoors. We describe and discuss how the artist pedagogues working with CCI perceive and articulate the positionality of the children they work with in relation to non-human nature and the significance of the imagination in this regard. We then reflect on what this positionality means for posthuman perspectives on the stewardship approach, arguing that humans being both *a part of* and *apart from* nature have important consequences for our capacity to steward the Earth. These artists and children work together in spaces with meaning for children; as such, their work fits with the theoretical framework of pedagogies of place. We explore how the artists conceive of "place" in their work with children and how this influences the way they situate children in relation to both human and non-human nature, highlighting the data on the role of imagination in this relation. The Chapter emerges from ongoing exploratory case study research involving thematic analysis of data from a focus group discussion and individual interviews with the artist pedagogues, as well as archival material from the charity. In our discussion of the findings of our study, we reflect on the usefulness of the notion of childhoodnature in this context, showing how this charity's work can contribute to its conceptualization and what it can contribute to current debates around the validity and usefulness of the stewardship approach.

Keywords

Place-responsive pedagogy · Artists · Stewardship · Imagining

Introduction

The notion of childhoodnature, while new, can be traced back to the dialectics of nature and childhood from Romantic eras where childhood is affiliated to nature both positively (from Rousseau as a state of "natural" innocence that society jeopardizes) and negatively from pre-Romantic eras, where childhood is seen as pre-socialized wildness that may itself be brutal, like nature, or carry original sin and needs to be trained and civilized through education. These early associations between childhood and nature via shared innocence have been identified by Taylor (2013) and have also been written about from eco-critical perspectives (Whitley, 2013). They hint at the current developments in the field of Environmental and Sustainability Education (ESE) research and in children's geographies', leading a trend toward the entanglement of posthumanism (Clarke & Mcphie, 2016; Gannon, 2015; Malone, 2015;

Rautio, 2013). What this posthumanist direction entails is a move away from the idea of humans and nature being separate. Posthumanism encourages a rejection of an anthropocentric view of nature where humans can in fact be disconnected from it as Louv (2005) and many others propose and toward an understanding that nature and humans are one and the same (Malone, 2015).

To try to understand this idea of humans being both a part of and apart from nature, we suggest a metaphorical representation of nature as a whole as an orange, made up of different segments each a part of nature but also with a form and shape in their own right, as the segments of an orange have. So we might conceive of nature as being constituted by segments that represent trees, humans, chickens, rocks, bacteria, and so on. This means that when we talk about nonhuman nature, what we mean is what remains of the orange when you take the human segment out. It also means that although you can extract humans from nature, humans still have the same qualities as the whole of nature has (like a segment of an orange still has the same texture and taste as the whole orange or any other segment of it).

A point of significance here is the way in which such an approach challenges the notion that humans can be or are stewards of the earth (stewardship: Taylor, 2017). If humans are in fact nature, as beech trees and lions are, then human exceptionalism and human stewardship of the earth become much more difficult concepts. We will return to human stewardship in our conclusion but to begin with we want to show how our investigation of an arts charity (Cambridge Curiosity and Imagination, CCI) working on pedagogy arising at the intersection of creativity, nature, and childhood provides evidence in support of the developing childhoodnature concept.

In this regard, we conceive of the childhoodnature concept as a means toward demonstrating the way that the qualities of nature are to be found in equal measure in both children and in non-human nature, such as the wind or trees. At the same time, this conflating of childhood and nature does not need to deny the uniqueness of human childhood, but rather it demonstrates that the uniqueness of human childhood is equaled by the uniqueness of the younger phases of the wildlife of other living organisms (such as being a lamb or being a bear cub might do).

To achieve our goal of showing how our investigation of CCI's work provides evidence in support of this concept, in the next section, we will outline the structure and features of the charity, and the role of the artists within it, as well as introduce their work in terms of the pedagogies of place theoretical framework. Although the research methods are described later, it is worth noting that this initial description draws on the charity's website, as well as on statements made by artists in interviews about their work. (The artists we interviewed have agreed to be named in this study: we talked to Caroline, Deb, Debbie, Elena, Helen, Sally, and Susanne.)

The Pedagogical Context: Cambridge Curiosity and Imagination (CCI)

CCI is an arts and well-being charity helping to shape cohesive and collaborative communities in Cambridgeshire (a region in the East of England) and beyond. It began as an artist-led collective in 2002, drawn together by artist Nathan to deliver

groundbreaking creative projects, initially in learning environments. Many of the original group of artists, educators, parents, and researchers have been actively engaging communities in the region ever since. The organization became a charity in 2007. While CCI most frequently works with school and community partners, they have been able to develop wider applications for their approach and now run programs in health and social care settings. Common to all their work is a focus on developing a sense of agency and voice for everyone through engagement with the arts.

Children are at the heart of the charity's work. As one artist, Caroline, says: "Children lead and the way we work, [we] give them the chance to be themselves and to be creative." CCI explores how their ideas and questions can lead the way in creative explorations with artists traveling alongside to support the process. A core group of ten artists works with CCI regularly, with others supporting particular elements, as appropriate. It is important to note each artist in CCI has their own individual practice; however, for the purposes of this research, we focus on the work they do together and the shared philosophy that underpins their approach to CCI projects. Such projects are planned to ask questions about the world, often taking place in communities with specific challenges. CCI's work is managed by a director and a small team of dedicated and creative colleagues, who work very closely with the artists and those involved with the projects, to shape how projects evolve. There are also a number of people who act as "critical friends" and patrons for CCI. One such patron is Robert Macfarlane who describes a CCI project: Ways into Hinchingbrooke Country Park, in his seminal book, *Landmarks* (Macfarlane, 2015).

It is important to note that this undergirding philosophy of giving children the space to lead is like inviting them to be artists and so members of CCI for the time that they are engaged in a project. As Susanne says: "I am working with the children who live around [a site of a new housing development] and trying to take something of the contemporary artist processes to them… I've made… we've made all the children around that area into Artscapers, so they get a badge, they belong to this big Artists in Residence group" (see "Composition 4: the Childhoodnature Imaginary" by Artists and Children from CCI book for more details about this project).

The mode of working varies quite significantly depending on the project. Each project usually involves artists working in pairs, but how the project begins, unfolds, and ends is determined by the participating children, the requirements of the funders, the school (or other institution), the specific artists' preferred working styles, and the place where the work is done. The work can happen during the school day where a year group or class might be "off timetable" for the day, or it can happen in the school grounds at the weekend; alternatively, a combination of different approaches can be adopted.

One example of an ongoing project involving artists that we interviewed is called Fantastical Cambridgeshire. A key partner for this project is Cambridgeshire County Council who provided additional funding for it, alongside the grant from Arts Council England. In this project, artists and children are creating a series of fantastical maps of the surrounds of primary schools in a town in Cambridgeshire through a process of what is described as *creative adventuring*. They do this by working

together in a variety of ways on processes that could include drawing maps in one minute (called One Minute Maps), making collages with old maps, a playful way of exploring called "found mapping," among other activities. While the artists present ideas by bringing in particular provocations in the form of materials or suggestions for ways to go, the children are invited to lead their own explorations and identify spaces they would like to spend time in – an orchard, the path by the river, and a churchyard have all been investigated in recent projects. In one example, children are provided with chalk and a playground area and asked to draw "home." In another example, they are taken to a cube space about 10 m by 10 m by 2 m on the school playground that has been cordoned off with string. The idea is that they will create a 3D map using found materials from the school grounds and any of the materials like brightly colored tape, string, wool, newspaper, and so forth that the artists have gathered. This is filmed by a drone; the person who is doing the filming has heard about the work and offered to come in and do this. These sorts of emergent methods from an open-ended beginning are a common feature of the way the projects are run. As artist pedagogue Helen, says: "I will take the risk each time that something will emerge [. . .] and it always does emerge, you know, and it's always a bit risky [. . .] but more often than not you will find someone or something that interests you and that will lead the project and then they'll open the door to other ways of thinking about a place."

Documentation is an important element of the charity's work. Everything is carefully documented and shared on the CCI website and ultimately in this case described above, reimagined by another artist – illustrator Elena Arévalo Melville – who creates unique fantastical maps of these localities. The maps created to date can be viewed on the CCI website (the companion chapter in the book accompanying this publication contains examples of the work of the young artists who collaborated with CCI).

The Fantastical Cambridgeshire project is particularly in tune with what has been described as *place-responsive pedagogy* by Mannion, Fenwick, and Lynch (2013). Set within the field of environmental education, place-responsive pedagogy seeks to encapsulate the way in which educators create assemblages of people, places, and purposeful activities to create effective learning experiences about environmental issues. Place-responsive pedagogy emerges from the vibrant and active field of place-based education (Gruenewald, 2003; Mackenzie & Bieler, 2016) that has long been popular in the field of environmental education. In privileging the local or in being lococentric, it has been described as "paying close attention to the place where you live" because this is "the best way to learn how to perceive the biosphere" (Thomashow, 2002, p. 5). It is not without its critics (see, e.g., Garrard, 2010; Heise, 2008), but this ethic of proximity has been accredited with the potential to instill a love of place and an ethic of care for nature by numerous writers and researchers (e.g., Gruenewald, 2003; Fettes & Judson, 2010). What is different about the place-responsive pedagogy practiced by CCI artists is that their purpose is not to inculcate an ethic of care for the environment, or indeed to address issues of sustainability, but to enable creativity through playful engagements with nature (broadly conceived). So as pedagogues they work with and alongside children,

emplaced with them in the places that are familiar to the children; observing, suggesting, guiding, and enabling them to follow their curiosity and in creative and imaginative ways, to play with the ordinary until it becomes extraordinary and fantastical. As Sally explains: "I aim and intend always to work alongside children, alongside the teachers, alongside any of the participants that I happen to be working with, whether they're elderly folk or teenagers in a museum."

At this juncture, we explain our utilization of the term "emplaced." Drawing on the work of Michael Bonnett (2012) who uses emplacement to elucidate the way that environmental concern and human sense of place questions contemporary moral sensibilities, we employ emplacement to represent the way in which human action and being is always linked to a particular place or is lococentric. In line with MacKenzie and Bieler (2016) and others (Clarke & McPhie, 2016; Gannon, 2016; Malone, 2015), we understand place in the posthuman sense, as a fluid entanglement of nonlinear time, geographic location, human relationships, and memories of prior experiences, current individual experiences, and the interplay between these. As such, the practice of the artist pedagogues and the young artists they work with emerges from this entanglement of dimensions. As our data will show, this is very much in line with the way these artist pedagogues themselves conceptualize place.

Returning to the exemplification of CCI's work through describing some of their activities that we undertake in this introduction to our study, another example of a CCI project also described in the companion book is Artscapers in North West Cambridge, commissioned by the University of Cambridge as part of their public art program. As Susanne describes it:

> They've commissioned contemporary artists, quite well-known contemporary artists, to work on that site and I'm looking at the processes and the way that the contemporary artists work. I am working with the children who live around the site and trying to take something of the contemporary artist processes to them. . . I've made. . .we've made all the children around that area into Artscapers, so they get a badge, they belong to this big 'Artists in Residence' group. That project includes sustainability and place and space and the outdoors [. . . and it is. . .] to do with communities and the future and how people might live together. (See companion chapter)

One question asked by the Artscaper's project is: "how can children help others to think creatively about planning and implementing changes in a city?". This approach is similar to the one used in the project reported on by Malone (2013) on participatory city design, and the question itself demonstrates the way in which the organization as a whole approaches children, an approach which fits well with participatory theory. Participatory theory is in part a response to the UNICEF Convention on the Rights of the Child and encapsulates the ethics of treating children as humans with their own rights, opinions, and power (Hart, 1992). Environmental education (EE) has worked extensively with this theory (see, e.g., Reid, Jensen, Nikel, & Simovska, 2008), particularly as means of doing research where children are given ownership of their data and are treated as co-researchers with the right to choose to be involved and to withdraw and the right to a voice regarding how data are interpreted. In some cases, children determine the direction of the research, asking the questions and

deciding on the research design (e.g., Alderson, 2001; Barratt Hacking, Scott, & Barratt, 2007; Christensen & James, 2000). It will become evident through this Chapter that the way this group of CCI artists works with children is strongly aligned with a participatory approach to pedagogy.

Place-Responsive, Participatory Pedagogy

What our research uncovers is a place-responsive, participatory pedagogy that emerges at the confluence of children, artists, nature, and place that has implications for the childhoodnature concept and thus for how we see our role regarding the sustainability of the planet. We will explore how this happens in the next section by outlining the ways in which these artists conceptualize the interplay between children and nature and how this influences their pedagogy and the pedagogical philosophy of CCI.

Childhoodnature Through the Lens of CCI

In this research, we wanted to explore what emerges from this confluence of an artist collective, nature, place, and children in the context of the charity: CCI. We have identified a number of significant strands through the research, one of which strongly appropriates the characteristics of the childhoodnature concept: this is that these artists think about children and nature in tandem: nature and childhood have shared qualities, such as being open and being disruptive, and the way they are talked of in the same context at the same time is suggestive of them being philosophically connected in the ontological approach that these artists demonstrate in this research. While individual artists have their own particular take and very unique approaches to the projects they do with CCI, collectively they define nature broadly, and they can find it anywhere. Nature might be an object (a stone or a shell) or an action (like breathing) or a process (a nail rusting), and it can be both wild and present in tame spaces. Nature is a disruptive force that leads to creative and critical thinking about familiar spaces. In the same way, the artists share a philosophy of children inhering in nature. Children can move between worlds, disrupting time and routine by allowing themselves to be led by a falling leaf or following a path in a woven structure or a wood that has no particular destination or being drawn into a puddle while moving between teaching activities. This impression was further articulated by the way the relationships between children and nature were depicted in their drawings; children were positioned throughout the sketches, in all of the different elements they drew. The data we gathered is, therefore, suggestive of a proximity in the way these concepts of nature and childhood are understood in this context that has a profound impact on how these artist pedagogues work. Their understandings of these terms intersect at a number of points (e.g., in seeing both children and nature as disruptive forces, or as fluid, embodying dialectical relations equally). While the pedagogy CCI artists practice is largely child-centered and child-led, their shared

philosophy on nature and childhood guides their practice in this context and illustrates the notion of a childhoodnature assemblage that underpins this publication. This Chapter will focus on the data emerging from our research that exemplifies this strand of our findings.

Research Methods

Our ongoing exploratory case study (Yin, 1993) of CCI aims to produce thickly described data of an ethnographic nature within a constructivist, interpretivist framework (Whitehead, 2004). The data collection for this aspect of the project comprised a "talk and draw" focus group interview with seven CCI artists. This was followed by individual interviews with the same artists. The directors of CCI were provided with a questionnaire that was designed after the artist interviews to elaborate on the data generated during the interviews. An impromptu interview with one director was also carried out to elaborate on some of the interview and questionnaire data. Our data is also backed up by archival research on CCI's detailed and active, constantly updated website.

"Talk and Draw": Working with New Methods

One innovation in these methods was the way in which we set up the focus group, here called a "talk and draw" focus group. We asked the artists to bring in their favorite implement for drawing or painting, and we provided them with a large sheet of paper stretched across the whole table to doodle on as we talked. This created a very useful focal point and provided further data for us about how these artists thought about childhood, nature, and place and the interplay between them.

These focus groups and interviews were audio recorded and transcribed. The transcriptions were sent to the artists for verification, and they made some suggestions and amendments, which were incorporated. The amended transcriptions were submitted to thematic analysis using NVIVO and a process of coding to back up our impressions from the interviews. The interviews were carried out by two of the authors and another colleague; the findings have been discussed on a number of occasions between the four authors and another colleague to check for validity and to increase the reliability of our conclusions. These conversations have also enabled us to draw on the interdisciplinarity of our research team and advisors (including educationalists with backgrounds in geography, natural science, and English literature), bringing our divergent experience to bear on the data and enriching our ability to interpret the data from various perspectives and epistemological framings.

Our extended conversations with the artists as a group focused on these three elements: nature, children, and place. This generated a revealing discussion, which demonstrated very strong intra-play between these artists as individuals and interplay in their own conceptualizations of these terms. It was clear that the pedagogy that emerges at the confluence of these three concepts was strongly influenced by

their entangled notions of them and their interactions with each other through their identities as CCI artists. In other words, the pedagogy they practice is shaped by the fact that they each individually view place, nature, and childhood in broad ways, as open concepts with no fixed definitions or rigid boundaries whose conceptualization is determined in situ, with fluidity in the context where it is being worked on. A child can only be understood to be fearless or a risk taker when that child is demonstrating those qualities in action. Nature seems tame when in a library garden, but in that same place, it is a source of disruption when it drops a leaf onto a child's book as she draws. The pedagogy is also shaped by the interactions between the artists themselves who often work together in a classroom on projects in schools or in communities. Their mutual understandings and long-term relationships influence the directions that they choose to follow, led by the children.

With that in mind, the focus of the remainder of this Chapter will be an exploration of how these emplaced artist pedagogues with orientation toward nature position children in relation to nature and what the impact of this might be for the way they design pedagogical interventions. Through this, we will develop the theme of childhoodnature in relation to the stewardship approach and the pedagogy of CCI. In the discussion section, we will use vignettes from the artists' experiences of working with children in place to illustrate the different themes arising from the data relating to children's positionality.

Findings and Discussion

Nature and Children in Tandem

In this section, we include extracts from our data, arranged (approximately) chronologically as the conversation unfolded in the discussion. We also include an illustration from each of the artists from the "talk and draw" activity. We have not analyzed these drawings in depth for this Chapter, but rather we have included them when they elaborate the point that the artists make verbally. This was the spirit in which the drawings were created during the focus group, and so it is appropriate to use them in that way here, although we acknowledge their richness as independent data that merit further analysis.

The first observation about our data that is noteworthy is that the vast majority of the statements made by these artists in their discussions of the meaning of nature made reference to children too. This means that their way of talking about nature was proximal to their way of articulating their thoughts on children. Similarly, when asked to show where in their illustrations of the discussions about nature and place they would put children, responses were illuminating. Elena says: "They are everywhere. I don't know how else to say that." Debbie agrees that they are ". . .in there, just everywhere." And Sally says: "Yeah, I completely agree with Elena, almost everywhere, coursing through the whole thing." These assertions are accompanied by gesturing toward their drawings. Susanne's way of incorporating children in playful

Fig. 1 In the mouth of the wolf by Deb Wilenski with the child drawn inside the wolf's mouth which represents fearlessness and daring within nature

ways in different positions all around her picture is particularly indicative of this perspective (see Fig. 3).

Deb says "I put [the child] right in here in his [the wolf's] mouth (see Fig. 1). There's an Italian phrase, I can't remember exactly, 'In bocca al lupo,' or something like that, it means in the mouth of the wolf, and is used to say good luck, but it's about getting right into the mouth of the wolf and being fearless and being daring. So that's what I most enjoy about [children] anyway."

Sally then elaborates: "this [illustration] has been made in a different kind of stream of consciousness, but definitely I would have a child hiding inside the shell, you know, there'd be like a big shell and they'd be hiding, they'd have a sense of a secret hideout. . .you know, a retreat. And then juxtaposed with that the same child might be balancing with one foot on this high wire, [..] taking a risk [. . .] really fearlessly, in the sense of what Deb is talking about." This can be seen in her illustration in Fig. 2.

What these quotes show is at once a commitment to the immanence of children in these artists' work, the thereness of them. It shows that they can visualize the child in any space in which they are working or thinking. The extracts also emphasize an awareness that children are different, that one child might be both fearless and fearful and that childhood comprises these dialectical relationships in extremes. What is more, both extracts demonstrate how this work between child and artist encourages risk taking and creative thinking, in line with other chapters in this section of this book.

This proximal thinking about children and nature across artists' explanations of their perceptions of nature begins to suggest the validity of the childhoodnature concept. It is worth noting that when we asked these questions, the interviewees knew that we would be exploring all three concepts (nature, place, and children) together so it might have been that this juxtaposition in our method sets up the connection. However, while the conversation about nature immediately led the artists to reflect on children, questions about nature did not lead to reflections

Fig. 2 The fearful and fearless child by Sally Todd

about place. We had to ask a separate question to get at their perceptions of that concept.

Nature Is. . .

We will now explore the way that these artists think about nature, but first we want to highlight that there is a differentiation made here between place and nature. While nature is seen as open and fluid, place is as Debbie says: "*the most fluid of all*." We will come back to this point later in our discussion of place-responsive pedagogy.

. . . A Natural Object or an Action

When asked to think of an object that represents nature, Sally suggested a shell. "I've done a tree," says Susanne (with children everywhere: see Fig. 3). Helen, however, resists the trope of representing nature with an object as too limiting; instead she prefers the way children think: "I think it's that freedom. They're not preoccupied about what they think other people think it should be." In a similar way, Caroline uses the verb "breathe."

The notion of nature as "freedom" is significant for the childhoodnature concept because freedom is a human expression, although this does not preclude the possibility that other animals also value the sense of being free. In characterizing nature in terms of something which is undoubtedly human, Helen's thinking indicates the dissolution of the nature/human binary. Caroline's identification of an action that is shared by all living organisms and is reliant on a nonliving element (oxygen) does the same thing. It brings humans into line with other elements of non-human nature. Characterizing nature as breathing dissolves the borders between humans and non-human organisms and demonstrates the interconnected of life with its environs

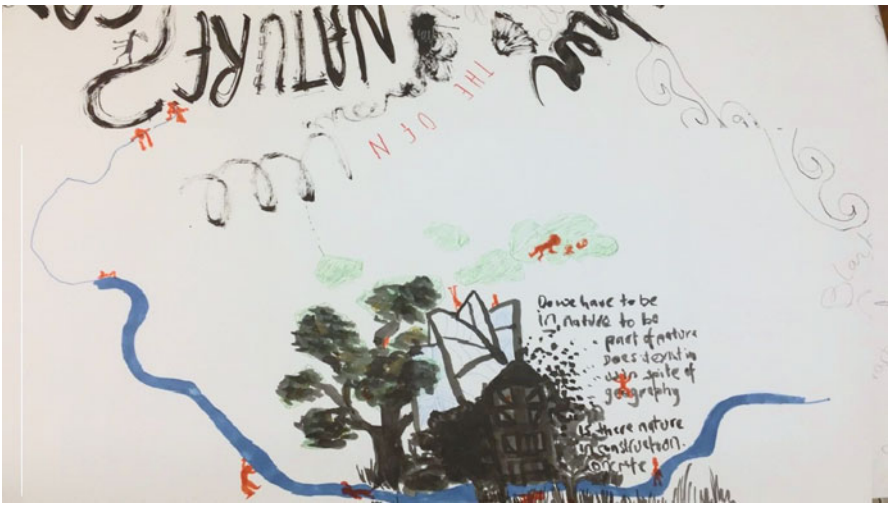

Fig. 3 Children present everywhere and from every perspective in nature. By Susanne Jasilek

through replicated activity (breathing) and sharing resources (oxygen and carbon dioxide).

. . . Also Human-Made

In our focus group, we had been talking about the fact that the objects chosen were natural and we were thinking about what that might mean, whether that meant that there are boundaries on this concept. Susanne says: "I can't see the beginning or end of nature, really. So for me I don't know how to put a boundary on it." She goes on to describe some of her work on the Artscapers project. She takes children on a walk with a small collection bag and asks them to imagine that this is the first time they have encountered nature, what things would they collect? "They weren't all natural things, they had some bricks and things. [. . .] I suppose it is whatever is on a site, the objects on some site become part of nature really, man-made (sic) things too." Again this quote shows how these artists incorporate their experience with children into the way they conceptualize nature. But the comment elicits similar anecdotes from the other artists about their work and how found objects on sites are nature, whether they are man-made or not. Sally says: "that reminds me of the rubbish dump we worked on [. . .] it became a wild nature reserve [. . .] and the rubbish was still bubbling up to the surface [. . .] a really encrusted, like burnt out bit of metal that a young child picked up, and it is in the same quality as picking up a leaf, and she said: 'look, a burnt witches house!' They did not make the distinction between nature and. . .." Here again we see that not only does Sally understand nature to be present in the metal rusting, but she comments on the fact that the children think

the same and more. For her, what is remarkable is that the children will not distinguish between leaf nature or rusty-metal nature, letting either inspire "wild imaginings."

At this point in the conversation, Deb interjects with her experience of carefully choosing sites with the CCI director which will work for the children and not going for sites that are "too manicured" or as Sally puts it: "too landscaped" but rather "have qualities of being slightly unkempt, definitely wild." "So that sense of coming into a wild world that is also there to be made something of by the children." This site-choosing process is clearly very important to the pedagogy of this organization and their sense of grounding their work with children in a place. It speaks to the notion of place-responsive pedagogy mentioned earlier. In the focus group discussion, it leads to some disputation of place-responsiveness by CCI artists which we will return to later in our discussion.

. . . Without End or Beginning

Moving beyond the artists' articulations about sites and material objects as a way of understanding their thinking about nature, Elena expresses the difficulty of "defining where nature ends and what is non-nature anyway?"

. . . Disruptive

"It's such a broad title, nature, it could just go in every direction," says Sally. And yet there are some boundaries here in our data. There is a propensity toward natural objects and wilder spaces and their disruptive, arrhythmic, unplanned potential. Nature is about fluidity and openness, but it is also about the world out there; we are a part of that, but the (very human) systematization of activity and the allocation of time are not. Nature is what provides opportunities that disrupt the ordered, routinized daily living. This aspect of CCI pedagogy has the potential to encourage creative thinking and resilience through its encouragement of taking a different perspective on daily encounters with time and space. It also contradicts somewhat the idea that humans are entirely a part of nature. In identifying how adults aim to control disruptive elements in both children and nature, we are challenged to think about whether adulthood and childhood are equally constitutive of nature, as the childhoodnature concept would suggest.

To illustrate this point, here is what Sally had to say: "I am now thinking about the library garden, which was a very cultivated space, but still because being outside, so it's like an active space, a leaf might drop on a child's paper while they're drawing, which wouldn't happen in the classroom, or the wind. . . There's something about that, okay, it's not an unkempt space, it was a very constructed space, the library garden, and yet it still lent itself to the wild imaginings of young children." As Helen says: "nature provides opportunities that disrupt and challenge that [sense of the constructed, the domesticated]."

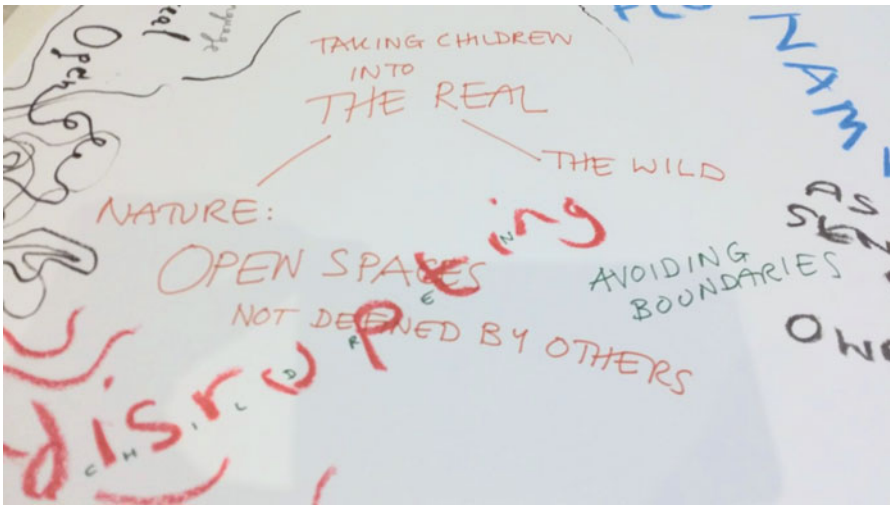

Fig. 4 Helen Stratford illustrates nature and children as disruptive, open, and real

Continuing this trend toward disruption (a word which Helen has used in her stream of consciousness doodling, see Fig. 4), Helen says:

> "I think it's about finding those open spaces and perhaps that's what nature is, within a CCI sort of context it's open spaces where children can be inspired and they're not defined by other people." Sally elaborates: "I wonder if there's something about the sense of an open space, whether it's the playground or whether it's beyond or whether it's inside in this interior world of our mind, it's kind of like the studio space, like Reggio Emilia sets up, how do we find ways of offering that for children? I'm just thinking about a few days ago [. . .] I was going to [School Z], and one of the children drew one of the playground areas because they were showing me around their playground and they drew the blank space, they called it the blank space, and it was this in a way constructed outdoor landscaped space for play, but the drawing was described as the blank space and I thought that was so beautiful. And someone else said 'The not really. . .the nothing really there circle, there's nothing really there', and then I thought 'Wow, that's amazing,' and then another child filled it immediately with a knight and a dragon."

This quote identifies the Reggio Emilia influence in these artists' work. Reggio Emilia is an approach to early childhood pedagogy that developed in the region of Italy called Reggio Emilia and was championed by Loris Malaguzzi (Miller & Pound, 2011). All of the CCI artists we spoke to had been exposed to this approach, either directly or indirectly, and it is important to be aware of this as it colors much of what they do. The notion of an emergent curriculum that Deb talks about is a particularly cogent example of the way that these artists' work appropriates the Reggio style.

. . . Your Imaginings

Returning to the way in which these excerpts exemplify nature, what they show is a conceptualization that is not completely all encompassing but is also not limited to things that are not human-made; rather it is about a sense of being uncontrollable, somewhat intractable, and unpredictable. It is also about the imagined, as Deb says: ". . .if nature is what's on the ground and it's the things that are growing right in front of you in the natural world, how much of what we see when we look at [nature] is determined by what we imagine about it as well and what we've read, stories that are there in my head, or built, or illustrations or whatever." Here we see that these artists are not only talking about nature as being something that opens out the imagination but that nature is also that which we, as humans, bring to it from our previous experiences. Nature is also our imaginings and this is depicted in Fig. 5 by Debbie.

Place Is. . .

While nature has some boundaries for this group of artistic women, place has very few (Fig. 6). This does not mean that place is unimportant; on the contrary, it is central to the way these artists work. Their pedagogy emerges out of their sense of emplacement and responsiveness to the way a place presents itself, both in and of itself but also how children react to it; from the very careful selection of a place described by Deb earlier to the fact that sometimes place is the reason for engaging the artists. Debbie (an artist working primarily with willow) describes a project where the local fire brigade asked them to come and work with the community that used a particular outdoor space where

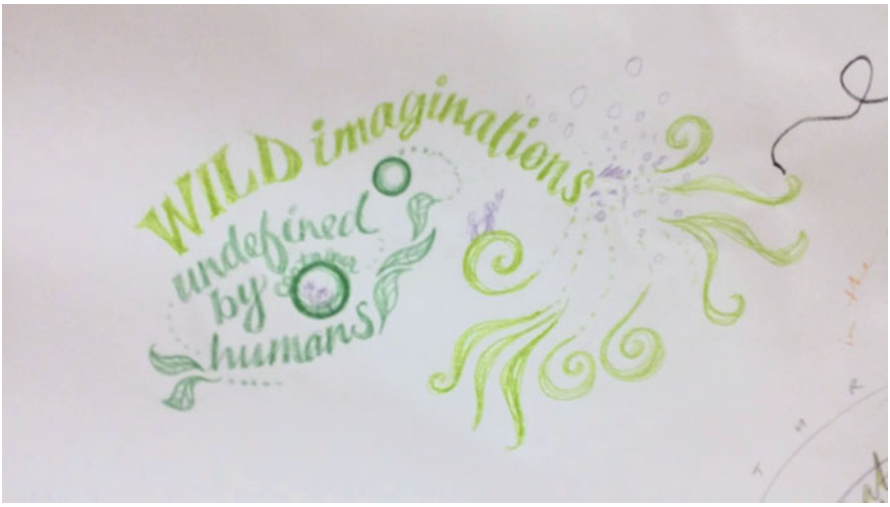

Fig. 5 Nature is wild imagining by Debbie Hall

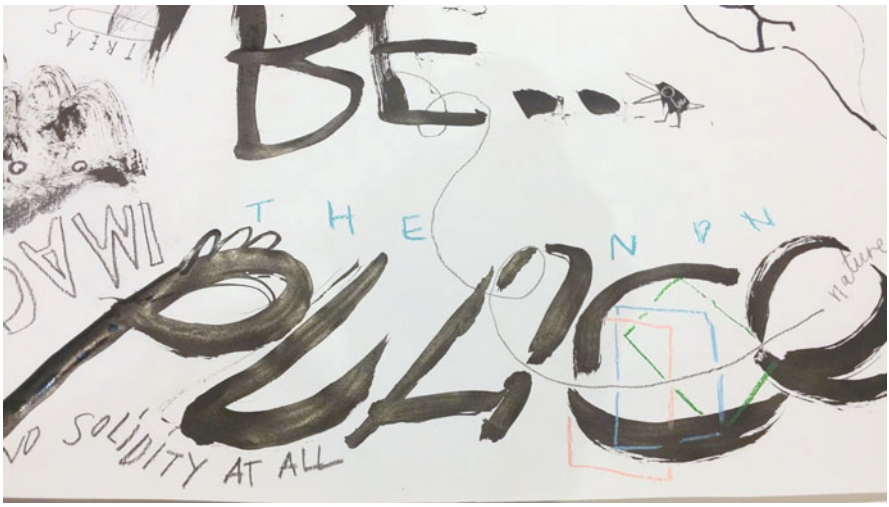

Fig. 6 Place has no solidity at all by Elena Arevalo Melville

there were repeated cases of arson and destructive behavior: "a huge adventure playground [. . .] which, though in a large green space, was in an urban, [somewhat neglected] environment, and part of the project was to actually see if we're sort of re-naturing it a bit with the willow and giving them a bit of ownership of the playground by creating their own stuff there, did that make a difference to how they treated it?"

. . .Owned and Created

This quote brings out ownership and place-making as significant elements of CCI practice. Both of these ideas are harmonious with participatory theories of learning identified earlier. Making place is an important aspect of the work of Keith Basso (1996) who discusses its role in constructing history using the imagination, through localized narratives repeated through the generations. He describes place-making as a "universal tool of the historical imagination" (p. 5). Place-making as it arises here is highly reminiscent of how Fettes and Judson (2010) outline imaginative place-making. They suggest that conscious efforts by pedagogues to involve the imagination in place-making has the potential to increase significantly the strength of attachment to place, which, they argue, can increase environmental concern and positively impact on environmental behavior. These CCI artist pedagogues value imagination very highly and identify the power that children have to engage it effortlessly, and they actively encourage this through their work with children. In this regard, Caroline says: "[. . .] children define place, they have a 'power' – in inverted commas – to actually create a place. From my experience of working with children in nature I always was amazed to see how they could enter nature, enter any space and just make it their own and create place in that way."

Deb and Elena add to these articulations about place-making in the following exchange, which both emphasizes the role of the imagination but also identifies how selective a process place-making is:

> Deb: "[These] narrative ways of making a place your own, or defining a place or saying what does a place mean to them, and especially with the maps that's what I've really enjoyed, that Elena has been able to pick up these different languages of landmarks, maps that represent routes that are actually there but also things which come and go depending on what scale you're looking or what stories you've made in the classroom, that kind of thing."
> Elena: "Yes, because there are many layers to place. So a place exists in a physical sense and then in a cultural sense and each person brings to it also their imagination. The maps that I created are just really mediocre snapshots of the projects, because there's so much that has to be left out to be readable. [But} we are always selective on how we see space and place. And of course children are selective as well and they also bring their culture and their imagination and so putting all that together in a single image is always incomplete."

. . . Also Imaginary

This excerpt brings to mind Ardoin's (2006) research whose work on drawing together place research from different disciplines identifies four dimensions in defining place: the sociocultural, the biophysical, the political economic, and the psychological. While Ardoin's definition of the dimensions of place is useful and encompassing, and her way of modeling these dimensions to show how they overlap is highly significant, there is something about it that deconstructs the concept too much for the context described here. Our experience of working with these artists exemplifies a tendency toward entanglement that does not lend itself to deconstruction, rather it emphasizes the need to keep all of these dimensions in play at once in a dialectical, relational manner. Moreover, while the sociocultural dimension of Ardoin's model attempts to capture the role of the imaginary, it is somewhat inadequate as it does not capture the active process by which nature captures the imagination, simultaneously reforming both nature and the imagination. In fact, our data suggest a further dimension to Ardoin's model, which would be called the imaginary. This is something that Fettes and Judson (2010) also write about, although they talk about imagination more broadly and include emotional engagement, active cognition, and a sense of possibility in exploring imagination as a dimension of place.

. . .Time

Another element of place that is significant for these artists is time. As Elena puts it: "place is just completely connected to time and to perspective. I mean you can never go back anywhere, because every time you go back somewhere you've experienced it already, it's loaded with memories, so in a way it's not a constant, so every place is rediscovered in a way, even if you've been to it many times." Besides identifying time interwoven into the conceptualization of place, this quote speaks to the notion

Fig. 7 Caroline Wendling incorporates time and space in her image of place

of entanglement in place as it is described by authors such as Malone (2015) and Clarke and McPhie (2016). For instance, Clarke and MacPhie's work developing Deleuze and Gautarri's posthumanist perspective on place elucidates place as continuously being recreated through novel and changing relational constituents. These artists are articulating that idea here (Fig. 7).

About the significance of time in creating a place Sally says: "I think it's a kind of critical sense of interrupting the rhythm that maybe is happening in a lot of educational settings. So that's something that we try to bring in, [. . .] that sense of offering a different rhythm, so to really inhabit somewhere, to then build on that relationship or engagement with inhabiting, embodying a space" and Helen says: "I do it with fluid space as well. Finding an open space is often through opening out time, I think even in those very defined structures of the school where time is controlled down to the last minute, I think saying 'Well actually you can spend as long as you need'" and Sally adds: "Even if you've got an hour, it's how can you bend time." Helen explains: "[. . .] through detail, really detailed looking at something as well, saying 'I'll give you these tools or this possibility and you can just take your time to really look in detail at a space that you might think you know.'"

Throughout these discussions, what keeps emerging is the notion of disrupting and defamiliarizing, and these quotes show how time, as an element of place, is used as a pedagogical tool to disrupt daily rhythms and create new places, owned by the children in a way that cannot be constructed by adult interventions. In encouraging children to play with time in this way, these artists are giving opportunities for the children to be creative and to harness their capacity for playful engagement with familiar spaces and objects.

These musings on time in our discussion elicit the following reflections from Susanne:

> [. . .] place has no solidity at all, [. . .] I used to go in like a classroom and then I would say 'Oh, I want you to find the tiniest details and go and draw them', and straightaway your room is totally transformed. [. . .] the place just expands and you don't even have to move virtually out of a classroom, and you can do that outside as well, so the whole concept of place is totally un-rigid and fluid, [. . .] and it's just like a sort of. . .it's not even a jelly, it's like a sort of magical air or something, in some ways. It's us, it's our minds, the children's minds, they do that, they expand it, they change its shape, they change the smell, they change everything about it just by being with the right prompts or encouragements. You don't have to say very much, they'll just get a sentence and they're off.

This quote exemplifies the role that these artists give to the children's imaginations in determining place. It also demonstrates the kind of place-responsive pedagogy that they both use but also create. So they employ responsiveness to a place by using its affordances such as found items (the rusted metal or the leaf) and a nearby beach as inspiration but also by encouraging children to respond to their own familiar spaces, by "the sense of how you are in our space in a different way, even in your regular space. [. . .] Just a tiny little thing like [. . .] lying down, it's incredible, it's quite powerful" or by "drawing the tiniest details' that make a place expand."

Debbie talks about how she uses willow in a very practical way to make children slow down and to bend time. Again here we see how these artists' pedagogical practices emerge at the intersections of their understandings of place and childhood.

> [. . .] if the school says we want living willow but we want a tunnel [. . .] I will usually try and persuade them that they'd really like a dome. Not only is it stronger. . .but with tunnels, when [children] see it, they just run straight through it. It doesn't really offer anything other than that, but a dome provides somewhere they can sit, they can chat, they can. . .I think really they take more time in looking what it is, because they sit down and really be in it and kind of like spot ladybirds on the leaves, and they use their imagination – then it can be whatever they want it to be.

Pedagogy Is About Holding Open Spaces for Exploration

Deb talks about herself and her colleagues as pedagogues: "We're making space, we're holding a space open, but that is quite an active way of standing back, it's not just passively following where the children go." Here the notion of place-making outlined by Fettes and Judson (2010) is once again pertinent.

So these active approaches of prompting and encouraging children are born out of a sense that, when given space children, as Helen says: "[have] that freedom. They're not preoccupied about what they think other people think it should be" and Sally says: "[. . .] children seem to fluidly get back or get into that state very, very quickly, very readily, so the naming of things is more fluid for them maybe." Caroline says: "They have still a power to dream and imagine and they do that extremely well."

Here we see that these artists conceive of childhood as a state where preconceived notions of what things are, matter less. Childhood is characterized by slippage into realms of fantasy and imaginary, and the fantastical and the actual are not nearly so clearly delineated. Alongside this, they see that nature offers means of encouraging that slippage, a means of defamiliarizing a place and disrupting every accounted for minute.

Sally says: "that's a kind of trope that we have to learn to do all the time as adults; to reintroduce the sense of de-familiarising familiar, and it's something I think as artists we all are very practised at doing, but it's still a challenge isn't it? Then children seem to fluidly get back or get into that state very, very quickly, very readily." It is clear that, for Sally, art is about defamiliarization and her perception is that children are very good at doing that (Fig. 2).

In some sense, we might then think about the kind of pedagogy here as one of place-making through artistic practice. These artist pedagogues provide space for children's artistic practices in the form of place-making, inspired by nature. They open up the sense of possibility (as identified by Fettes & Judson, 2010) that is inherent in nature for children who, as these artist pedagogues well know, will gleefully and playfully make real. Of course, this work has a feedback effect on the art that these women create with some of them seeing their pedagogy as integral to their art and others taking a different view on this. However, this is something which we will explore in a different publication.

To some extent our data exemplify the way that a child-led, child-centered pedagogy of the kind practiced by individual CCI artists that emerges from the tandem or proximal manner of thinking about children and nature (a childhoodnature epistemology) elicits opportunities for problem-solving, creative thinking, and adaptability, in line with the focus of this section of this Handbook. While our data do not directly exemplify critical thinking and resilience, it is possible to extrapolate that improved problem-solving and greater adaptability are likely to increase a child's resilience and capacity for critical thought. These attributes are important capacities in times of accelerating change and have been shown to be significant outcomes of place-responsive pedagogical approaches. This research is particularly useful for showing how tandem thinking about children and nature can draw out and emphasize the role of imagination in place-making. We think the work of CCI has the potential to extrapolate this strand of the childhoodnature assemblage, and Fettes and Judson's (2010) imaginative place-making supplies a useful theoretical touchstone which might be considered in this context. Our findings suggest that their work has the potential to contribute to the notion of a childhoodnature assemblage where it intersects with pedagogies of place.

However, what we think is particularly valuable arising from this research with CCI is the role of the philosophical approach that these artists take to conceptualizing nature and childhood. To return to the metaphor of the orange, the fluid, adaptable, open conceptualization, and appreciation of these two connected but sometimes separate subjects, held proximally, underpins the creative, playful encounters between child-in-place, artist, and opportunity that results in the highly imaginative artistic creations seen on the CCI website and in the companion Chapter. In this

sense, the shared philosophy of this group of CCI artists issues an emplaced pedagogy which corresponds to notions of childhoodnature.

To Disrupt and Familiarize: Some Concluding Comments

We will now conclude by reflecting on what this philosophical approach means for the dialectic of humans as a part of or apart from nature and discussing the usefulness of the childhoodnature concept in the context of CCI as a means of addressing some of these dialectical issues. In this endeavor, we bring Michael Bonnett's (2012) work on the importance of localized emplacement back into consideration. Bonnett reflects on the value of using our very local, embodied relations with particular places as a means for modifying our moral outlook. He discusses the dialectical nature of our relations with place as one of both ecstasis (being able to see our place from a removed position or "apart from") and mutual anticipation (where human and surroundings are constantly mutually responsive to each other or "a part of"), and he concludes that, at the very local level, this has potential positive consequences for improving how we treat our environment. Here we will use a similar notion of a dialectic but at a level of our understanding of our place in nature on the grander, planetary scale.

> Caroline: "I feel that us as civilised humans have made a separation between us and nature, and the way we look at nature and the way we behaved in the past with nature, comparing it, trying to clean it up, trying to make it less scary for us, more accessible. And then at the same time now of course we are desperately trying to preserve what we consider as being nature, but my question is, is it still nature? Is that really nature? All those little pockets or places that we can go on a stroll, on a walk, and they are all perfectly tidy and looked after. But what is nice, and this is where this thing was interesting for me, is that the idea of children, it's that children have still the power – and this is an important word for me, power – and I put that close to nature. They have still a power to dream and imagine and they do that extremely well. So you can take children just outside their classroom and well, in a little puddle, if they see the sky being reflected or anything it will be a very special moment for them. So I'm just sort of trying to think about nature as something we can all be into it at some stage, and be part of it, and physically part of it, and we don't have to think about it as being something else outside of us."

Caroline's response to a question about the meaning of nature pinpoints the struggle between identifying ourselves as apart from or a part of nature but also points to how this artist pedagogue experiences that children are not troubled by this dialectic. Neither are children so concerned to separate what is real and what is imagined; as Sally says, the slippage happens easily into imaginary realms. This power of children to dream and imagine and be inspired by nature identified by these artist pedagogues in whatever form it presents itself brings to mind the work of Gannon (2016) and Taylor (2017). Taylor makes a strong and compelling case for moving away from human stewardship strategies because of the way that they influence our thinking about our relationship to the world. It is very difficult to imagine ourselves as a part of nature as many authors now argue we should (Clarke

& Mcphie, 2016; Fettes & Judson, 2010; Haraway, 2008, 2015; Malone, 2015) if we are somehow seeing ourselves as responsible for saving the planet. In being responsible, we are at once also exceptional and individualistic. In fact, the logical argument would be that we cannot see ourselves as "saviors of the world" at all if we are to understand ourselves as relational, entangled becomings-with, as Taylor (2017) explains with the work of Haraway. However, what our data from artist pedagogues suggest is that we are at once exceptional *and* integral that the nature/culture binary is both a useful heuristic and a troubling dialectic. In the language of "common world pedagogies" used by researchers from the Common Worlds Research Collective, the existentialist state of beings-as-becomings-with does not need to exclude exclusion or ecstasis. In fact, thinking of ourselves both apart from and a part of nature, able to operate in both and move between these seemingly opposed positions may hold the key to Haraway's (2015) call to "make kin." Perhaps in knowing ourselves and others as exceptions, we are better able to make kin with others. So rather than avoiding othering, we can use our undeniable tendency toward othering (Bonnett, 2012) as an heuristic for enabling interspecies understanding and familiarization to make kin or "family-rise."

Perhaps children, nature, and artists (as disruptive influences) have to fall outside of these definitions so that we can learn from them to achieve this process of kin-making? In so saying, the conceptualization of nature and childhood as childhoodnature is both useful in its integrative potential and in how it highlights the historical tradition of human exclusion and our undeniable tendency toward othering. In thinking consciously about our tendency toward thinking about humans as superior, we are encouraged to diminish it, but we are also able to build on our unique potential to positively influence the sustainability of life on Earth. What is more, if we can think of ourselves as having unique potential, we can also think of other species as having those same qualities, at once the same orange but also, as separate segments of the whole orange, uniquely able to affect the flavor of the orange. If we think of each organism as having distinctive qualities that have significant influence on the whole orange, but also that distinctive existence is entirely dependent on their being a part of the whole, owing their existence to being a part of the whole fruit growing on the tree, we can begin to move toward an equitable way of life and eco-justice for all.

What these emplaced pedagogues do at once draws on children as individuals and separate from nature but also on their power to slip between this world of ecstasis, to use Bonnett's term, and the world of integration with nature. The pedagogy that emerges from their emplacement with children in nature is one that both disrupts and familiarizes a that both makes real and imaginary. It is a pedagogy that disturbs rhythms and distorts time by paying careful and close attention to children's curiosities and interests as expressed in places. It is a pedagogy that manages to at once be led by children but also to lead children through exciting and challenging places. In so doing, this pedagogy is one that may enable a journey toward eco-centrism without ever articulating it; simply by being equitable in its approach, this artistic pedagogical practice puts children on this path about which more research from the child's point of view is warranted.

Cross-References

- ▶ Children Becoming Emotionally Attuned to "Nature" Through Diverse Place-Responsive Pedagogies
- ▶ Everyday, Local, Nearby, Healthy Childhoodnature Settings as Sites for Promoting Children's Health and Well-Being
- ▶ Propositions for an Environmental Arts Pedagogy: A/r/tographic Experimentations with Movement and Materiality
- ▶ Uncommon Worlds: Toward an Ecological Aesthetics of Childhood in the Anthropocene

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Nature Experience Areas: Rediscovering the Potential of Nature for Children's Development

66

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Abstract

Natural environments play a key role in childhood development, promoting mental, physical, and social competencies. However, children's presence and movement in open spaces, especially in urban areas, are becoming increasingly limited. This results in decreased opportunities to experience elements within a natural environment. One solution for this situation is to create safe natural environments within the neighborhood which allows children to have daily contact with natural environments and integrating it into their learning. We introduce the concept of nature experience areas, which consists of natural elements such as trees, shrubs, sticks, and few artificial playground elements. Nature experience areas provide open spaces for children to play freely with little or no assistance by adults. It is argued that children can playfully use their body and senses, thus providing a context for hands-on learning. The potential of natural environments for children's play and the effects of nature experience areas on children will be outlined in a brief review. Then the approach and findings from two studies are given: the first involved a quasi-experimental design including structured observations, while the second included in-depth interviews with children. Results show that activities on a conventional playground consist of primarily repetitive movements, compared to nature experience areas where a higher variety of play behavior appears. Favorite places of children within the nature experience area are characterized by a high degree of complexity and provide opportunities to climb and explore the area. The potential of natural experience areas for nature contact and free play is discussed.

Keywords

Nature experience · Child development · Urban nature · Play behavior · Action space

Introduction - The Meaning of Natural Environments in Childhood Development

Children experience their direct physical surroundings in a multisensory way. In this Chapter, we address the meaning of natural environments in the context of childhood development. Natural environments are defined as areas without or little built infrastructure. At first we will provide an overview of literature about the interaction between children and the natural environment. Then we introduce results of two empirical studies focusing on natural experience areas for children.

Recent Trends of Child Interaction with Natural Environments

Childhood conditions have been changing dramatically in the last few years. This affects children growing up in urban areas as well as children growing up in rural areas (Blinkert, 2016). A so-called modern childhood in industrialized countries can be characterized by the following trends.

1. Childhood is increasingly organized. Children are more involved in education and care institutions than they have been in former times, thus having less leisure time available (Bamler, Werner, & Wustmann, 2010). They spend most of their spare time apart from school in institutions or at organized spare time activities. At the same time, a tendency toward all-day schooling increases which leads into the same direction (Raith, 2015). Due to these developments, the opportunities for children to play freely and without supervision decrease substantially.
2. Furthermore, children are more and more influenced by increased media consumption. Often, spare time is spent using digital media such as television, computer, and smartphones (see ► Chap. 40, "The Child-Nature Relationship in Television for Children" by Pettersson). A lot of children have access to the internet at all times (Blinkert, 2016). However, at the same time, children miss physical activity and social interaction with peers.
3. The radius for autonomous actions of children has decreased drastically in the last decades (Blinkert, 2016). Besides the aspects given above, another reason is increased traffic. Traffic density can cause serious accidents, feeding the increased worry of parents for their children's safety.

Due to these developments, some authors are suggesting that children are developing a nature deficit disorder which can have drastic consequences for society nowadays. Louv (2011) argues that children who are not able to experience natural environments – in contrast to built environments – lack a connection to nature and develop a nature deficit disorder, characterized by physical and psychological deficits. This development is rather critical since children need a diverse environment including various affordances or a holistic development. These are especially present in natural environments (Louv, 2011) since natural environments enable continuity and change at the same time. Continuity and change arouse by seasons and weather, meeting the need of children for reliability, safety, orientation, and at the same time curiosity, imagination, and adventure (Gebhard, 2014). Simultaneously, limitations and resistance in natural environments support the development of one's personality and help to become aware of one's own strengths and weaknesses (Renz-Polster & Hüther, 2013). Facing these tendencies of a modern childhood, we should take a closer look at the effects of natural environments on childhood development.

Significance of Natural Environments for Child Development

Numerous studies are stressing the importance of gaining experiences in natural environments – in contrast to built environments – during childhood. Especially in a time with increasing diagnoses such as attention deficit disorders, attention deficit hyperactive disorder, obesity, and cognitive problems, natural environments play an assuasive role (Mustapa, Maliki, & Hamzah, 2015). The exposure to natural environments has a restorative effect (Hartig, Mitchell, de Vries, & Frumkin, 2014), e.g., children with attention deficits are able to concentrate significantly better after being exposed to natural environments than after being exposed to urban environments (Taylor & Kuo, 2009). However, the effect of natural environments is much more general. Restorative effects of natural environments have been shown on different levels (Hartig et al., 2014). Children who are highly exposed to natural environments show significant differences on a physical, mental, and social health level compared to children with less exposure to natural environments (see ▶ Chap. 50, "Everyday, Local, Nearby, Healthy Childhoodnature Settings as Sites for Promoting Children's Health and Well-Being" by Green, Dyment, and Dooris).

Physical Effects of Natural Environments

Children get less sick and develop better motor skills in a forest kindergarten compared to a conventional kindergarten (Grahn, Mårtensson, Lindblad, Nilsson, & Ekman, 1997). Additionally, children are more resistant to illness. They develop better motor skills and present a healthy body weight (Jung, Molitor, & Schilling, 2012), and children's motion intensity is higher in natural environments than in built environments (Wheeler, Cooper, Page, & Jago, 2010). Also, children develop more diverse motion patterns (Fjørtoft, Kristoffersen, & Sageie, 2009).

Mental Effects of Natural Environments

Executive functioning skills, which are obtained by measuring the attention span, are more developed in 7- to 8-year-old children who are exposed to the natural environment (Schutte, Torquati, & Beattie, 2017). Research reveals that children who spend time in natural environments show lower levels of psychological distress (Wells & Evans, 2003). Additionally, children living in a more natural environment show a higher level of self-discipline, measured by power of concentration, impulse control, and delayed gratification (Taylor & Kuo, 2009). They also show higher levels of self-competence, measured by creativity, motivation, self-dependence, power of concentration, and fluency (O'Brien & Murray, 2005).

Social Effects of Natural Environments

Children who spend time in natural environments have been shown to develop better social competencies such as team work, communication, and social behavior (Dyment, 2005).

Considering the effects and thus the importance of contact to natural environments for children, the tendencies of a modern childhood described above are rather alarming. Children who are not able to play freely in natural environments may suffer serious limitations in physical, social, and cognitive development, and deprivation of natural environments may lead to children developing into adults who lack essential social and personal skills (Blinkert & Weaver, 2015).

Significance of Autonomy for Child Development

Another important factor in healthy child development is autonomy. Due to societal changes, action spaces for children – spaces in which children can move freely and without supervision – have begun to disappear. Blinkert distinguishes between autonomous and heteronomous forms of childhood (Blinkert, 2016). An *autonomous childhood* is defined by indicators of independency, namely, when children play outside for long periods of time without supervision and little time in institutions in the afternoon. A *heteronomous childhood* is defined by indicators of little independency, namely, when children play outside rarely without supervision. They are often accompanied by parents and take part in afternoon child care, providing few affordances to experience the natural environment.

The most important condition for a positive autonomous childhood is the quality of the action space of a child (Blinkert, 2016): the time spent outside correlates with quality of children's residential environments. Children living in a high-quality residential environment have a higher potential to access action space autonomously (Blinkert, 2016). Interestingly, when children had the possibility to choose their spare time environment, they preferred a large number of various locations where they were not being controlled or supervised, while they avoided playgrounds which were especially designed for them (Beach, 2003). However, we have to be aware that natural environments are not always positively associated by children, and it might arouse negative effects as well (Malone, 2016). Children name natural environments often as locations where they feel insecure, e.g., because of darkness, loneliness, and fear of crime or threatening interactions with adults (Hallmann, Klöckner, Beisenkamp, & Kuhlmann, 2005).

Thus, natural high-quality action spaces for children have to meet specific requirements in order to increase the willingness of parents to allow their children to play outside. The action space should be characterized by:

1. Safety – while yet accepting that danger can be perceived and handled by children. There is no complete safety.
2. Accessibility of appropriate play locations in the neighborhood without insuperable barriers
3. Possibilities for creation, which describes the practical value of a location
4. Possibilities to interact with each other (Blinkert, 2016).

Especially in large cities, it is often difficult to provide open spaces for children for unsupervised play. The barriers include dense traffic as well as fewer play locations in the neighborhood and parental fear that their children might hurt themselves (see ▶ Chap. 47, ""She's Only Two": Parents and Educators as Gatekeepers of Children's Opportunities for Nature-Based Risky Play" by Laird and McFarland). Still, children need a daily contact with natural environments to encounter other species, risk, and free play (Richard-Elsner, 2016).

Learning Environments and Nature Experience

Most urban centers tend to be denaturalized and dehumanized. For children it is difficult to engage with natural environments in daily life, especially if they are not allowed to move independently. Thus, children's opportunities to develop literacy, risk assessment skills, and resilience are limited (Malone, 2016). There are research approaches which explicitly or implicitly have identified this problem and are addressing the interaction between child and non-human nature, trying to design environments which are supporting imaginative and creative play. These approaches include the development of schoolyards (Raith, 2015; Tsevreni), preschools (see ▶ Chap. 23, "Child-Nature Interaction in a Forest Preschool" by Kahn), and child-friendly urban structures in general (Broberg, Kytta, & Fagerholm, 2013). In Scandinavia, there is a long history of outdoor education. "Utescole" in Denmark is the concept of school taking place outside, growing stronger since 2000. This "outdoor school" is defined by context-based learning, working outside the classroom and a multi-sensual approach to practical and guided activities, including group work (Jordet, 2010). This meets the call for a place-responsive outdoor education (Mannion & Lynch, 2016). Outdoor learning and education opens up space for physical activity such as play and games, communication, teamwork, experiences, curiosity, and imagination. These aspects are the basis for nonformal learning processes. Outdoor learning and education aims to integrate advantages of school inside and outside and merges the need of a holistic development using the affordances of natural environments. As a result, children are enabled to achieve an interaction with natural environments on a daily basis to reduce nature deficit disorders (Louv, 2011; see ▶ Chap.80, "Childhoodnature in Motion: The Ground for Learning" by Eddy and Moradian).

The self-organized autonomous contact of a child with natural elements such as soil, water, and plants has a high importance for healthy physical and psychological development (Gebhard, 2014; Schemel, 2002, 2008). Thus, nature experience areas could substantially contribute toward learning by immediate, multisensory, affective prescientific learning experiences. Some examples for meaningful activities in the natural environments are given in Table 1 (Reidl, Schemel, & Blinkert, 2005).

Nature experiences include a direct, multisensory, affective, and prescientific learning opportunity a child receives through her or his contact to nature (Bögeholz, 1999).

Table 1 Activities and examples for nature experiences

Activity	Natural element: nature experience
Soil activities Walking in mud puddles	Feel soft, wet soil, interaction of soil and water (see, hear, smell, touch)
Water activities Impound water	Experience water on own body Perceive running water
Activities with plants Harvest and eat fruits Cut and carve parts of plants	Perceive with all senses: see, taste, smell, touch, hear Creatively modify plants
Activities with animals Follow and catch animals	Experience the behavior of animals
Overall activities Run, walk	Experience the variety of the terrain

It includes opportunities for the child to have an embodied experience in a living environment (Meske, 2011), which are made by actively perceiving the environment through observation, smelling, tasting, touching, enjoying, researching, grasping, and recognizing (Renz-Polster & Hüther, 2013).

Playing as a Learning Process

As we can see, one important factor of learning is exploration and play. Play enables development and education. It is an innate behavior in humans enabling a variety of different experiences which are valuable throughout life. Playing offers the opportunity to develop competencies such as creativity, social competence, and executive control (Renz-Polster & Hüther, 2013). According to the definition of nature experiences and play, we consider play behavior as a learning resource for children. In order to contribute to this, some countries adopted the children's right to play in their laws according to the UN Convention on the Rights of the Child (e.g., Bundesministerium für Familie, Senioren, & Frauen und Jugend, 2014).

In contrast to purposeful, planned work, play is the purposeless, spontaneous, voluntary action, which is intrinsically motivated, pleasure-oriented, led by imagination and follows specific rules. Depending on the developmental stage a child is in, play behavior shows a different complexity (Hegemann-Fonger, 1994; Oerter & Montada, 1998). The research is based on the following classification of play behavior.

Play behavior	Description	Authors
Psycho-motor play or exercising play	First occurrence in nursing age Surroundings get integrated, e.g., being outside and playing with sand, moving objects and playing in puddles	Hegemann-Fonger (1994)
Exploration	This looks much alike psycho-motor play in nursing age. However, it is a *conscious* exploration of objects. Again, the surrounding environment plays a major role	Bögeholz (1999)

(*continued*)

Play behavior	Description	Authors
Imagination and role-play	It develops from the age of about one and a half years. Familiar situations as fictional scenes get reenacted. Children pretend to do something, e.g., sociodramatic play adopting roles from family life	Hegemann-Fonger (1994)
Construction play	A specific purpose is apparent, thus overlapping with work: there is an aim to build something. Construction play includes handicraft, painting, and reparation Construction and role-play often depend on each other, e.g., the construction is used to illustrate a role scene	Hegemann-Fonger (1994)
Games	Games integrate various play activities, e.g., "pretending," motor skills or competition Games provide specific rules and often have a name	Hegemann-Fonger (1994)
Movement play	Movement play does not follow specific rules. Children have a strong need for movement, which provides the motivation for their own experiences and physical strength development. The movement as such is the aim, e.g., running, jumping, or swinging. Often, it is repetitive. Movement play does not necessarily involve strong active movement of children, e.g., swinging can be played with little physical activity	Hegemann-Fonger (1994)
Communication play	With increasing age of children, communication play becomes more important. It is rather quiet and with limited movement, e.g., watching, listening, talking, and making music	Bauer (2001)

All play activities can provide parts of others, e.g., games often include communication and movement play, and construction play often includes movement and role-play. The classification serves to differentiate the complexity of play by the main aspect addressed in the apparent play behavior. All these play activities need a location where they can take place and affordances to be activated. Besides structured programs such as outdoor school or the design of playgrounds, nature experience areas could serve to activate children to broaden their play behavior.

Nature Experience Areas: A New Concept to Enable Children's Interactions with Natural Environments

While the concepts mentioned above address institutionalized play areas, free accessible areas for children are still rare. Natural experience areas close this gap and focus on free play for children in their neighborhood and can be reached by children aged 6–12 years without supervision of adults. Natural experience areas, which are located close to the living environment, are unstructured and design-free natural open spaces for children to play and

experience natural environments in an autonomous, spontaneous, and unsupervised manner (Schemel, 1998). Thus, natural experience areas might provide a naturally managed area addressing the loss of non-human nature contact of children. They provide hardly any artificial play elements such as slides or swings. Still, their main purpose is recovery for children. Table 2 summarizes the concept of nature experience areas for large cities.

Empirical research on nature experience areas has been conducted in the German-speaking area in particular. Using observations and interviews, previous empirical studies show that children play in larger groups and the age group of children playing together showed a greater variety in a rural natural experience area (Reidl et al., 2005). Also, children's play is more complex and continues for a longer time in the nature experience area compared to a playground and parental supervision was lower (Berglez, 2005). The play behavior included the creative production of things and play elements such as huts or earth dams. Thus, the play behavior included more planning and setting goals (Blinkert, 2005; Reidl et al., 2005). Additionally, children showed an interest for their physical surroundings and animals (Lude, 2001; Meske, 2011). These reported studies took place in small cities, and a generalization to children living in large cities needs to be questioned. We will now introduce an interdisciplinary project, supported by the Federal Agency for Nature Conservation in Germany. In this context, three nature experience areas in Berlin are supervised by ecological, planning, and social research. Here, we question the effects of nature experience areas on children growing up in an urban context. Results are shown from the initial phase of one of these recently initiated urban nature experience areas in 2016, connecting play activities and nature experiences for children who have fewer

Table 2 Characteristics of urban natural experience areas (Stopka & Rank, 2013, adapted to Schemel, 1998)

Use	Primarily recovery
Character	Min. 50% natural, untreated areas, other areas extensively cultivated Natural development of plants (natural succession) Natural attraction (e.g., mound, puddle), no play tools or other infrastructure
Size	0.5 ha with minimal width of 20 m
Maintenance	Extensive care in order to preserve open views in some parts Development of care plan with organizers and users Control of areas in order to avoid hidden safety risks
Location	Integrated into the living environment in the range of 500 m
Target group	Children in the age of 6–12 years
Assistance	Play actions to get to know location and lose a fear of "wild" nature Extracurricular offers, offers for child care institutions Work in public relations Enable unobserved, free play on a daily base
Regulation	Considering safety issues (according to insurance) All activities allowed except for motor sports
Protection by planning	Initiation in given space category without additional protection Initiation of separate greenspace category possible

opportunities to be in natural environments than children in small cities. We are focusing on the following research questions: **How do children growing up in an urban context experience nature experience areas? What kind of play behavior do nature experience areas arouse in children growing up in an urban context?**

Structure of the Reported Methods

In order to address this research question, we decided to opt for a two-stage empirical approach, including a quantitative and a qualitative part (see Fig. 1). In study 1 we conducted observations in order to see how many children were present, analyzing play behaviors in the natural experience area. A conventional playground served as the control area (see section "Study 1: Observational Study on Utilization and Play Behavior in a Metropolitan Nature Experience Area"). Subsequently, in study 2 we carried out media-supported interviews with children, a hands-on research method in order to analyze in detail what kind of activities children are involved in the nature experience areas (see section "Study 2: Media Supported Interviews with Children: A Photo Ramble"). Figure 1 gives an overview about the mixed-method approach.

Study 1: Observational Study on Utilization and Play Behavior in a Metropolitan Nature Experience Area

In Berlin, Germany, a city with roughly 3.5 million inhabitants, a new nature experience area was initiated in June 2016, located in the periphery of the city with a mixed sociodemographic infrastructure. Results from an analysis of data on the experience of the use of this nature experience area will be presented. In order to compare the play behavior of children, we chose a conventional playground in the direct neighborhood as a comparison site. Thus, there were two different research areas – the nature experience area and the conventional playground – where behavior observations took place.

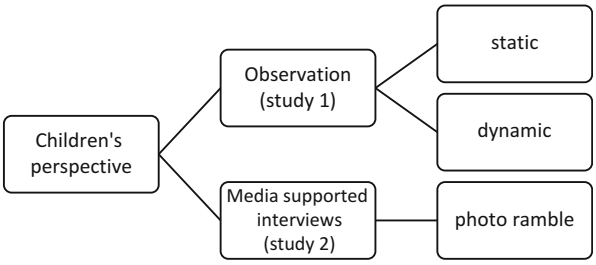

Fig. 1 Structure of the reported methods

Nature Experience Area

The nature experience area is a public space, thus accessible 24 h a day without restrictions. It consists of 0.64 ha of natural vegetation with a high variation between open, partly covered, and covered spaces. The design of the area took place in participation with children from schools and child care institutions in the surrounding neighborhood, starting in December 2015. After visiting and playing in the area, planners asked the children about their ideas and requests concerning the design of the area. Children built models and discussed their implementation. The planners integrated the children's considerations into the design of the area, including work on the space with children. The area was opened for play on June 6, 2016, in an official ceremony. Figures 2, 3, 4, and 5 gives an overview of the nature experience area.

In order to inform neighbors and decrease a possible fear about accidents, a trained child care worker was employed. This employee is in charge of perceiving and removing possible sources of dangers for children and to talk to neighbors, parents, and teachers in order to introduce the concept of a nature experience area.

Playground

As a comparison site apart from the nature experience area, a playground in the direct vicinity was observed. This site was chosen as a comparator since it had the same size and accessibility as the nature experience area. It was located about 100 m away from the nature experience area but served the same neighborhood. The playground has been designed in 2002 and provides play elements in play sand which has a natural appearance due to sandstone elements (see Fig. 6).

Fig. 2 Impression of the nature experience area with entrance area

Fig. 3 Impression of the nature experience area with headge structure

Fig. 4 Impression of the nature experience area with constructed hut

Procedure

Four weeks after the opening, the observation of usage started. A randomized time scheme for the observations was put up to avoid bias due to time, observer, weather, season, and school or holiday season. Fridays were excluded due to special activities conducted on these days before the weekend, thus not being representative for daily

Fig. 5 Impression of the nature experience area with trees

routines (Bauer, 2001). The observations were alternated from 10 a.m. to 4 p.m. and from 2 p.m. to 6 p.m. alternatively in order to include morning activities as well as evening activities in the areas.

The observations were divided into two different procedures: a static and a dynamic observation (see Fig. 1).

- In the static observation, children were counted on various days, differentiated by age and gender. This served the purpose of usage of nature experience areas and playground as a control in general.
- In the dynamic observation, consisting of 1093 time slots, one randomized chosen child was observed in detail for 4 min, including the play behavior according to Hegemann-Fonger (1994).

Observers were trained for 1 day in the given areas, which included obtaining examples for children's play behavior and conducting observation in teams. Results have shown a high consistency between different observers. Two persons were present each day of observation: one person observing the nature experience area, the other person observing the playground. The distribution toward the starting observation area was randomized in order to avoid observers' preference or time effects. After 2 h, they changed locations in order to avoid observation biases due to fatigue. The frequencies of visits in different defined parts of the nature experience area were counted every 15 min. All children were counted, grouped by age and gender, both on the playground and the nature experience area. Additionally, adults were taken into account and served as an indicator for autonomous or heteronomous childhood of the present children.

Fig. 6 Impression of the playground with slide and climbing elements

A pretest of 2 weeks from July 5 to 17 served to evaluate the given sketches of the areas, the measurements, and the research procedure. After analyzing the data and experiences with the procedure, small changes were adopted. The pretest was excluded from subsequent analysis.

The main study took place from August 22 to September 25 on a daily basis which included 2 weeks during school season and 2 weeks during holiday season. Due to low case numbers in the nature experience area, an additional week in September was added.

Sample

The sample of the static observation consisted of all children who were present in the areas when observers were present, either on the playground or the nature experience area. Since the children were not randomly distributed to one of these areas, we worked in a quasi-experimental design, leading to $n = 439$ children in the natural experience area and $n = 2866$ children on the conventional playground for static observations (see Table 3).

Additionally, we had a total of 1093 time slots observing detailed play behavior of children for 4 min in the dynamic observation. Including the additional week of observation in the nature experience area, we had observation data for 380 children in total, consisting of 58 cases in the nature experience area and 322 cases on the playground (see Table 4).

Table 3 Frequencies of children present and no children present in the natural experience area and the conventional playground

Area		Frequency	Percent
Nature experience area	No children present	397	47.5
	Children present	439	52.5
	Total	836	100.0
Playground	No children present	101	3.4
	Children present	2866	96.6
	Total	2967	100.0

Table 4 Gender distribution in the play areas

Area		Frequency	Percent
Nature experience area	Female	25	43.1
	Male	33	56.9
	Total	58	100.0
Playground	Female	167	51.9
	Male	148	46.0
	Missing	7	2.1
	Total	322	100.0

Measures

The observers had a structured protocol to follow and marked how many children were present and what they played, separated by age and gender. Additionally, the observational protocol included weather and temperature in a three-part scale (sunny, cloudy, rain) and the temperature, as well as time, date, school or holiday season, the name of the observer, and the number of children and adults.

Results and Discussion of the Observational Study (Study 1)

In the next sections, results of both parts of the observation study, the static and the dynamic observation, will be provided and discussed.

Static Observation: Number of Children in the Play Areas and their Age

Static observation data show that far more children were visiting the conventional playground than the newly opened nature experience area. In the time span of observations, 78% of the observed children were present on the conventional

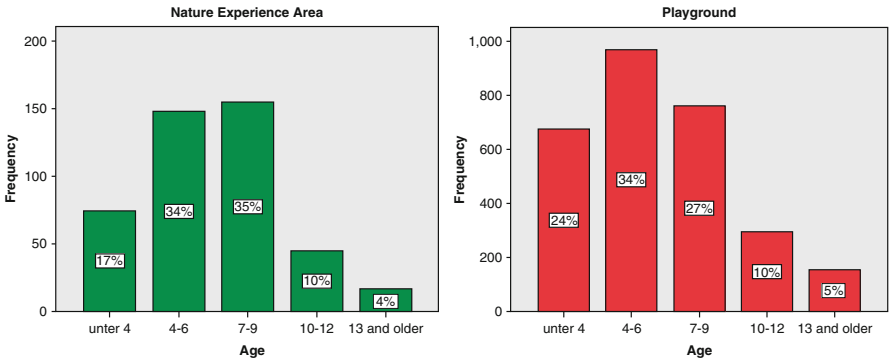

Fig. 7 Frequencies of children present on nature experience area (left, green columns; $N = 439$) and playground (right, red columns; $N = 2865$)

playground. Consistent with this, the times of children present varied between both areas (see Table 3). The nature experience area had more time slots with no children at all (47.5%) than the playground (3.4%).

The age distribution of children in the nature experience area and the playground differs as well. The majority of children (69%) in the natural experience area ranged within an age group of 4–6 and 7–9 years. On the playground, almost one quarter of the children was under 4 years old; most children were between 4 and 6 years old (34%). With 27%, the age group of 7–9 year olds was less represented on the playground than in the nature experience area. Children over 10 years and over 13 years used both areas the least amount of times (see Fig. 7).

A slightly lower percentage of girls (43%) were observed in the nature experience area compared to the playground with 51%. The number of adults supervising children was higher on the playground. The peak of present adults was 26 persons on the playground, while in the nature experience area, in most cases three adults were present, with a peak of 12 persons at the same time.

Discussion of the Utilization of the Play Areas

Results show clearly that a higher number of children were present at the conventional playground than in the nature experience area. This might be due to familiarity since the playground existed for some years already, providing the opportunity to get established for parents to go there with their children or send their children off to play. The nature experience area opened up 6 weeks before the main observation was taken; thus, it is possible that the majority of people from the neighborhood did not know about it yet and therefore have not visited it yet. Furthermore, the nature experience area with dense vegetation might not be inviting for some people due to esthetical considerations (Martens, Gutscher, & Bauer, 2011). Parents might fear their children would hurt themselves in such an area. Watching their children at all times is

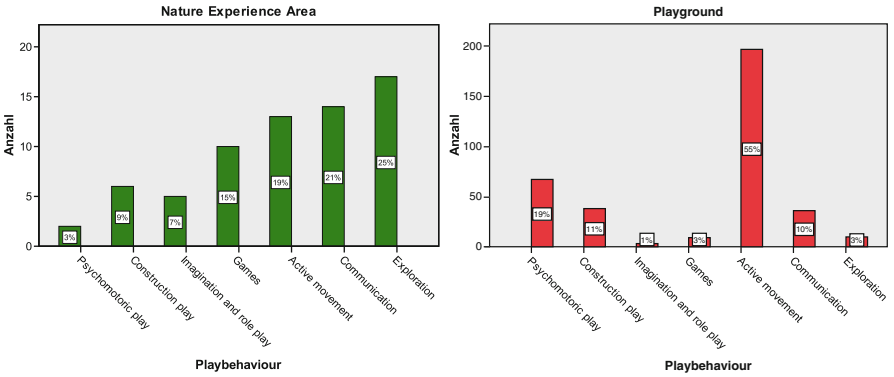

Fig. 8 Play behavior in the nature experience area (left, green columns, $n = 58$) and on the playground (right, red columns, $n = 322$)

not possible in the nature experience area due to the dense vegetation unless parents moved with their children all the time. However, the dense vegetation might be one of the driving factors of children playing freely and learning in the nature experience area. The person employed in order to take care of the area and inform parents and neighbors about the usage of the area could lower this obstacle in the long term. Mostly, children were accompanied by their institutions such as school or preschool on the nature experience area.

The observation data shows that the natural experience area meets the target group of children aged 6–12 years. However, the nature experience area seems to be quite relevant for younger children as well, considering that 17% of the observed children were younger than 4 years old. These children possibly came with an institution, and child care educators have been chosen the area for their play. These groups should be focused in further research, questioning the effects of nature experience areas in early childhood development.

Dynamic Observation: Play Behavior in the Play Areas

Our data show a different pattern of play behavior in the nature experience area and the playground, respectively (Fig. 8).

The comparison between the nature experience and the playground shows some interesting differences: While movement play provides the main play behavior on the playground with 55% of the observations, followed by psycho-motor play with 19%, the play behavior in the nature experience area is more diverse, representing all groups of play behavior to a relevant extent.

The dominant behavior in the nature experience area was exploration (25%), followed by communication (21%), active movement (19%), and games (15%). Activities like construction play (9%), imagination and role-play (7%), and psycho-motor play (3%) are represented less often.

The dominant behavior in the control group on the conventional playground was movement play with 55%. Psycho-motor play was observed in 19% of the cases, while other play behaviors appear in less than 12% of the observed cases (see Fig. 8).

Discussion of Play Behavior in Play Areas

Not taking into account the different group sizes between nature experience area and playground, we analyzed the percentages of play behavior in each area in order to show the relative distribution. Overall, the play behavior in the nature experience area shows a much broader variety, ranging from simple and repetitive movement play to complex imagination and role-play. The dominance of movement play on the playground does not necessarily indicate more physical activity, because more complex play behaviors include movement as well, e.g., creating a hut, which is considered to be construction play, includes running around looking for movable material, carrying it, and moving back to the initial construction site. This can be physically just as challenging as swinging for a longer time. The play classification we used does not aim to make any suggestions to the amount of movement in play but to differentiate the complexity (Hegemann-Fonger, 1994).

The apparent play behavior is more complex in natural areas, consistent with earlier studies carried out in a more rural context (Reidl et al., 2005). We assume that the natural environment stimulates the children with the variety of bushes, trees, and shrubs and thus provides affordances to play (Jansson & Mårtensson, 2012). The playground provides affordances to play as well, but often it is a single function arousing specific play behavior, e.g., the slide to slide, the sandbox to play with sand, and the swing to swing. The natural environment offers opportunities without a given obvious function, e.g., the tree can be used to climb on, to hide behind or as a part of a hut. It challenges the children to develop their own ideas and functions of the elements and thus could stimulate a broader variety of play behavior. Another aspect present in the natural experience area is movable material, such as sticks. Movable material can be put into different locations and be used in a multifunctional way, again supporting a more complex play behavior (Maxwell, Mitchell, & Evans, 2008). Our analysis suggests that the variety of play behavior is an effect of the given environment: a natural environment provides continuity on the one hand, e.g., by a slow growing and changing process, and change on the other hand, e.g., by the different appearance due to season or weather, at the same time. These antipodal trends apparent in the natural environment meet the need of children for routine and excitement at the same time, thus supporting their cognitive development (Gebhard, 2014).

Since children's play in the nature experience area is more complex, they are likely to have diverse experiences, such as social interaction, psycho-motor perceptions, and the exploration of natural elements; it provides a basis for more complex learning processes (Edelmann, 1996). Exploration was the dominant play behavior in the nature experience area, shown in 25% of the observed cases. This is especially interesting in comparison with the conventional playground: exploration

does not play a significant role on the playground representing 3% of the play behavior only. On the playground, movement play such as sliding, swinging, and running is the dominant play behavior which is often repetitive. The cognitive stimulation is higher in more complex play behaviors such as exploration. Exploration of the surrounding environment includes a prescientific experience and understanding (Bögeholz, 1999). Opportunities for various play behaviors enable complex learning in children (Lau, Nerger, & Schreiber, 1997) which could be increased by the implementation of nature experience areas.

One aspect that needs to be further analyzed is the age distribution. Younger children tend to play in less complex ways. Psycho-motor play appears at the age of 4–6 years especially, which was the second most frequent age group on the playground.

Our results suggest that natural experience areas have a stronger affordance character to show different and complex play behavior, while the playground has a strong affordance to show the predetermined play behavior such as sliding or swinging. Thus, it seems nature experience areas stimulate a greater variety of different play behaviors. This may be due to the possibilities of active involvement by modifying the environment themselves, e.g., by creating huts, breaking sticks, or designing pathways. This result is consistent with research on the positive effect of movable objects in outdoor play areas (Maxwell et al., 2008; Moore, 2014) and the importance of space for learning is apparent in general (see ► Chap.7, "Outlining an Education Without Nature and Object-Oriented Learning" by Bengtsson). Results of study 2 will pick up these considerations in detail.

Study 2: Media-Supported Interviews with Children: A Photo Ramble

In order to give a deeper insight into the play behavior in the nature experience area, an explorative procedure questioned the children's view of the area and play opportunities. This served to explore the specific behavior in nature experience areas, which had not yet been analyzed in detail. Due to this focus and the explorative aim, no control group was implemented (Kuckartz, 2012). We were interested in what places children preferred, which ones were avoided, and what kind of activities children were involved in the natural experience area, thus using a playful method (see ► Chaps.17, "Unplanning Research with a Curious Practice Methodology: Emergence of Childrenforest in the Context of Finland" by Vladimirova & Rautio and ► 39, "Embodied Childhoodnature Experiences Through Sensory Tours" by Green). Media-supported interviews serve to address children in a playful, understandable way and place-responsive way (Bauer, 2001; Lynch & Mannion, 2016). The natural experience area was the same as described above (Figs. 2, 3, 4, and 5); the conventional playground was excluded for this study. The interviews took place during early autumn; thus, there were ripe blackberries next to the stinging-nettles and trees full of ripe large and small plums.

During summer break 2016, we contacted organizers of school holiday activities in the neighborhood, supported by the pedagogical staff of the nature experience area. The elementary school holiday institutions were located in the radius of at most 3 km from the nature experience area. From August 15 to August 22, 2016, we conducted 20 media-supported interviews with elementary school children, aged 6–12 years.

Children were informed and offered to take part in the media-supported interview called "photo ramble." Children carried an informed consent letter to be read and signed by their parents. When the children arrived at the area with their holiday institution, they handed in the informed consent sheet. Children took part voluntarily. Some children decided not to take part in order to just play in the area. Children who took part were given an easy to use camera. The researcher explained how to use the camera. The child took a picture of the feet from child and researcher as a first picture to indicate the beginning and to test the usage of the camera. Then, the child was instructed to take five photographs in total, with the following aims:

1. A favorite place
2. A place to be avoided
3. A place to be alone
4. A place to be with others
5. An object that is particularly fascinating to the child

The child received a little flag to put up at each photo to indicate the location in question. As a reminder, the five different photo aims were written on the backside of the flag. Then one child at a time strolled through the nature experience area and took five pictures. No time limit was given.

After taking the pictures, the child came back to the indicated location where a researcher waited. The pictures were put onto an 11-inches-screen in order to present the photos to child and researcher. The interview took the photos one-by-one as prompts (see photo-elicitation, e.g., Briggs, Stedman, & Krasny, 2014). The interview consisted out of five blocks of open questions according to the selected and photographed locations. The first question was "Why did you pick this location as your favourite place?" (place to be with other children, to be alone, respectively), followed by "What do you do there?". Further questions were developed in case an answer was not detailed enough for research reasons. Additionally, we asked for age, gender, and independent activities in a daily context of the children, e.g., the way they get to school (accompanied or by themselves), spare time activities, and distance to the nature experience area. After the interview, we thanked each child for their expertise and handed out a certificate of participation.

The interviews were recorded, and a transcript was written. The interview text was analyzed by content analysis (Mayring, 2003). The first step, the coding, was done very close to the interview material. In the second step of analysis, the codes got reduced, reaching ten categories. These categories were then, in the third step, generalized into four head categories, which aimed to analyze the research question how children perceive nature experience areas.

Results and Discussion of the Interviews (Study 2)

Twelve girls and eight boys at the age of 7–12 years took part. More than half of them (11 children) were accompanied by one of their parents to school, while 9 children went by themselves or were accompanied by siblings. The walking distance to the nature experience area was estimated by most children to more than 20 min from home. Only six children reported a walkable distance of 10 min.

The coding system (see Table 5) derived into a categorization of the whole interview material on the perception of urban children perceiving the nature experience areas. The four head categories adventure and creativity, retreat, instrumental use, and threat, which are shown to be meaningful to the children, will now be reported and illustrated by anchor examples (Mayring, 2003). The anchor examples were translated by the authors from German into English. Results are discussed directly after each head category.

Natural Environment as Location for Adventure and Creativity

The nature experience area was described as a location for playing, climbing, and creating in particular. Adventure was a major aspect children mentioned. Children enjoyed free play and role-play: "In this area, I play with my female friends and pretend to be pirates – or police women" (D1, girl, 10 years old).

Physical activity is an important factor mentioned by the children: "We can run and create uproar. I have to find (my friend) all the time since he is hiding from me. And then I run after him and run through the whole area" (D10, boy 10 years old).

Places to be alone stimulated needs and different play behavior, including role-play: "Here, I can play nicely alone. I'm a dancer and dance... and nobody can disturb me" (D1, girl, 10 years old). Favorite places often had a variety of climbing opportunities: "I like to climb. And this was the location, where you can climb trees" (D7, girl, 9 years old).

Table 5 Categories and head categories of nature experiences

Category	Head category
Possibility to climb	Nature as location for adventure and creativity
Possibility to create	
Possibility to observe	
Possibility to hide/shelter	Nature as retreat location
Esthetics	
Quietness	
Possibility for nutrition	Instrumental use of nature
Darkness	Nature as threatening location
Derangement	
Painful experiences	

Another important activity reported is creating. Building something played an important role for fascination and identification: "This is my favourite place, because I have built it with my friends (. . .) We found a tree. We put sticks onto it, and a hole appeared. And then we could sit in there. (. . .) I built it together with my friends and we had a lot of fun looking for the sticks" (M7, boy, 9 years old).

An important aspect which was reported by several quotes is the explorative character of the area. Children reported observing and thus discovering things as a fun activity, either observing natural phenomena such as animals or other children in play: "(We) look if somebody attacks us in our play, or we look for animals or something else" (M1, boy, 9 years old).

Possibilities to climb and adapt the area were mentioned to be very important. Children enjoyed climbing trees, including the perception of dangerous action as well as the appreciation of a challenging task. These results confirm earlier studies (Reidl et al., 2005) and open up a more detailed picture. The adventure and creativity aspect reflects the explorative nature experience dimension facing the examination of animals and plants (Bögeholz, 1999). Consistent with previous results on the design of play areas, it needs to be considered that children enjoy natural elements, which they are able to utilize in new ways (Maxwell et al., 2008). This is possible to a stronger degree in the natural experience area and might be an explanation for the higher variety of play behavior that we reported in study 1. The learning aspect is assumed to be stronger due to this category, because the possibility to hide plays an important role for children and their learning processes (Renz-Polster & Hüther, 2013). The creative leeway was wider in the nature experience area as results show here, indicating that we need to move away from telling children how things should be to enabling their climbing and creating needs instead. Hiding places, hand-made or given by designed structure, enhance the adventure-orientated dimension of natural environments and need to be considered in terms of design. Creative play and design of the area have to be enabled deliberately in order to support childhood development. This is a main difference to conventional playgrounds, which often provide given elements only and few possibilities for children to change the area.

Natural Environments as Retreat Location

Children reported finding quiet places for retreat or creating places like that, such as huts or walls with little possibilities to be observed. They purposefully sought out such places, e.g., when they are angry or had an argument: "There, I'm always alone, for example when someone beat me or I'm not doing well or so on. Then I sit down there. (. . .) I can calm down, (. . .) because usually there is nobody. Because, when I was there, nobody disturbed me" (M9, boy, 12 years old). They purposefully sought out areas with high vegetation in order to find quietness for themselves: "I went into the shrubs very, very deep. And thus, you do not hear any voices" (M7, boy, 9 years old).

They also looked for quiet areas in order to plan and talk to others: "We are there to make plans what to build" (D3, girl, 8 years old). Imagination and role-play were

part of exclusive locations as well: "I have a secret path to this location (...) and nobody can reach it except for me" (D8, boy, 8 years old). Quietness and esthetic pleasure are enjoyed: "Because it's pretty there (...) and sometimes so quiet, too" (D6, girl, 7 years old).

In a very instrumental way, children expect specific characteristics of the natural area, which they use, e.g., recovery. This is consistent with the recovery-oriented dimension of nature experience including the restorative effects arousing by a stay in a natural environment (Lude, 2001). The data show that dense vegetation structures meet the need for quiet time well. The mention of recovery was probably primed by the research design since the media supported interviews included one question on the location where children liked to be alone. Thus, our results give important additional information about the need of children for quiet areas. Children seeking quietness often perceive the beauty in the natural environment, which is a strong pattern in the esthetical nature experience dimension (Bögeholz, 1999). Planning should include spaces for recovery such as hiding places or areas which are not accessible for adults.

Instrumental Use of Natural Environments

The instrumental dimension of natural environments was apparent especially as it was early autumn and there was an abundance of ripe fruit, which were present during the interview period. Locations with fruit were photographed as favorite places as well as places to be alone: "Because there are so many fruits and you can eat them. (...) small plums and plums. I like to play there or eat (...) the plums I picked" (M1: boy, 9 years old). Collecting fruit was a favorite activity for some children: "There are small plums which I collect and eat. And blackberries" (D9, girl, 9 years old).

A third aspect apparent in our interview data was the instrumental dimension of nature experience, shown by the use of ripe fruit. Our data show the instrumental dimension consistent with earlier research of Bögeholz (1999), including the cultivation of plants and the care for animals. In our case, this dimension was apparent due to the collection and consumption of fruit; children show a fascination to pick and eat fruit. A very intense and positive contact to natural environments was apparent through the consumption of fruit.

Natural Environments as Threatening Location

As we did not limit our perspective on positive effects of natural environments, the interviews asked for avoided locations, too. Children took pictures of negative aspects of the nature experience area. Especially esthetical assessment, such as an untidy appearance, darkness and the lack of climbing opportunities were mentioned. One boy disapproved the change of things he had created earlier, again a sign for identification with the location. "Earlier I liked this (location), there was a

hut, and now it is destroyed, everything, and I dislike it strongly. (. . .) When I came back, everything was broken" (D10, boy 10 years old). "I dislike that it is so narrow and dark" (M2, boy, 7 years old).

Additionally, the children reported threatening and painful experiences. They report a strong sensory-physical perception. "There are thorns and they sting" (M4, girl, 9 years old).

Some children were additionally afraid of getting dirty. "When I run (through the fruits on the ground), my shoes get messed up. And sometimes I fall down, when I run there" (M8, boy, 9 years old).

The threatening dimension of nature experience found in our data is a new aspect, which has not yet been focused in research on nature experience of children (Bögeholz, 1999; Lude, 2001; Reidl et al., 2005). We took it into consideration due to the fact that it was represented in the photo ramble. The threatening nature experience dimension addresses the inconveniences in natural environments, which are perceived by children. These consist of the risk to be hurt as well as esthetical assessment of the area. The threatening dimension addresses an esthetic nature experience dimension (Bögeholz, 1999) but in a negative way. Children cope with it in different ways, such as avoidance or practice. It could provide an important challenge for the children to learn how to deal with new or complicated situations and control them. Thus, it provides an important additional aspect, which could be a key factor for the positive influence of natural environments on children's development.

Limitations of the Research

The studies presented show some potential for the planning and design of children's play areas in an urban context. Nature experience areas were researched regarding their affordances for children and their play and learning behavior.

Study 1 focused on the usage of a nature experience area and a conventional playground as well as a comparison of play behavior. As we used a quasi-experimental design, not randomizing the children to either area, we could not exclude systematic effects here: it might be that a different selection of children visits each area, e.g., very fearful parents prefer the playground, while nature-oriented parents are more open for the nature experience area. These aspects – fearfulness, nature orientation, and environmental literacy, just to name some – might influence the effects of play behavior, too. This could be addressed in further research.

Study 2 with an explorative approach gives a deeper insight into the perspective of the children, showing the importance of complex and creative play in the nature experience area. However, generalizing from these results was not an aim of the research and is not possible. Further research could address the findings and test them for generalization.

The main weak point of this research is the cross-sectional design, allowing innovative results in one point of time only. If we want to make suggestions for planning processes, the studies need to be repeated in a longitudinal design in order to gain results about the development of the site and the development of children's

use of the site. Further work addresses this lack in the context of an interdisciplinary research project.

Conclusion

With an increasing consumption of media and decreasing contact with natural environments for children living in urban areas, the meaning of free play (Skår & Krogh, 2009) and the contact to natural environments (Bögeholz, 1999) are the focus of the two studies about nature experience areas, which were conducted in the metropolis Berlin, Germany. In order to analyze the specific effects of an extensively designed "wild" nature experience area for children, the main research questions addressed the experience of children and their play behavior in nature experience areas. Two studies, using quantitative and qualitative methods, show that playing in natural environments provides important opportunities for children to both play freely and experience natural environments. The results show important nature experience dimensions, which serve the cognitive development of children and influence their attitude toward nature (Bögeholz, 1999).

Nature experience areas in an urban context provide possibilities for contact with natural environments. Thus, they could counteract the recent trends of childhood such as institutionalization and media consumption (Blinkert & Weaver, 2015; see ▶ Chap. 25, "Children in the Anthropocene: How Are They Implicated?" by Malone). However, in order to reach this effect, children need to visit nature experience areas. We compared the usage of a newly initiated nature experience area and a conventional playground and showed that the natural experience area was much less frequently visited. It may be that the new installation needs some support in usage in order to promote the positive effect on children. The improvement of familiarity could well support the visits of children to the natural experience area. Other strategies could be initiated to meet the parents' needs for comfort and child safety. One possibility for this is a design solution: the appearance of a well-tended play area in the front can be inviting also for fearful parents since they can see the purpose and care of the area. Another possibility is a human resource solution: an employed mentor or supervisor of nature experience areas could take care of the area and inform about the potential. This has been the case at the research site and needs to be analyzed in future research over a longer time span. This can reveal whether the usage of nature experience area increases over time due to increasing familiarity or decreasing parental fears. A third solution, again by design, is to create opportunities for parents to sit and socialize. There were not many obvious places to sit down and meet other adults in the nature experience area. More comfortable seating could motivate parents to accompany their children, especially younger ones, into the nature experience areas. Parents' acceptance and willingness to let their children play in nature experience areas is strongly needed and could be supported by opportunities for parents to have a say in further planning of nature experience areas. Still, these need to be designed in a way that the children have the opportunity to play freely and without supervision.

Nature experience areas help to promote a more complex play behavior compared to a conventional playground. This is consistent with earlier studies showing that children develop diverse motion patterns in the natural environments (Fjørtoft et al., 2009). Children show various different play behaviors and thus enable the development of different competencies (Meske, 2011). The nature experience area enables a contact to natural environments for children and complex play behavior, which is very meaningful in their development and learning process (Louv, 2011; Renz-Polster & Hüther, 2013), a nonformal learning process in particular. Both studies show that children find continuity and change at the same time in the nature experience area, a basic need for their cognitive development (Gebhard, 2014). As our data show a broader variety of play behavior in the natural experience area compared to the conventional playground, we show that the learning process is strongly influenced by space itself (Mannion & Lynch, 2016): we assume that children will develop higher creativity and motivation as well as a stronger variety of motion patterns in the long run, thus initiating a more intense learning process (Reidl et al., 2005). Our analysis of interviews on the perspectives of children support these findings, showing creative and complex play behavior in the nature experience area. Also the importance of physical activity for the children becomes apparent in the interviews. Natural environments allow children to engage in independent mobility and thus develop environmental literacy and risk assessment skills (Malone, 2016), and nature experience areas could provide the independent engagement with natural environments (Blinkert, 2016). Our photo-elicitation interviews show that adventure and creativity are important dimensions for the children: they actively adapt and design the areas visited, e.g., by building huts. Such behavior is important for a healthy cognitive development (Oerter & Montada, 1998). Thus, possibilities to climb and to create and design the area should be taken into consideration in the planning process of not only nature experience areas but play areas in general. The interest for physical surroundings was quite apparent in the nature experience area. Affordances in the environment, shown in the reported study by a diverse vegetation and movable material for multifunctional use, can support independent mobility (Broberg et al., 2013). In this context, nature experience areas can play a key role in incidental learning processes in an urban context. The utilization of such areas needs to be carefully looked at as mentioned above over a longer time span in order to promote more regular and established use.

Learning by playing is possible in both of the research areas: a variety of play behaviour was observed in the nature experience area and the playground. However, since the variety of play behavior is much broader in the nature experience area (showing less repetitive movement play and a more diverse and complex play behavior including exploration), the learning effect promoted is stronger. Children engage in a variety of play from simple psycho-motor, construction, imagination, movement and communication play, and exploration behavior. This variety does not appear on the built playground. This result supports earlier studies on nature experience areas in smaller cities (Reidl et al., 2005). Variations of play in the nature experience area arouse more diverse experiences across many levels such as

movement, social interaction, and cognitive challenges, thus supporting the development of different competencies and learning processes. The stronger learning process involved in nature experience areas could be due to the affordance character for children to play and experience their environment (Jansson & Mårtensson, 2012). Qualitative data support the learning process by showing the importance of creative, free, and complex play children reported. Additionally, daily experiences in natural experience areas can contribute toward a better understanding of natural interrelations and to an enhanced environmental awareness (Bögeholz, 1999) and a better subjective importance of nature conservation (Hallmann et al., 2005) (see ▶ Chap. 24, "Childhoodnature and the Anthropocene: An Epoch of "Cenes"". by Cutter-Mackenzie, Krasny, Malony, and Whitehouse).

Our results suggest that nature experience areas should be included into urban planning processes on a regular basis in order to create affordances to enable complex play behavior of children, which are the basis for various learning possibilities. More generally, further design of play areas, traditional playgrounds, as well as nature experience areas needs to consider the positive effect of movable play elements and of play elements which are not predetermined in their function.

Considering the *characteristics of nature experience areas*, our observational and interview data show some interesting results. There is some divergence to the basic concept of the nature experience area according to Schemel (1998). So far, there is no area that remains undeveloped. This was due to the initial design phase, which has been realized with the participation of children in 2016. The derelict brownfield site chosen before the project started is most likely not to be favored by people in an esthetical way (Tenngart Ivarsson & Hagerhall, 2008). Since this subjectively rather unattractive area has been turned into a play area for children, it may take some time for visitors to become familiar with the setting. Signs of setting care effect people positively (Martens et al., 2011) and could lead to an acceptance of the rather wild natural concept for parents and neighbors over a longer time span. For example, could a tended entrance area provide a needed perceived sense that the area is being taken care of, providing a greater acceptance for the more valuable "wilderness" behind?

The size of the nature experience area has been rather small with 0.64 ha. With the use of playing children, the ecological development needs to be focused in longitudinal research: is the area dedicated to play for children sufficient for ecological development in the long run? This should be focused in further research and is part of our interdisciplinary research including ecological development of nature experience areas. Also, safety issues need to be addressed in the maintenance of natural experience areas, especially when trying to promote positive learning effects and autonomous activities in these complex environments. The advantages of nature experience areas in child development shown in the reported studies need to be harnessed into planning processes of an urban child-friendly environment and place-conscious education. Such places need to be created and used for outdoor education in order to enact place-responsive education (Mannion & Lynch, 2016). The value of implementing nature experience areas could possibly simultaneously increase the

opportunities for children to learn in the urban environment while also addressing the need for nature conservation.

Cross-References

- ▶ Childhoodnature and the Anthropocene: An Epoch of "Cenes"
- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Children in the Anthropocene: How Are They Implicated?
- ▶ Embodied Childhoodnature Experiences Through Sensory Tours
- ▶ Outlining an Education Without Nature and Object-Oriented Learning
- ▶ Remembering and Representing the Wonder: Using Arts-Based Reflection to Connect Pre-service Early Childhood Teachers to Significant Childhoodnature Encounters and Their Professional Role
- ▶ Significant Life Experiences That Connect Children with Nature: A Research Review and Applications to a Family Nature Club
- ▶ The Child-Nature Relationship in Television for Children
- ▶ The Influence of Nature on a Child's Development: Connecting the Outcomes of Human Attachment and Place Attachment
- ▶ Unplanning Research with a Curious Practice Methodology: Emergence of Childrenforest in the Context of Finland

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Developing Youth Agency Through Place-Based Education: Challenges and Opportunities

67

Bob Coulter

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Abstract

Place-based education – an approach to learning which engages young people in meaningful investigations taking place in their local community – shows great promise in advancing the concept of childhoodnature. Through sustained and thoughtful engagement with the natural and social worlds of which they are a part, young people can be supported in the development of agency, or the ability to make a difference in the world. This Chapter argues that place-based education projects can best realize this potential by building on culturally and ecologically responsive experiences informed by a fusion of David Greenwood's framing of place consciousness and Steven Fesmire's articulation of ecological and moral imagination. Specific program design recommendations are then made to ensure age-appropriate youth leadership of the work, support continuous development of skills and dispositions, nurture interest and commitment through maintaining

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connection to place, and foster depth of engagement through the enhanced interest that comes about through meaningful participation in the world.

Keywords
Place-based education · Agency · Moral imagination · Ecological imagination

This Chapter takes a critical look at conceptions of agency that are often implicit in descriptions of place-based education, with a goal of developing greater understanding of the challenges and opportunities involved in fostering youth agency. As a curriculum design strategy, place-based education has great potential which emerges directly from its local focus. Owing to the smaller scale and close proximity, students participating in a place-based education project have a better chance to observe and understand what is happening and to have opportunities to effect change. Viewed more broadly, early experiences with meaningful local engagement nurture a lifelong disposition to be an active, committed member of the community (Coulter, 2017). As desirable as these outcomes may be, however, they are not simple to achieve. If place-based education is to realize its potential to connect young people with their community and equip them to be contributing members, we need to be sure we bring our best wisdom to the design and implementation of each project.

In this chapter, I highlight one of the most common limitations found in designs for place-based education: the need for better articulation of the ways in which we support meaningful agency among the participants. Many projects are overly scripted by the adults in charge, which limits opportunities for young people to truly connect with their local space. Imagine, for example, the all too common scenario where a teacher decides on a nature improvement project and gives each student a specific direction to follow, and then everyone goes inside having completed their work. I've actually seen this, where more than 100 students have planted a garden in just over an hour with two students assigned to each plant, which is dropped in the teacher-assigned space. Once all the plants are in the ground, everyone goes back inside; having done what the teacher decided was their part for the environment. While these projects are technically rooted in place, there is not much that motivates student engagement aside from a chance to get out of the classroom. Other more fully developed projects might have a level of shared authority appropriate for the students' age, but as with the first scenario, if that project is not part of a sustained effort to connect young people to their community, it still falls short of what is needed. For example, an isolated ecology or local history unit sandwiched between unrelated studies might engage students for a time, but it has limited potential to foster lasting connections to students' lives. Place-based education works best when it supports the development of effective agency, which in turn requires sustained opportunities to develop skills and dispositions in the context of ongoing engagement with the local community. When we do this, we can be more confident that young people are growing toward responsible citizenship in tune with their social and ecological communities.

As we move forward, I will illuminate these concerns working from the position of a "pracademic," a creative term offered by Badgett (2015) to describe a practicing, publicly engaged academic. I will be drawing on the research literature and my own 30+ years of experience in the field, including 12 years as a classroom teacher leading place-based education programs with students ages 7–12 and more recently as an educator responsible for mentoring teachers in their use of the local community as a learning resource. Even though I have transitioned away from the classroom as my primary responsibility, I continue to have direct contact with preteen students most days of the week. Their work deeply informs the perspectives offered here, as illustrated in a series of short vignettes illustrating key ideas.

What follows is a synthesis of empirical data that has been collected both formally and informally in a variety of contexts, presented in the context of a philosophical reflection on the state of place-based education and its potential to support the growth of agency among participants. My hope is to meet the standard offered by Daniel Dennett for a useful work of philosophy: "A scrupulously reasoned argument that opens our eyes to a new perspective, clarifying what had been murky and ill-understood, and giving us a new way of thinking about topics we thought we already understood" (Dennett, 1999, quoted in Dawkins, 2015, p. 334). Here, the focus is on making an argument for place-based education as an essential curriculum design strategy, bringing attention and clarity to the all-too-often tacit role which youth agency plays in the most successful programs. Lest the philosophical framing of the chapter turn you away, please know that (consistent with being a "pracademic") my focus will be on the practical implications of what we do, rather than on abstract argumentation. Also, to be clear about my own biases as an educator and as a researcher, I am working from a Dewey-inspired, pragmatist point of view. To borrow from Ben Minteer (2009, p. 6), who in turn acknowledges an intellectual debt to Ian Hacking: "pragmatism suggests less the image of the philosopher's armchair than it does the craftsman's [sic] workbench. Ideas, as well as values and moral principles, are not abstractions; they are tools for social experimentation with the goal of bettering the human condition and enhancing our cultural adaptation to the environment." I largely concur with Minteer in this, though I will offer a friendly amendment proposing that our work needs to better more than just the human condition.

I will start building my argument by offering an overview of place-based education as a curricular strategy. With this, I describe key learning benefits, highlighting the ways in which place-based education helps us to address long-standing educational goals such as engaging students' interests and promoting authentic inquiry. The central portion of the chapter develops an analytic frame which allows us to take a close look at the role of agency within place-based education. This section builds on two existing conceptual structures and proposes a synthesis. First, David Greenwood (2013) describes place-conscious learning as a foundational aspect of place-based education. He frames this argument by offering three questions which ground place-based education deeply within the local ecological and cultural space. Following immediately after that, I argue that Steven Fesmire's (2010, 2012) descriptions of ecological and moral imagination give us the tools through which

we can develop well-considered responses to Greenwood's questions. This process of grounding our ecological and moral imaginations deeply in our local space gives us a powerful framing as we consider the role of agency in place-based education. Consistent with overarching principles of childhoodnature, we need to develop a mind-set that works against separating humans from their local environment and, from that basis, continue to develop and refine a set of educational principles to guide our work. To that end, the Chapter closes with reflections on how we might better frame the role of agency within place-based education.

What Is Place-Based Education?

At the outset, we need to be clear on what place-based education offers as a curricular approach. Many teachers I work with at our ecology center have the initial misconception that if it's outdoors, it's in a place, and thus it "counts" as place-based education. While this is minimally true, we need to reach higher. The Place-based Education Evaluation Collaborative (2010) offers a helpful definition when they describe it as an approach to education that "immerses students in local heritage, culture, ecology, landscapes, opportunities, and experiences as a foundation for the study of language arts, mathematics, social studies, and other subjects." When compared with generic "could be anywhere" placeless curriculum, rooting learning in places where students can have recurring firsthand experience offers great potential for educative growth (Place-based Educational Evaluation Collaborative, 2010). First, working directly within the communities and local ecosystems that are close at hand offers real potential – amply supported by research evidence collected by PEEC and others – for young people to be more connected to their work and each other than they would be if their learning were limited to reading text and trade books or using other mediated representations. With this deeper involvement, place-based education enables multifaceted inquiry which transcends traditional curriculum boundaries to encompass historical, ecological, social, and cultural perspectives.

For an example of a more fully articulated project based on ideals of place-based education, consider the work two 11-year-old former students of mine did for their science fair project (Coulter, 2000a). Nathan Strauss and Nate Litz were interested in studying water quality, but they didn't limit themselves to simple "kitchen chemistry" testing of key parameters. Rather, they worked with me to design a project where they field-tested the water at four different locations along the same urban/suburban creek, at roughly monthly intervals from late fall to early spring. By design, they tested the water quality as it coursed from leafy suburbs to more highly urbanized spaces. This spatial perspective offered interesting points of contrast for their data analysis. The geographic spread also helped to bring the boys' attention to one of the many socioeconomic divides in our community – a useful perspective for students in a comparatively privileged private school. I'll have more to say about this project later in the chapter.

To be clear, creating rich local learning spaces is not easy, and it usually requires much more effort on the part of teachers and students than does reliance on

prewritten, heavily sequenced curriculum. If the teachers or group leaders are able to foster age-appropriate engagement in the community in ways that students find meaningful, the value of place-based education as a curricular strategy can be realized. Investigation of local historical or ecological events supports a range of mathematics and language skills including description, measurement, organization, and representation of data, as well as the use of evidence-based reasoning throughout the process as participants work toward understanding. While this same sort of work could be done with artificial data (or even authentic data from distant locations), inquiry that is grounded in the local context makes the work more real for the students and less of a textbook exercise.

Some may counter that focusing on the local risks the students developing a parochial point of view in an increasingly global world, but my experience is just the opposite. A number of projects I have led (or supported others in leading) have been able to cultivate a wider point of view precisely because of the intensive grounding in the local. For example, a project I did with my 9- and 10-year-old students started with intensive field investigations of the woods across the street from our school. The goal at this stage of the project was to help them develop an understanding of our local temperate deciduous forest ecosystem and how the plants and animals they found there are suited for the temperature and precipitation patterns typical in our region. From there, the students investigated a self-chosen distant ecoregion such as the desert or rainforest, exploring how the plant and animal life that flourished there reflected local climatic conditions (Coulter, 2000b). By pairing the local and the distant, students' understanding of key ecological concepts including adaptations, form and function, and survival strategies improved considerably. Comparisons involving what can live where (and why) fostered an awareness of how sensitive plants and animals are to different abiotic conditions – an essential understanding as they wrestle with more complex topics such as climate change. Taken together, this effort built interest as well as a depth of understanding, both of which served as the catalyst for the students' looking further afield in their efforts to understand the world they are a part of. As with the creek project, I will be revisiting this project later in the Chapter to illustrate key ideas.

In conjunction with the academic benefits of place-based education projects, there are opportunities for students to develop and exercise agency, which can lead to personal growth as well as improvements to the ecological and social fabric of the community. As a concept, agency has taken on increasing significance in the sociology of childhood (Mayall, 2002) and childhood studies fields (Qvortrup, 2005). This evolution in stature grows out of an effort to better describe the ways in which young people act capably and with intention to influence their world. The emphasis on agency draws a notable contrast with earlier sociological framings of childhood which largely assumed that passive children could be socialized into being productive future members of their community (Leonard, 2016). As we will see later in the Chapter, recognizing and supporting agency is an important educational goal. Giving young people a voice – metaphorically and literally – sets them on a path toward engagement and responsibility that cannot be traversed if we settle for passive training for some future role as a citizen. The trick here is in finding the

right balance for the intensity and scope of engagement. Consistent with Aristotelian philosophy (Kristjansson, 2015), the virtue is in finding the curricular version of the golden mean – in this case, the spot that is right for a particular group of learners at a particular stage of their development. We need to encourage a level of ambition where students do not settle for a quick "one-off" foray into the community before retreating to the classroom (like the "express garden" installation I referred to earlier). At the same time, we need to ensure that young people do not feel the need to solve the world's environmental problems themselves (Sobel, 1999). Teachers need to find a way to foster a level of sustained engagement which ensures that students come to feel that they are part of larger socioecological systems and that they can make meaningful contributions. Implicit in this mind-set is the need to work with cultural sensitivity and a sufficient level of engagement with community stakeholders to avoid imposing ideas to the detriment either of marginalized cultures and/or the non-human parts of our world.

Before we go too much further in scoping out place-based education, I feel compelled to offer a brief context note. While place-based education may sound very innovative when compared to standard classroom practice, we should remember that what we are discussing here is a time-honored tradition found in most cultures. Perhaps owing to the modern propensity for newness, place-based education has become one of those terms the schooling business has a way of reinventing and turning into something new. (For another modern example, consider the ways in which the maker movement has become trendy, in school and out. Imagine the radical idea that people can make things instead of buying them! Sadly, as we know, making things – like going out into the community to learn – has become so devalued in schools that even perfunctory efforts to do this make it an innovation.) Specific to place-based education, for most of human history young people have learned through their experiences in and around the home and neighborhood. In fact, many traditional cultures still place great emphasis on the highly localized, contextually rich approach to learning that many in Minority western contexts now see as an innovation (see, e.g., Hart, 1997 or Bolin, 2006). Even within a Minority western context, we need to recognize that the approach is hardly new. More than a century ago, John Dewey (1900) raised a concern about the split in more industrialized countries between children and their community, arguing that educators need to find ways to reintegrate the two if education is to achieve its goals. Not surprisingly, the curriculum at Dewey's laboratory school at the University of Chicago had this as a central focus (Tanner, 1997). From there, progressive schools founded on similar goals have continued to flourish as a subculture within the larger educational landscape. All of this is not meant to be critical of place-based education as a learning strategy so much as to point out that what we have before us isn't entirely innovative. Rather, it's a variation on a theme that has maintained a small but persistent thread in the history of education. I will be looping back to this often unacknowledged legacy toward the end of the Chapter when I argue that restoring place within educational designs is our best plan for helping young people remain connected (or perhaps become reintegrated) with nature and society. For now, it's sufficient to note that the very idea that we might need place-based education is a

reflection of the poverty of our collective vision that has allowed schooling and other educational ventures to become detached from the world in which we live.

Be that as it may, it is still worth looking briefly at the emergence of current forms of place-based education. Since others (Smith, 2013) have traced the history of modern place-based education, I will only touch on some of the highlights here as they are relevant for the focus of this Chapter. As a formal approach to curriculum, many consider Gerald Lieberman and Linda Hoody's (1998) report *Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning* to be one of the founding documents of the contemporary place-based education movement. In this report (often known as the "SEER Report" since it was published by the State Education and Environment Roundtable), the authors report on research conducted in schools which used the "environment as an integrating concept" (EIC) as an organizing principle. This term – coined by the Roundtable – makes a careful differentiation from traditional approaches to environmental education. As Lieberman and Hoody (1998, p. 1) argue, "EIC-based learning is not primarily focused on learning about the environment, nor is it limited to developing environmental awareness. It is about using a school's surroundings and community as a framework within which students can construct their own learning, guided by teachers and administrators using proven educational practices." Based on their study of 40 schools in 13 states, Lieberman and Hoody found a number of traditionally defined academic benefits (such as higher standardized test scores) as well as a lower frequency of behavioral issues and higher levels of student engagement. These findings recur in the literature, indicating that – despite some peoples' fears – using place-based educational strategies doesn't detract from test-based accountability efforts, and it can often help.

Building from there, David Sobel, a senior faculty member at Antioch University New England, led what was initially a regional effort in New England to promote place-based education. This grew into the Place-based Educational Evaluation Collaborative (PEEC) which led a joint research and evaluation effort over the course of several years working toward a synthesis of what was known at the time about place-based approaches to learning. Summarizing the findings in a briefing report intended primarily for school administrators and board members, PEEC (2010) found empirical evidence across a wide spectrum of programs that place-based education:

- Helps students learn
- Invites students to become active citizens
- Energizes teachers
- Transforms school culture
- Connects schools and communities
- Encourages students to become environmental stewards.

As these examples illustrate, over the past 20 years place-based education has developed a clear (if not large) presence on the educational landscape in the United States and elsewhere. Perhaps a sign of it "arriving" is the fact that books are now

being produced at a level intended to support classroom teaching practice (Demarest, 2015; Lieberman, 2013), whereas early documents were more theoretical and conceptual pieces.

Reflecting on the movement, there is a lot to appreciate, though one can easily turn a critical eye as well. On the one hand, there is an intuitive appeal. It is hard to get excited about schooling which aims for the opposite of the six research outcomes summarized in the PEEC report. An approach to education that helps students to learn less and become passive citizens led by disempowered teachers is hardly a strategy to get behind, even if that is the de facto outcome of typical neoliberal approaches to education. Still, a couple of clarifying considerations are in order. First among these, as Greenwood (2013) points out, is the fact that there are fundamental mismatches in pedagogic goals between a place-based approach to curriculum and the more corporate-driven, highly standardized approach to education which is the norm in the United States and which has a strong hold in many other Minority western societies (Blossing et al., 2014). Also, there are serious questions about whether classroom teachers locked in a standardized approach to teaching based on a "deliverology" mind-set (Pring, 2013) have the requisite skills, capacities, and pedagogic vision needed to design and carry out complex, locally based investigations (Coulter, 2014). While these facts do not devalue the noble ambitions and good work that has been done in the field, it does suggest rather strongly that a host of obstacles stand in the way of place-based education ever becoming "normal" practice in schools.

A Closer Look at Agency

As an educational concept, the term agency seems to have little presence outside of academic circles, yet the underlying concept is fundamental to the day-to-day life of every classroom, after-school program, or free choice activity. Sociologist Berry Mayall (2002) provides a useful distinction between a person merely taking action and one who is acting as an agent: "A social *actor* does something, perhaps something arising from a subjective wish. The term agent suggests a further dimension: negotiation with others, with the effect that the interaction makes a difference – to a relationship or to a decision, to the workings of a set of social assumptions or constraints" (p. 21). This framing moves us in the right direction as it captures elements of strategic intention and impact rather than just carrying out an activity or acting on an unconsidered or unregulated impulse. In a similar vein, Matthew Crawford (2015) argues that our best thinking and acting do not occur in a world free of constraints. Rather, real creativity emerges through our constructive engagement with the world.

If we apply concepts of agency to a school context, we see that students exercise some degree of agency as they navigate each school day, though the extent to which they are allowed to do this varies quite a bit. In free schools like Summerhill in England (Neill, 1995) or the Sudbury Valley School in the United States (Gray, 2013), young people's opportunities for agency are quite extensive, as they construct

learning opportunities alone or in collaboration with others. Consistent with this open framing, restrictions on their bodily movement are quite minimal. On the other end of the continuum, many students attend regimented "no excuses" schools where behavior is tightly regulated and enforced with harsh consequences (Nathan, 2017). Even in these spaces, however, students find ways to exercise agency within the cracks or as instances of "interstitial agency" (Oswell, 2013). Examples here include students texting each other surreptitiously or creating original games during the limited free time they might enjoy during recess.

As the rest of the chapter unfolds, I will work from a definition of agency consistent with Mayall's framing, where an agent takes actions that are designed and structured to make a difference in the situation at hand. Two important corollaries follow from this: first, agency captures a particular stance reflecting adult-child relationships where there is a high degree of respect and autonomy afforded to the young. With this, there is an assumption that the young actually take up this expectation of agency and make increasingly good use of it as they grow. Both of these corollaries challenge traditional classroom-based models of education where shared authority is rare, as is the assumption among students that they are to take active ownership of their work.

One of the most useful framings of developmental growth toward agency is offered by Roger Hart (1997) in his Ladder of Participation. Encompassing eight rungs, people work up the ladder as they exercise increasing agency:

8. Child-initiated, shared decisions with adults
7. Child-initiated and directed
6. Adult-initiated; shared decisions with children
5. Consulted and informed
4. Assigned but informed
3. Tokenism
2. Decoration
1. Manipulation

I have found it useful in planning programs to discern where a group of students would be placed on Hart's ladder and then provide the scaffolding within the project to support growth toward the next level. So, for example, in working with Nate and Nathan on their water quality project, I had two very self-directed students. They knew I had recently taken a job with the Missouri Botanical Garden focused on using geographic information system (GIS) software to support environmental education. Still, as students who were just approaching their 11th birthdays, they had comparatively limited understanding of what would be possible, which meant that I had to do some groundwork to scope out possibilities for them. From there, they chose to do water testing, and we jointly developed timelines and strategies to make a project they found interesting and which met the requirements of the science fair they would be entering. In terms of Hart's ladder, I'd place it at level 6, where I initiated a good bit of the work, but the boys had substantial involvement in a series of decisions to select and refine the topic selection and procedures. In terms of scaffolded growth,

Nathan went on to complete a largely youth-directed project (Hart's level 7) in middle school as he and a different partner used GIS and an assortment of local historical resources to investigate the ecological impact of the proposed relocation of a sports stadium.

The other project I noted a while ago linking local and distant ecosystems would rank lower on Hart's ladder, due primarily to the lack of experience most students had with taking on self-direction in their work. They were used to highly structured, teacher-led lessons with little student input. Given this, we started the field study in the woods at Hart's level 4 (teacher assigned, students informed), but with a clear agenda on my part to scaffold more involvement as we moved forward toward the comparisons with distant ecoregions. As we jointly developed the project, I had to guide the discussion quite a bit at first, but the format and criteria for the final projects had a good bit of student input. Given this, I would describe the later work in the range of level 5, with much more student consultation on the scope and expectations for the work than we started with.

I will be revisiting Hart's ladder later in the Chapter, but for now, two more items are worth noting. First, Hart argues (correctly in my opinion) that the bottom three rungs are best considered nonparticipation, as there is little value (or virtue) in young people being manipulated into an activity, used as decoration on behalf of a cause or as token actors. Young children holding signs in a political demonstration advocating on behalf of a cause for which they have no understanding would be a good example of nonparticipation. Agency implies a much more intentional and strategic focus, which is captured as young people move up the ladder beyond the nonparticipatory levels. At the higher end of the ladder, notice the apparent juxtaposition in the top two levels. Intuitively, work that is fully youth-directed would seem to be the ideal end point. However, positioning shared adult-youth decision making at a higher level captures an important point. In many ways, it is a more significant achievement for young people to work as equal partners in a cross-generational effort than it is for them simply to have a youth-led project. By taking on the extra challenge of negotiating work across generational boundaries, they are growing toward increasingly responsible citizenship.

Building Connections to Place

If our goal is to connect young people with their local community in ways that build agency, how can we best conceptualize the effort? I find David Greenwood's (2013) framing of place-conscious learning to be an excellent place to start, since the questions he asks enable us to better frame considerations of place-based agency. Drawing on previous work done with Marcia McKenzie (Greenwood & McKenzie, 2009), Greenwood argues that two closely interrelated efforts need to underlie our relationship with place: decolonization and reinhabitation. To that end, he argues (2013, pp. 96–97) that "political decolonization/reinhabitation involves the process of resisting or transforming relationships of domination and control that limit people's possibilities to direct their own life circumstances. Political decolonization/

reinhabitation also implies the space needed to maintain, renew, and create ways of being and knowing that serve the people and places in which they live." With this, he continues by advocating that we pursue opportunities for "(a) maintaining, recovering, or creating ways of knowing and living in relation to place that are threatened or have been lost or silenced, and/or (b) unlearning patterns of thought and action that limit potential for experience and learning in relationship to places" (p. 97).

What I appreciate most about Greenwood's framing is the way in which it provides a structure through which we can bring deeper meaning to our efforts. Decolonization and reinhabitation challenge us to resist control, dominance, and exploitation; instead, we are called to reconnect with the social and ecological community in a more collaborative and respectful engagement. This framing might seem to work against notions of agency if we are being called to turn away from an impulse toward power and influence. Viewed in a different light, however, we do not have to surrender agency as we embed ourselves in our socioecological community in ways that are consistent with childhoodnature. In fact, we can work toward a higher form of agency by moving past control and directing our efforts toward mutual accommodation with the human and nonhuman, living and not-living parts of our surroundings.

Continuing to draw from Greenwood's insights, we can explore three "critical questions" he proposes for place-conscious learning:

- What happened here?
- What is happening here now and in what direction is this place headed?
- What should happen here?

The first of these questions – *What happened here?* – opens us to looking backward. Like many great questions, it can be approached from several directions. It can be answered by reading the landscape surrounding us, as well as through a broad, culturally inclusive reading of human history in the land. In the ecological sense, it challenges us to develop an ability to see what is in front of us in terms of the forces and factors that led up to this point. Common examples here might include observing evidence of bank erosion that has degraded water quality over time or using historical maps and photographs to see how a community has changed. One of the aspects Nate and Nathan found interesting in their creek study was to note the changes over the course of the twentieth century as what was once a heavily wooded riparian corridor was transformed into a concretized channel broken up in places by the creek being totally submerged underground. Historic photographs paired with field investigations made suburbanization very real for the young researchers. If we are to leverage the benefits of being rooted in place, we need students (and the rest of us!) to develop this foundational ability to see nature and communities as processes in flux and to understand that what we are seeing now came to be because of a set of previous natural conditions and social choices. So, we should always have before us the key question: What happened here that got us to this place? It is important to remain cognizant that we are not the only people who have lived on this land. Indigenous communities may or may not still have an immediately noticeable

presence in your community, but the fact remains that our community life today has both continuities and differences with the ways in which others have lived in the same space. This in turn opens the door to considering cultural differences in how people have interacted with the environment to meet their needs. With this, it is good to look for similarities in cultural practices that are driven by factors such as the climate and natural resources within your ecoregion. This effort reinforces the idea that we live *within* and not *above* nature, though modern technology does let us avoid constraints in this regard, at least for a time. All of these strands offer very fertile spaces for inquiry, leading to deeper ways of knowing our place that transcend traditional academic subjects.

The second question – *What is happening here now and in what direction is this place headed?* – challenges students to engage in systems thinking as they look at both the natural and social systems at work. Rather than seeing their local place as a static painting, students need to see themselves within active and ever-changing ecosystems and communities, with components linked by a number of competing and complementary processes. In many ways there is considerable overlap with the previous question, in that both require an ability to "see" the landscape. Here the focus is less on seeing change over time and more on what is happening in the moment. How are animals meeting their needs? Are fluctuations in weather conditions influencing local plant growth? To understand what is happening now, students need to improve continuously their ability to see how multiple factors interact, supporting some processes and limiting others. From here, trying to predict the future requires the ability to see how processes play out over time. I will consider the normative "what if" questions in a moment, but at a simpler level, if the local community is left to itself, what will happen as the core social and ecological processes play out? Systems thinking skills are essential here as students interweave understandings of how cultural, biotic, and abiotic factors interact and how feedback loops can maintain the status quo or create long-term destabilization.

As young people investigate and reflect on current conditions and potential future directions, they should look at the role of humans as an integral part of this process. To guard against seeing ourselves as separate from nature, we need to be very aware of how we draw from the land to meet our needs and how our choices impact the land, both locally and far away. Key questions relate to who is working to be in harmony with the land and how are they doing it? Who is improving the land? (With that, what do we consider an improvement?) Who is making choices that separate us from the land? What motivates these choices? All of these are important considerations at any age, though the degree of sophistication brought to the questions will vary with the students' capabilities. Our task as educators is to foster the kind of experiences that nurture growth over time. Here, Dewey's (1916/1966) description of experience as an interplay of "an active and a passive element peculiarly combined" seems particularly apt, as we foster synthesis emerging from students' direct engagement with the world, coupled with opportunities for both structured and informal reflection on that engagement. Over time, these rich experiences support growth in the sense of an increased ability to learn from future experiences.

The third question – *What should happen here?* – raises interesting moral and ethical questions that have potential to support young people's growth and identity development in ways not often supported in traditional curricula. If students' engagement with the first two questions has anchored them in the full history of the land – the living and non-living, social and ecological, past and present – they will be well equipped to think creatively and critically about future possibilities. As they do this, they will need to be able to draw on an age-appropriate set of skills and perspectives on the land as they consider the future. While the scope of Greenwood's third question is primarily moral, we need to be careful not to lose a grounding in the social and ecological dynamics we hope to see emerge from (or perhaps be maintained in a manner consistent with) the current conditions. Given that both biological and social ecosystems have inherent continuities, there is little value in visioning exercises that happen in a vacuum. They often devolve into fits of wishful thinking, as exemplified by a teacher we worked with who wanted our maple syrup program to be offered in the late spring since warmer days would make for a nicer field trip.

To be effective, moral visioning needs to draw upon the history of what has come before and an understanding of how things got to the place they are today. So, the many (often contested) stories of the land need to be factored in, as does an analytic look at how the interplay of different biotic, abiotic, and social factors contributed to developing the current reality. With that, we also need a healthy dose of humility in recognizing that we do not know everything, and there is much that is beyond our control. Former US Defense Secretary Donald Rumsfeld (US Department of Defense, 2002) inadvertently captured a fundamental conundrum when he made his often-maligned comment about there being knowns, known unknowns, and unknown unknowns. Part of this uncertainty is the inherent, somewhat random variation in the world. Weather patterns fluctuate, and climate change will almost certainly lead to new ecological and social structures. Viewed in a much longer term, species will change. While evolutionary theory offers interpretive frameworks that are quite useful in understanding how we got to this place, there is no way to be certain that what we have is the only possibility or even the most likely one. While it takes place in a fictional setting with parallel worlds, Philip Pullman's *His Dark Materials* trilogy (1996) offers a useful reminder that evolution could lead to quite different outcomes that address the same survival need. In sum, we are better equipped to project future visions if we understand how we arrived where we are, but we need to be fully aware that we always operate with limited information and in a largely probabilistic world where future outcomes are hardly guaranteed.

Fostering Imagination

Moving forward in our analysis of agency, if young people (and the adults in their lives) are going to develop the capacity to engage deeply in a consideration of the past, present, and future of their community, they will need a fusion of what Steven

Fesmire has framed as ecological and moral imagination. Starting with ecological imagination, Fesmire (2010) defines it as:

> An outgrowth of our more general deliberative capacity to perceive, in light of possibilities for thinking and acting, the relationships that constitute any object. Such imagination is of a specifically ecological sort when key metaphors, images, symbols, and the like used in the ecologies shape the mental simulations we use to deliberate—i.e., when these interpretive structures shape what John Dewey calls our 'dramatic rehearsals.' (p. 183)

To clarify the context here, these dramatic rehearsals focus on how we might respond to a situation before us. When we act intentionally (and not impulsively), we choose from among these rehearsals. Continuing, Fesmire argues that ecological imagination lets us "zoom in on things, events, concepts, institutions, and persons without losing sight of their relational context—say, a child in relation to family, a sunrise in relation to the solar system, a statement in relation to its interpersonal, sociocultural, or literary context" (p. 184). Thus, a well-developed ecological imagination can help us to better understand the natural processes and webs of cultural beliefs which help to form the world around us and to appreciate the often-contested interplay of perceptions and beliefs that go with this. All of this holds promise for a more deeply engaging educational space, giving young people a better chance to cultivate over time the imaginative capacity to see the past, present, and future of our places.

While I find the concept of ecological imagination compelling, it is clearly not enough, since by itself it is value-neutral, and thus it could be used for exploitative purposes. Viewing the same issue from a broader vantage point, Dewey (1916/1966) is clear that growth by itself is not sufficient as a goal. One could get very good at being very bad. Imagine, for example, a real estate magnate using a highly developed ecological imagination to understand the processes by which he or she can extract the most revenue from the land. To fully realize the educative potential of place-based education, ecological imagination is needed, but we also need to draw upon (and continue to nurture) the development of a strong *moral* imagination. To do this, Fesmire (2006) lays out a challenging path, calling us to move beyond the somewhat simplistic notion of our values being nothing more than doing what we claim to prefer at the moment. Instead, we need to support students' progress in undertaking the fundamental human quest toward combining what we enjoy doing and what serves the greater good. Many consider such a fusion to be an essential part of living a meaningful and fulfilling life (Baggini and Southwell, 2012). Keeping our focus on place-based education, working to support personal fulfillment without also considering how our choices affect the greater good of the community has a risk of fledging rather narcissistic people.

Alas, the opposite end of the moral values spectrum is equally problematic. An expectation that we can rely on fixed moral commands to tell us what to do is likely to leave us wanting, since by their nature such dictums can be inflexible and thus inappropriate for the situation at hand. Here, Fesmire (2006) argues:

> When we turn to life experiences, we discover that moral decision making at its best has little to do with ready-made rules singling out the right thing to do. Principles are helpful summaries of past moral experiments, but letting them dictate behavior saps our ability to respond intelligently to unique situations that cannot fit prefabricated rules. And all situations are unique: just as you can't put your foot in the same river twice, you can't apply a rule to the same situation twice. Deliberation is more a matter of imaginatively scoping out what would happen if we acted on this or that alternative. In other words, moral rules cannot substitute for moral imagination." (pp. 255–256)

If we are to help young people build a life founded on ecological and cultural sensitivity, we need to do better than relying on their impulsive whims or on imposing fixed moral dictates. Developing moral imagination is complex work, indeed, but it is quite important nonetheless.

Pulling all of this together, Fesmire (2012) argues for the need to develop an "ecologically responsive moral imagination." This becomes imperative, he believes, when we recognize a number of interrelated premises. In making his case, he notes that "there is rarely a single right thing to do," and for that matter, "[w]e can rarely if ever do a single thing" (Fesmire, 2012, p. 215). If we embrace an ecological metaphor, it's hard to disaggregate the many interrelated connections involved. Hence, the options before us are inherently not simple choices. Further, he notes that "we cannot respond to everything that makes a legitimate demand upon us" (p. 216), which necessitates making difficult choices in a complex and perhaps murky environment. With that, we also make choices to leave things undone and perhaps even make choices that we know are ecologically unsound in the moment that we hope have a greater benefit in the long run. Those of us who have ever flown to an environmental conference should appreciate the irony. Navigating this space with a suitable degree of ecological and moral sensitivity requires an imagination that can see and respond to connections. Here Fesmire (2012) offers a vignette from his own life that should resonate with each of us: "To take a simple ecological example, many migratory songbirds I enjoy in summer over a cup of coffee are declining in numbers in part because trees in their winter nesting grounds in Central America are bulldozed to plant coffee plantations. Awareness of this amplifies the meaning of my cup of coffee" (p. 212). I am sure we can each add our own examples.

To recap the role of imagination as it relates to Greenwood's questions: If we are to see the past, the present, and the future of a local place and, with that, if we are to understand the underlying ecological forces and sociopolitical choices that led to current conditions, we need a well-developed imagination. This represents a significant point of departure from instrumental approaches to education that were satirized by Charles Dickens when he created Gradgrind, the school master in *Hard Times*, who wanted only facts: "Facts alone are wanted in life...You can only form the minds of reasoning animals upon Facts; nothing else will ever be of any service to them" (Dickens, 1854/1998, p. 7). Narrow approaches to education were also, of course, criticized in the late nineteenth and early twentieth century by John Dewey when he developed his arguments for a more progressive approach to education. Specific to the role of imagination, Dewey observed that "imagination is as much a normal and integral part of human activity as is muscular movement" (1916/1966,

p. 251). Today, instrumental goals still predominate in neoliberal approaches to education, which favor fidelity to prescribed curriculum paths and which reward assessment results showing an ability to reproduce approved truths on schedule.

By way of contrast, imagination as it is articulated by Fesmire requires a more open-ended approach to thinking which is able simultaneously to apply critical and creative readings to what is known and to fill in the gaps in knowledge where necessary. Phrased differently, to understand place and to exercise agency within it, we need the capacity to engage in a level of integrative thinking and to be comfortable working with Rumsfeld's "known" and "unknown" unknowns. Imagination in this context is a sophisticated, flexible cognitive process, not the fluff version that is often derided by modern-day Gradgrinds. Here Fesmire (2003) draws on Dewey when he remarks that "Dewey cautions against the custom of identifying the imaginative, which is interactively engaged and rooted in problematic conditions, with the imaginary, which is subjective. Neither the imaginative nor the imaginary occurs *ex nihilo*, independent of a bio-cultural matrix, but only the imaginative necessitates courage to engage the present and stretch" (Fesmire, 2003, p. 65).

Toward Effective Agency: Challenges and Opportunities

As the Chapter comes to a close, we are now well positioned for a critical consideration of place-based agency. Many projects, including those shared in this Chapter, illustrate the great potential for learning based in the local community. These individual ventures can be very meaningful in the moment, but we need to be more intentional about sequences of experience if we want to scaffold growth in agency. As noted at the outset, there is little explicit guidance in the place-based education literature concerning how we can structure and sustain youth engagement in ways that build agency. In this closing section I argue that we can best support this growth through long-term commitment and identity development attached to place.

As the broadest level, simply having young people "do something for nature" as part of an ecology unit before moving back inside serves to reinforce human separation from nature. Instead, we need to build from a fusion of Greenwood's articulation of place connection (past, present, and future) and the moral and ecological imagination Fesmire advocates. Deep, imaginative connection to place is the foundation of agency and, arguably, of growth more broadly. If students have a suitable grounding in their local space, they are well equipped to start thinking about next steps, building from a moral and ethical vision of short- and long-term futures. To do this, four design principles are integral to agency-supportive place-based education:

Age-appropriate youth control: Recalling Hart's Ladder of Participation, we need to scaffold ongoing growth toward increasing levels of youth engagement. One might think of this as a continuum from projects which are *assigned* to those that are (youth) *designed*. Implicit in this, of course, is the premise that the intended scope of youth engagement is developmentally grounded to ensure that their efforts are positioned at a level where participants feel competent in the moment and are

supported in their growth. Two simple examples that I have seen include a poster campaign undertaken by students at a local middle school to remind people not to idle their car engines and a second effort done in partnership with local convenience stores to let people buy drink refills with reusable drink containers. While middle school students are not equipped to take on the automotive or soft drink industries, these two efforts are well scaled to sustain youth involvement and serve as building blocks for more ambitious future projects.

Continuous development of skills and dispositions: Too often, we hold back on student involvement and focus on developing skills for some unspecified later use. Whether this is driven by a need to "cover" the curriculum or by a fear that students just do not know enough to make a difference, the lack of authentic engagement endemic to many learning contexts in and out of school reduces motivation to develop needed skills and dispositions. I often find a basketball analogy useful here. If students never play a game, developing skill in making free throws is tedious at best. However, once students have game experience, they can see how the ability to sink free throws is an essential skill, especially when the game is on the line. While truisms can be overused, it might be good to focus on learning what is needed "just in time" and not "just in case" it is ever needed.

Nurturing interest and commitment through connection: Along with providing a context for ongoing skill development, sustained connection to place nurtures interest and commitment. Quick one-off projects such as the "express garden" installation I described earlier, or programs for scouts where a badge can be earned in a day, simply do not have this capacity. Instead, we fall back on vague hopes that something has been sparked for the participants that they will carry forward on their own. While this may happen in some cases, I am skeptical that it is the norm either for over-scheduled suburban youth who are all too quickly on to something else or for the many urban youth we work with who do not have the resources or mentorship to scaffold sustained interest and commitment. Instead, we need to design for this level of connection by fostering sustained involvement with increasing levels of engagement and sophistication.

Fostering depth through enhanced interest: With sustained interest and commitment, participants can achieve a depth that is virtually impossible to achieve with one-off, disconnected projects. If instead we are able to nurture interest through sustained commitment to a project, participants are well positioned to develop both a depth of understanding and an expanded tool kit of skills, both of which are essential to developing agency. If we are to make a difference in the world, we need to see things with a level of detail and complexity that goes beyond headlines or immediate impressions. As we move toward deeper and more nuanced engagement, we come to understand more and want to learn more. It's a virtuous cycle that cannot happen if everything stays at a surface level. Educationally, this depth fosters capacity in reading and writing increasingly complex texts and in effective use of data. These foundational skills are part of most school curricula, but they often wither for lack of authentic use contexts.

Taken together, these four intertwined design principles let us build on the base of connection and imagination. In my experience, this can happen even with young

students, which lets us support place-based work at a level well beyond simple projects like cleaning up litter. For example, my staff and I often partner with local schools to support the development of native plant gardens. While each project has its own features, the ideal baseline is that the students have an age-appropriate say in determining what project they undertake. From there, if they choose to develop a native plant garden, we help them learn in more detail about the ecological benefits of native plants. We also help them to investigate the location where they will be planting. As planning for their garden continues, they learn the specifics of different plant options, including the botanical and ethnobotanical background of each plant. From there, the students design, build, and maintain their garden with our support and the help of their teachers and others in the community.

Projects like this capture (on a school-friendly time and space scale) the potential young people have to envision ways their community could be improved and to act on that impulse in a productive way. Key outcomes in this process include (1) connecting the students to a patch of land which is "theirs," at least for the time they are at the school, (2) giving them a chance to envision alternative uses that are informed by scientific and cultural knowledge, and (3) providing the space for a sustained experience of being better connected to the community. While the ecological benefits of small-scale projects like this may well be negligible, as an educational practice the work has much more potential for lasting impact than would be realized if students simply read about the benefits of native plants. Too often, those latter experiences amount to an implied exhortation that an unnamed *some*one should do *some*thing *some*time. Even though the scale of most place-based projects is small, giving young people a chance to envision the future and act on it has much more potential to build a disposition toward productive agency in the world.

Conclusion

The consistent element in all of this work is seeing ourselves as powerful but not autonomous agents. The legacy of human impact on the land shows an enormous capacity both for destruction and for care. By positioning ourselves within – and not separate from – the nested ecological and social systems we are a part of, we can best realize our place in the world and act as a citizen of the communities we find there. Helping young people grow toward this level of collaborative agency requires care and wisdom that is responsive to their needs and interests. It cannot be scripted or limited to a single curriculum unit. Still, there are paths that can help us get there. Viewing the land and all of its living and non-living elements from the perspectives of the past, present, and future helps to situate us more fully than if we simply go to nature for a service project. As we take on this larger effort and embed ourselves ever more deeply in our local community, we need to work continuously to develop the ecological and moral imagination that allows us to see the world before us and envision what we are called to do. Together, vision and imagination enable us to take on increasing responsibility, equipping us to live as an agent in harmony with the land and each other.

Cross-References

- ▶ Nature Cements the New Learning: Expanding Nature-Based Learning into the K-5 Curriculum
- ▶ Wild Hope: The Transformative Power of Children Engaging with Nature
- ▶ Wild Pedagogies: Six Touchstones for ChildhoodNature Theory and Practice

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Toward a Pedagogy for Nature-Based Play in Early Childhood Educational Settings

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Julia Truscott

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Abstract

Reflecting the growing momentum around childhoodnature, there has been enormous interest in increasing opportunities for young children to experience nature-based play. This has resulted in considerable efforts by early years' settings to naturalize their outdoor play areas, introducing polymorphic natural features,

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such as pebbly creeks, mud pits, and willow arches. Inherent in these efforts is an assumption that children will connect with and become immersed in nature as they play. However, there has been little research exploring *how* young children experience nature through nature-based play, particularly when it occurs within the confines of an early childhood (EC) setting. Further, little is known about what might influence their experiences in this context.

This Chapter draws upon qualitative data from Australian preschool children and their educators to build these areas of knowledge. Informed by sociocultural theory, along with notions of flow, the data indicate that children's experiences of nature and nature-based play in EC settings occur across a continuum, from immersion in nature-based play to nature acting as a backdrop to play. Critical to this section of the Handbook, it is educators' pedagogy that emerges as playing a central role in shaping these experiences. In examining the data, this chapter explores the facets of pedagogy – educators' values, beliefs, and behaviors – that appear to best afford children the opportunity to become *immersed* in their nature-based play.

Keywords
Nature play · Nature-based play · Early childhood pedagogy · Nature pedagogy · Flow

Introduction

The thesis of childhoodnature – that children *are* nature – is perhaps most readily apparent in babies and toddlers who tend to be uninhibited in engaging with nature in an "embodied" manner – they are active, sensory, experiential, and situated in their interactions (Hyun, 2005; Payne, 1997). Over time, a wide range of sociocultural factors – implicit social messages about dirt, transfer of fears or disinterest in the outdoors, and lack of opportunities for extended interaction in naturalized, outdoor environments – can act to socialize children away from nature and its processes (Hyun, 2005; Orr, 1994). The preschool years, when children increasingly grasp social nuance and language, may potentially be one of the key turning points in this process of dissociation from nature, particularly within affluent countries such as Australia.

There is a now established interest in nature-based play within early childhood research and practice worldwide, a trend that has been proliferating in Australia in recent years (Elliott & Chancellor, 2014). This interest responds to concerns that many children in countries such as Australia are being denied of extended outdoor play opportunities at a cost to their health and wellbeing (Bowden, Band, & Gray, 2011; Waller et al., 2017). Through nature-based play, educators seek, sometimes somewhat romantically, to offer children a sense of joy, creativity, and adventure but also to capitalize upon the reputed wellbeing and learning benefits it offers (Waller et al., 2017). These can be fairly anthropocentric (Cutter-Mackenzie, 2010), including learning to negotiate risk and challenge, opportunities for more complex,

imaginary play, advanced motor skills, and the development of social and emotional abilities (Waite, Passy, Gilchrist, Hunt, & Blackwell, 2016), but of particular importance to this Handbook are also desires to foster a deeper connection to the natural world with its intrinsic links to mental and spiritual wellbeing (Waite et al., 2016; Waller et al., 2017).

The nature kindergarten and forest school models of Europe have been a strong influence behind the nature-based play agenda in Australia (Elliott & Chancellor, 2014). These models have offered a nature pedagogy of sorts in that identifiable aspects of the approach remain consistent across settings and countries, with accredited training available in some countries, such as in the UK (Knight, 2009). However, the majority of research has been evaluative, highlighting the benefits rather than critically examining pedagogy in the context of nature-based play. This has created a knowledge gap, which has become particularly apparent as the grassroots nature-based play movement has expanded into other spaces, as well as other cultures (Waller et al., 2017; Warden, 2015). This knowledge gap has only very recently begun to be engaged with, and notions of "nature pedagogy" (Warden, 2015) in early childhood education are still very much in their infancy.

This Chapter reports upon a study that sought, in a broad, open-ended way, to explore children's nature-based play within everyday outdoor green spaces. It draws upon the data from two early childhood settings in NSW, Australia, which had been inspired by the nature-based play movement to re-naturalize their outdoor playgrounds. While the study was exploratory, aiming to examine *how* children experience nature and play within the confines of these familiar settings, educator pedagogy emerged as the strongest and most critical component of the findings and analysis. Correspondingly, the focus in this Chapter is on the interplay between children's *experiences* and educator *pedagogy*, with exploration of the facets of pedagogy that appear to best afford children opportunities to become *immersed* in their nature-based play within the confines of naturalized playgrounds of EC settings.

Early Childhood Pedagogy in Australia

Pedagogy has come to be commonly, albeit somewhat elusively, defined as the art or science of teaching (Alexander, 2008). While it is an expanding concept, it is often narrowly applied in terms of action rather than theory – the professional *practice* of teaching. For the purposes of this Chapter, I take a broader conceptualization, aligning with Alexander's (2008) assertions that pedagogy encompasses a teacher's underlying beliefs and values about their students, about the process of learning, and in this case perhaps about children and nature, *as well as* the ways in which these beliefs and values influence their approach in practice.

In Australia, the Early Years Learning Framework (EYLF) (Department of Education, Employment and Workplace Relations, 2009a) aims to foster shared national beliefs and values among early childhood educators regarding children and the process of learning. The accompanying educators' guide (Department of

Education, Employment and Workplace Relations (DEEWR), 2010) argues that without this, "Educators' individual images, beliefs and values about what children should be and what they should become influence both the planned and unplanned curriculum experiences and learning of children and can lead to wide differences in outcomes for children" (p. 14). The foundational beliefs and values advocated in the guide are as follows:

- Children are capable and competent
- Children actively construct their own learning
- Learning is dynamic, complex, and holistic
- Children have agency – they have capacities and rights to initiate and lead learning and be active participants and decision-makers in matters affecting them (Department of Education, Employment and Workplace Relations, 2010, p. 14).

Clear within these beliefs and values are connections to children's participatory rights, as afforded to them under the United Nations Convention on the Rights of the Child (United Nations, 1989), as well as to sociocultural understandings of learning and development (Rogoff, 2003; Vygotsky, 1978). Given this participatory and sociocultural basis, the EYLF (DEEWR, 2009a) does not include any predefined areas of knowledge that children must learn. Rather, educators are encouraged to foster a collaborative and playful dynamic between themselves, the children, and relevant learning content, based around the daily routines, arising interests, and community context of the EC center. Within this collaborative process, the children's general knowledge, understanding, and skills will expand, but the focus for educators is on intentionally nurturing five key attributes. These attributes, referred to as "outcomes," are positioned as socioculturally relevant to children both in the present and for the future. They include their sense of identity, their sense of connection and capability to contribute to their world, their wellbeing, their confidence and involvement as learners, and their ability to communicate effectively (DEEWR, 2009a).

Despite the above, Australian research conducted just prior to the launch of the EYLF highlighted that sociocultural theory is poorly understood by EC educators (Edwards, 2006), and even when it is understood, making the necessary mindset shifts to fully adopt the beliefs requires considerable time and commitment, particularly for these beliefs to become actualized in pedagogical practice (Edwards, 2007). Further, following the launch of the EYLF, increased research attention surrounding how best to collaborate with children appeared to lead to a "cognitization" of early childhood theory in Australia (Fleer & Peers, 2012). This referred to a preoccupation with how to most effectively expand children's cognitive understandings, rather than focusing on the EYLF outcomes (DEEWR, 2009a), and a resultant shift away from child-led play. This slippage resonates with worldwide concerns about the "schoolification" of early childhood education (Waller et al., 2017). It also echoes findings from practice-focused research in the UK, which identified that many educators struggle to "contribute to, without commandeering"

collaborative interactions with children (Waite, 2011, p. 75), running the risk of diluting children's sense of participation and their subjective sense of the activity as play (Waller, 2007; Waters & Maynard, 2010).

In an effort to redress these issues in Australia, Fleer and Peers (2012) argued that educators have important collaborative roles in children's imaginary play, such as fostering the "collective imagination" by engaging in imaginary conversations with the children (Fleer & Peers, 2012, p. 423). This resonated with the Vygotskian-based "Tools of the Mind" approach in the USA, in which a key role of the early childhood educator is to scaffold purposively increasingly mature play skills, such as assigning a role to open-ended props, taking on and sustaining attributes consistent with a specific character, and adhering to the implicit rules of the established play scenario (Bodrova, 2008). Bodrova (2008) has proposed that in previous generations, when children played more regularly in mixed age groups (often outdoors), this process likely occurred effortlessly, with older siblings or neighborhood children modeling these sorts of play skills.

What is evident then is that collaborating with young children offers the *potential* to bridge dichotomies between play and learning and between cognition and imagination. Further, when practiced well, it can offer added benefits for children, through the intentional modeling of skills and behavior relating to wellbeing, rights, positive relationships, and respect for others and the environment (Waller et al., 2017). Yet, considerable tensions remain around the actualization of effective collaboration in practice.

Pedagogical Values Relating to the Outdoors

Naturalizing the playground of EC settings offers the opportunity to expand opportunities for collaborative play and learning (Blanchet-Cohen & Elliot, 2011; Waters & Maynard, 2010). Naturalized spaces offer scope for new daily or seasonal routines (from managing a worm farm to sweeping fallen leaves). Natural features also provide changing loose materials and interesting affordances to capture children's curiosity (Blanchet-Cohen & Elliot, 2011; Waters & Maynard, 2010), which can stimulate open-ended "joint attention" (Smith, 1999), "sustained shared thinking" (Siraj-Blatchford, 2008), and imaginary play (Waller, 2007). However, competing values regarding children and nature, and about children's outdoor play more generally, create added complexity for educators around collaborating with children outdoors (Ernst & Tornabene, 2012; Mawson, 2014; Waller et al., 2017).

In Australia, the EYLF (DEEWR, 2009a) offers a starting point in considering values and purpose for outdoor play and learning. Nature and the outdoors are not a primary focus in the document, but there is a scope for nature-based play within several of the outcomes, including:

- Outcome 2: Children are connected with and contribute to their world (particularly the sub-outcome, "children become socially responsible and show respect for the environment") (DEEWR, 2009a, p. 29).

- Outcome 4: Children are confident and involved learners (in the sub-outcome entitled, "children resource their own learning through connecting with people, place, technologies and natural and processed materials") (p. 37).

Within these, it is notable that, while there is reference to connection, nature is positioned largely in an anthropocentric way, as an environment to be cared for and a resource to be utilized for learning and play. Further, the dual emphasis on caring for *and* utilizing nature offers little pedagogical guidance in finding a balance between fostering environmental values (and/or preserving natural features in the preschool grounds) and affording rich, exploratory experiences.

In turning to the field of environmental education more broadly, this tension between preservation and exploration has long persisted and is embroiled in issues around the role of adults. On the one hand, adult mentors are positioned as playing important sociocultural roles in validating children's connections to nature as well as more purposively fostering sustainable mindsets (Asah, Bengston, & Westphal, 2012; Chawla, 1999). On the other hand are concerns that children are predominately experiencing outdoor, naturalized environments in supervised, structured, and programmed ways (Kellert, 2002). There is apprehension that this risks a "look, don't touch" approach (Sobel, 2012) that may disconnect children from nature (Hyun, 2005) and even foster feelings of "ecophobia" (Sobel, 1996).

Educational research on outdoor play and learning tends to be fairly consistent in advocating that educators need to be purposeful in modeling interest and enthusiasm for nature and the outdoors, intentional in helping children nurture and maintain their connection to nature, and to consciously challenge themselves as educators with regard to allowing children to experience risk (Sandseter, Little, & Wyver, 2012; Waller, 2011; Waller et al., 2017). Existing educational research indicates that these practices seem to occur most effortlessly in Scandinavian nations, where cultural priority is attached to being connected to nature (Maynard & Waters, 2007; Sandseter et al., 2012). In Australia, connection to country is central to Indigenous cultural heritage and identity, yet like other anglicized countries, nature is not so central to Australian cultural identity at national level (Fargher, 2012). Therefore, like other anglicized nations, educators may lack a sense of purpose toward nature-based play, and hold varying levels of commitment to outdoor play and learning (Maynard & Waters, 2007; Waite, 2010).

Those educators most likely to make intentional use of natural outdoor spaces tend to have a deep personal connection to nature and hold a strong belief that the experiences are important for children's health and wellbeing (Ernst & Tornabene, 2012). However, these intentions can be complicated pedagogically by a sense of romanticism toward outdoor play (Waite, 2007; Waller et al., 2017). Indeed, one of the most consistently identified values among educators toward outdoor play and learning is a desire to offer children a sense of freedom and discovery, and this can leave educators feeling reluctant to seek opportunities to involve themselves in children's play outdoors (Mawson, 2014; Maynard & Waters, 2007; Waite, 2011). Overlaid upon this are practical issues, particularly tensions around risk (see, e.g., Little & Wyver, 2008), which can again lead them to focus on general supervision

rather than seeking opportunities to collaborate outdoors (Blanchet-Cohen & Elliot, 2011; Maynard & Waters, 2007). Given such complexities arise alongside existing tensions around the actualization of collaborative pedagogy in early childhood education in Australia, there has been increasing interest in the notion of "nature pedagogy" (Waller et al., 2017; Wynne & Gorman, 2015).

Nature Pedagogy

Insights into the sorts of beliefs and values that might underlie nature pedagogy can be drawn from existing place-based pedagogies (Wattchow & Brown, 2011) or ecopedagogy (accredited to Paulo Freire but further developed by others, particularly Kahn (2010)). However, in EC education in Australia to date, it has been the nature kindergarten and Forest School models of Europe that appear to have achieved the greatest traction (Elliott & Chancellor, 2014). These offer a pedagogy of sorts in that aspects of the model have remained identifiably consistent even it has spread to different countries and environments (Elliott & Chancellor, 2014; Knight, 2009). Notably, this includes the practice of utilizing a small naturalized area, often within a larger "wild" environment such as a forest, park, or beach, which becomes a familiar "base camp" for activities. In this space, basic boundaries are established, and then emphasis is placed upon child-initiated play and learning, including the facilitation of healthy risk taking. The model tends to promote utilizing the resources nature provides rather than adding toys or additional resources, and as such collaboration tends to occur democratically and spontaneously. Many beneficial outcomes have been identified in evaluations worldwide, including notably the strengthening of relationships between children and educators as well as among children (Elliott & Chancellor, 2014; O'Brien & Murray, 2007). However, beyond Scandinavia, nature kindergarten-style experiences tend to be weekly visits to a nearby forest, park, or beach and as such may be a time when an alternative pedagogy is consciously adopted. Outside of Scandinavia, it is unclear to what extent the pedagogical-type tenets of the nature kindergarten model would be sustained within the more limited confines of everyday early childhood playgrounds.

Recently, influential and entrepreneurial Scottish educator, Claire Warden, has been promoting the need to articulate a natural pedagogy that can cross context, environment, and cultural boundaries (Warden, 2015). In 2016 she founded the International Association of Nature Pedagogy (www.naturepedagogy.com), and her ideas have gathered particular interest in Australia (Wynne & Gorman, 2015). Warden defines nature pedagogy as "the art of teaching and learning *with* nature inside a classroom, outside in nature and then beyond in wilder spaces" (emphasis added) (www.naturepedagogy.com). Her ideas are aligned with notions of childhoodnature, positioning children as part of the earth's natural system. She identifies five environmental and social aspects that shape experiences of outdoor play and learning: topography, space, resources, time, and the adult role (Warden, 2015). Each of these is positioned as a continuum, generating a vivid image of dialing up and down the various aspects. However, despite grassroots momentum,

little research has explored the concept of early childhood nature pedagogy. This chapter seeks to contribute to this emerging area of interest, by reporting on a study that offers nuanced insights into the inherent tensions surrounding the adult role in nature-based play.

Background to the Study

This study was explorative, with an overarching aim to examine how young children experience nature-based play within everyday green spaces. It involved two mainstream Australian early childhood centers, approached for involvement because both were known to have made changes to their playgrounds in an effort to expand opportunities for the children to experience nature-based play. The overarching method for the study was the customizable Mosaic approach (Clark & Moss, 2001), which offered the opportunity to bring together elements of ethnography and the participatory paradigm (Clark & Moss, 2001; Heron & Reason, 1997). Ethnographic-style observation encouraged the formation of interpretive understandings of nature-based play and attention to culture – children's culture, the culture of EC education, sociocultural shifts regarding children, nature and risk, as well as the individual culture of each center. A participatory approach allowed these interpretive understandings to be explored with the participants and for their reflections and meaning-making to contribute further insight. This combined approach was particularly valuable in relation to the concept of nature, a word initially unfamiliar to the children. It also became incredibly fruitful in helping to uncover some of the values and beliefs underlying the observable aspects of the educators' pedagogies.

The study took place in 2013 during a period of considerable reform for EC education and care in Australia. In 2009 a seminal national Early Years Learning Framework (DEEWR, 2009a) (as described above) was introduced, followed by a system of national quality standards (Australian Children's Education and Care Quality Authority, 2011), which includes assessment of outdoor provision. Then, in 2013 all children in their final preschool year (typically aged 4–5 years) were guaranteed access to an EC education and care program for 15 h per week, across 40 weeks of the year, delivered by a degree-level trained educator (DEEWR, 2009b). This could be delivered in a wide range of existing settings, including long daycare centers, dedicated preschools, or in preschools attached to primary schools. This study involved children in their final preschool year (hereafter referred to as "the preschool children") and their educators, at a long daycare center and a community preschool. Given the standardization implied by national reforms, the initial intention of the study was to explore nature-based play in a fluid way across both centers. However an unexpected level of disparity emerged, and as such the two settings came to be examined in a way more akin to two case studies. They are presented largely in this manner throughout this Chapter.

Theoretical Frame

The study was informed by a theoretical frame combining sociocultural theory (Vygotsky, 1978) and the concept of flow (Csikszentmihalyi, 1997). As signaled earlier, sociocultural theory is central to contemporary early childhood theory and practice and foundational to the Australian EYLF (DEEWR, 2009a). The theory stems from the ideas of Vygotsky (1978) who questioned assumptions that competency and ability were determined solely by biological ages or stages. He viewed learning and development as a culturally embedded process, occurring in response to situation and through interaction with others. This dynamic process is understood as being influenced by the child's engagement in their world and the expectations, opportunities, modeling, and requirements they encounter, along with and the nurturing and guidance they receive (Rogoff, 2003; Smith, 2013; Vygotsky, 1978).

As the values laid out in the EYLF (DEEWR, 2009a) indicate, applying sociocultural theory to education requires viewing children as inherently capable – to focus on their *capacity* for competency and to gently scaffold them to extend their abilities progressively, rather than being limited by predetermined ideas about what they can or cannot do (Edwards, 2007). However, dominant societal assumptions and beliefs about children and childhood, such as in relation to safety and protection, or expectations of supervision, may bear influence upon children's opportunities for nature-based play within early childhood settings (Lupton, 1999; Smith, 2013). Therefore, a sociocultural lens drew attention to the dynamic, social, relational, and cultural processes surrounding the nature-based play movement. It encouraged examination of *how* nature-based play was encouraged, facilitated, or otherwise within the socio-relational milieu of each individual center and in particular the social and pedagogical interactions surrounding and integral to this play.

Where sociocultural theory offered insight into the processes surrounding nature-based play, the concept of flow (Csikszentmihalyi, 1997) offered a way to consider the children's lived experiences. *How* did they experience nature-based play – as play or as work, as free or restricted, or as something enjoyable, relaxing, or boring? Csikszentmihalyi (1997) describes the experience of flow as "the state in which individuals are so involved in an activity that nothing else seems to matter" (p. 4). Although flow requires the conscious directing of attention, it is understood as resulting in a relaxation of the brain from full arousal to a focused state of peak efficiency. Therefore, flow is described as "optimal experience." It is linked to happiness, an intrinsic sense of satisfaction and personal growth, with growth occurring both in the skills of the activity and in higher consciousness (Csikszentmihalyi, 1997).

Flow is of particular interest to learning as it taps into students' intrinsic motivation to enhance their skills and to continually repeat this experience of growth. The EYLF makes reference to flow in describing it "as a state of intense, whole-hearted mental activity, characterised by sustained concentration and intrinsic motivation" (DEEWR, 2009a, p. 45). It is suggested that educators can recognize the flow state by children's "facial, vocal and emotional expressions, the energy, attention and care they apply and the creativity and complexity they bring to the situation" (DEEWR, 2009a, p. 45). Notably though, no guidance is offered on how to facilitate these

experiences. Utilizing the concept of flow in this study allowed for exploration not only of the children's experiences but also to consider how educators might balance the delicate task of extending children's learning through collaboration while not destroying the essence of children's self-directed play.

The Early Childhood Settings

The study involved two EC centers situated in similarly demographically diverse, medium-sized towns, in NSW, Australia. The centers were intentionally approached for involvement because both were known to have a keen interest in expanding opportunities for children to experience nature-based play. One was a private long daycare center (referred hereafter as "the daycare"), which operated daily from 8 am to 6 pm all year round and accommodated approximately 80 children between birth and 5 years of age. The daycare grouped children according to age, with each group having their own room indoors. The large outdoor playground was shared, and children between the ages of 2.5–5 years often played outside at the same time. However, only children from the oldest group (aged 4–5 years) and their educators were involved in this study. The second setting was a not-for-profit community preschool (referred hereafter as "the community center"). It operated daily between 8 am and 3:30 pm during school term time and catered to approximately 45 children aged 3–5 years.

The outdoor play space at the daycare was bigger and had greater expanses of grass, but aside from this, the outdoor areas at both settings were comparably naturalized, with mature trees, small bushes, and other vegetation. Both had some landscaping features involving slopes, rocks, and bridges, as well as nature-specific features such as frog hotels (pipe constructions for frogs to hide in). Also, both had areas of patio, large sandpits, cubby houses, and some playground equipment, including swings, which were surrounded by bark rather than artificial softfal surfacing. In addition, the centers had recently added vegetable plots and passionfruit vines. The centers were situated in a subtropical region of Australia inhabited by different species of snakes, including venomous brown and red-bellied black snakes, and many types of spider, including poisonous redbacks, presenting uniquely Australian outdoor risks. At both centers, outdoor playtime tended to be scheduled in the morning from approximately 9 to 10.30 am to comply with sun protection guidelines. At the daycare, another session of outdoor play was sometimes programmed toward the end of the day, although I only observed the morning sessions at both centers.

The Participants

Four educators were involved in the study, two from each setting. These educators worked directly with the preschool children on a daily basis. All of the educators were fairly experienced, although they held a range of qualifications as detailed in Table 1 below. As Table 1 highlights, both centers had already employed degree-qualified educators long before this was mandated by the national reforms.

Table 1 The educators involved in the study

Setting	Educator pseudonym	Job title	Highest relevant qualification	Years of experience at time of study	Length of service at the setting (years)
The daycare	Donna	Room leader (preschool group)	Specialist early childhood degree	16	6
	Danielle	Assistant educator	College-level, workplace-based certificate III in childcare	8	8
The community center	Christina	Center director (and room leader)	Specialist early childhood degree	Unknown	24
	Cath	Room leader	Diploma in early childhood education and care	Unknown	28

Twelve children participated in the study, six from each setting. Eleven of the children were aged 4–5 years and were often some of the oldest at their setting. One child participant at the community center was 3 years old. I aspired to make the research experience enjoyable and playful for the children and invited them to make up their own pseudonyms. I wrote these onto wooden necklaces, like the one I wore when I first attended the center and which the children had admired. We all wore them when we were "doing" our research. At the daycare, the children decided to choose pseudonyms based upon their personal interests. I worked with four boys, Ninja Turtle, Superman, Spiderman, and Surfing, and two girls, Catwoman and the Bead One. At the community center, the children chose to continue the researcher theme and labeled themselves as Dr. and then their first initial. Therefore, at the community center, I worked with Dr. K, Dr. E, Dr. F, Dr. J, Dr. L, and Dr. M. All were girls expect for Dr. F.

Methods

The fieldwork was undertaken several times per week over a 2-month period in late autumn. In line with the customizable Mosaic approach (Clark & Moss, 2001), a range of methods were employed. I began with an initial period of participant observation during which I recorded field notes by hand and interacted with the children mainly following their request or initiation. After 2 weeks of observation, I moved into a more participatory phase with the children and their educators, which involved child-led tours of the playground, child-framed photography, and making collages. These were undertaken in small, child-nominated groups of three and were

undertaken with the aid of a "research assistant," a handmade fictional puppet called Wattle-Pottle. Wattle-Pottle helped to bring a playful feel to the research process and was positioned as being the one with the interest in nature-based play. This additional "persona" afforded the children considerable agency and influence in the research process as indicated further in the section on "Ethics" below.

Toward the end of the fieldwork, I undertook an individual, semi-structured interview with each of the four educators, arranged at a mutually convenient time. Each interview lasted between 30 and 60 min and took a reflective approach to exploring motivations for nature-based play and arising aspects of pedagogy.

The interviews and the participatory activities were digitally recorded via an MP3 player (which I wore on a string around my neck during the more active activities with the children). I transcribed these as soon as possible after each visit, which aided in identifying the voices of the children. The collages were photographed so that the original collages could be left at the centers to share with parents and as a record of the children's work. The field notes were typed up and collated with the photographic material and transcriptions. I took a thematic approach to analyzing this combined data, initially organizing it under overarching headings: childhood, play, learning, nature, and risk (Lofland, Snow, Anderson, & Lofland, 2006). I then used manual coding and memoing to cyclically readjust, collapse, and expand the emergent themes and subthemes (Glaser, 1965).

Ethics

The research was granted ethical approval by the University's Human Ethics Committee (grant number ECN-12-274). In addition, influenced by the ERIC Charter and Guidance (Graham, Powell, Taylor, Anderson, & Fitzgerald, 2013), ethics was approached as an ongoing reflexive endeavor throughout the study. For instance, the settings were recruited for the study through initial contact with the educators. Once they indicated an interest in participating, the directors of the settings were contacted officially to request permission. This aimed to increase the likelihood that the educators would be interested in becoming involved in a participatory way in the study and to reduce the risk that they might feel obliged to participate through workplace hierarchies. Formal informed consent was then sought from each of the individual educators.

The educators were asked for assistance in identifying a diverse range of children based on attendance patterns and likely interest in being involved. They generally suggested the oldest children at the centers, for whom they felt the study would offer a new and different experience. Invitations and consent forms were sent to the children's parents. In addition, in line with contemporary ideas about ethical research involving young children (Ruiz-Casares & Thompson, 2016), a child-friendly information sheet with pictures was enclosed, and parents were asked to discuss it with their child. This information was also reiterated to the children at the beginning of the observation and participatory phases, along with their right to discontinue or

restart their participation should they wish to. The children were also monitored for physical signs of assent or dissent throughout the study (Dockett, Einarsdóttir, & Perry, 2012). Notably, some children choose to briefly stop and restart their involvement during the study, and the youngest child, Dr. M., chose not to participate in the collage-making.

Even in research seeking to be participatory, there can be potentially limiting power hierarchies between the researcher and the children (Graham et al., 2013). The puppet, Wattle-Pottle, acted more powerfully than expected in helping to diffuse some of this. The children used him as a conduit to steer the direction of conversations or activities, to voice concerns, or to indicate dissent. For example, on one occasion Dr. K said, "I think Wattle-Pottle would like to paint now." Conversing through Wattle-Pottle, I was able to clarify that she was suggesting that we all do some painting on the easels on the verandah. This impromptu, child-initiated activity generated some of the richest inter-child dialogue regarding nature and nature-based play.

At the end of the study, summaries of anonymized results were prepared and disseminated to the educators and parents, along with a child-friendly version with pictures suitable to be read aloud to the children. The children were also given their wooden necklaces to take home as a memento of their participation.

Findings from the Study

The study found that the children's experiences of nature-based play could not be uncoupled from the pedagogy of their educators. Accordingly, while this Chapter focuses upon exploring pedagogy, it is necessary to preface this with an overview of the children's experiences. Central to these was the identification of a continuum, from nature providing a backdrop to activities through to the children experiencing "immersion" in nature-based play. Immersion in nature-based play was identified as a twofold experience. It encompassed children's *physical embodiment in nature* (Payne, 1997) – the opportunity to step into the mud, let the rain pour onto their face, hold a lizard in their hand, or experience the risky thrill of climbing a tree. At the same time, it reflected an experience of flow (Csikszentmihalyi, 1997) – children's deep and purposeful *absorption in the activity of play*. Through the links to flow, the experience of being "immersed" in nature-based play can be understood as an "optimal" childhood experience with nature (Csikszentmihalyi, 1997), with potentially important benefits for children's health and wellbeing, their experience of education, connection to nature, and possibly the sustainability of the planet (Bowden et al., 2011; Louv, 2008; Sobel, 1996).

Depending upon the activity they were engaged in, the children's play at each of the study centers could be located at either end of the continuum or somewhere in between, sometimes shifting across the continuum as their play evolved. However, the study children at the community center appeared much more commonly to be "immersed" in nature-based play. This occurred usually through sociodramatic or

creative play based around natural materials, which they often sustained in pairs or small groups for 40 min or more. These observations were reinforced in the conversations with the children and educators who talked extensively and with enthusiasm about this play. By contrast, the study children at the daycare did not often use natural materials or affordances in their play and engaged in much less imaginative or creative play. Instead, they tended to engage in physical play on the equipment (the swings, slides, etc.), in rule-bound games such as "What's the time Mr. Wolf" with the educators, or to walk around chatting to one another. In these activities, the children were rarely, or only fleetingly, observed to be in a flow-like state. Perhaps for this reason, the study children at this center verbally expressed feelings of boredom and frustration several times during the conversations I had with them, emotions that were never mentioned nor identified among the children at the community center.

There is a risk of overgeneralizing the nature-based play experiences of the study children from each center, and it is important to reiterate that the children were not engaged in one form of play experience all of the time. There is also potential to overstate the differences between the centers, although it will be recalled that the initial intention was not to compare the centers – they were chosen for their likely similarity. Indeed, given the similarity in natural affordances and materials in the outdoor areas of the two centers, it was a surprise to find such disparity in the children's nature-based play experiences. This begged further examination and offered an illustrative opportunity to explore the wider influences that might be shaping the children's experiences of nature-based play. Of particular prominence were facets of their educators' pedagogy – varying values, beliefs, and behavior that may have been acting to constrain or enhance the children's opportunities to become immersed in nature-based play. Below, results pertaining to four of these most prominent aspects of pedagogy are presented: values toward nature, parent partnerships, beliefs about children's capabilities, and approach to play and learning.

Values Toward Nature

The educators at both settings described the sustainable practices or wildlife gardening initiatives that were in place at each center, such as small vegetable plots, minibeast habitats, and frog hotels. At the community center, these initiatives had usually been driven by the educators, and tasks such as collecting produce from the gardens, monitoring levels in the water butt, and collecting scraps for the worm farm were particularly well-established within the routines of the center. Both educators at this center described with enthusiasm their personal passion for being in nature, for its beauty and wellbeing benefits, and the importance of preserving the environment for its own sake, as well as for future generations. As such, they appeared to feel deeply connected to nature and to hold the sorts of eco-centric values that resonate with the concept of childhoodnature. It was clear that they felt personally motivated

to foster opportunities for the children at their center to nurture their personal connections with nature.

> Christina: To me it's...the children kicking through the bark and the smell of the bark and...the emotional benefits of being connected with nature that they can take with them through their lives. It's not just the bigger picture [climate change etc.], which is really important, but it's actually something that is important for your emotional wellbeing...that relationship with nature is so important...Well, it is for me, so I suppose I would like that for them as well.

Correspondingly, the educators allowed and actively facilitated the children to have hands-on, full sensory experiences. The children frequently mixed up "potions" in the birdbath using water, petals, bark, and mud. They were allowed to climb low trees and sometimes cut fresh, "springy" branches to play with. There was also a "mud pit" where they could step right into the mud and allow it to ooze through their fingers and toes. As such, at this center, there appeared to be a fairly straight forward link between the educators' personal connections to nature, their values around nature and sustainability, and their rationale for nature-based play.

At the daycare, these connections were a little less clear. It was the owners of the center who had initiated the changes to the grounds, adding circular garden beds, hay bales, shrubbery patches, and a small bridge, as well as introducing the other features such as the vegetable plots. Both of the educators were appreciative of these, and Danielle described the playground as previously being "just blank from one end to the other." However, Danielle did not describe any particular connection to or personal interest in nature, although she did not describe any fears or dislikes either. Donna also did not have a strong personal interest in sustainability, but she did clearly articulate a personal preference for natural spaces:

> Donna: I've worked at a few different centres and [our backyard] always makes me feel better than the fake backyards, like they give me a different feeling. I really feel enclosed by them rather than comfortable...

She also had a fascination with insects, bugs, and spiders, something that was recognized by the children and staff throughout the center. At the same time though, she described that nature could be problematic or aesthetically unappealing, and there was a sense that she liked nature to be managed and under close control: "You just have to kill a few [spiders] and get rid of them." Both her enthusiasm for nature and desire to engage with it in a managed way were further evident in her wish for a professional to add "more adventure" into the playground area and to add natural landscaping features such as "a hill there, and tunnels there." As such, she emerged as having an ambiguous connection to nature, and although she certainly seemed to

value it, this was in a more anthropocentric way. When compared to the educators at the community center, there was much less passion for the messy reality of nature-based play. Indeed, it became apparent that some of the changes to the grounds at the daycare, while ostensibly driven by the nature-based play movement, may have been as much for adult aesthetic appeal as for the children's experiences of nature-based play:

Danielle: I think the circle garden was probably the first thing that they did, because before the garden was there it was just a big mud patch...
Researcher: OK, and so did the kids use to play in that mud?
Danielle: Um, yes and no, but tried to encourage them not to do it because the parents didn't like them getting too dirty, because...as soon as it rained it was just a big slosh pile.

It seemed then that differences in the educators' personal connections and values toward nature were likely contributing to some of the differences in the children's experiences of nature-based play. These values may have been particularly central to educators' commitment to overcome complexities or barriers to nature-based play, such as the weather, dirt, and parental attitudes, as explored further in the following theme.

Parent Partnerships

The interview narratives of the educators also revealed differing levels of parental engagement and rapport between the centers. The educators at the community center described feeling very close to the families who attended their center, often knowing various members of the extended family and sometimes having taught more than one generation. At the daycare, the educators did not feel they knew the children's families so well, something they reflected may have been influenced by the shift work required by long daycare staff, whereby it may not always be the same staff member who is there at drop-off and pickup times. Donna described finding that the same parent could react differently on different days (or to different staff members) to the report that their child had had a small injury or fall. She found this undermined trust in the parent-educator relationship and found it personally quite stressful: "It's like being on a trampoline all the time, you never quite know which way it is going to bounce." To deal with this, she described having to curtail the children in their nature-based play.

Donna: It is never going to be as good as the home environment. . .It's just not really comparable because you do your best, but it is still an environment where you have lots of staff looking after a lot of children who belong to other people. So you do have to reduce the risks as much as possible.

In addition to keeping risk to a minimum, Danielle lamented that parents complained if their children got too dirty or if they learned that their child had been playing outdoors in inclement weather.

Danielle: If it's too cold we're not allowed to take them out, because the parents don't like them being outside if it is cold. Even if it is a sprinkle of rain they have to come in, they're not allowed to stay out in that, because parents don't like them out in the rain.

In contrast, at the community center, Christina mentioned that "parents sometimes check whether the children are allowed to be barefoot as some centres don't allow it," suggesting that, rather than dictating to the educators, the families respected their professional judgment. Indeed, perhaps by virtue of their long-standing, close relationships with the children's families or the educators' personal commitment to nature (as explored earlier), it appeared that the educators at the community center had established themselves as trusted professionals in the context of young children and nature. Consequently, rather than bearing ongoing tensions and worries about parental complaints, there was a sense that the educators had positioned the center as a key site, within the landscape of modern childhood, where the children *could* experience the risks of nature-based play, play out in the rain, and get muddy:

Cath: ...with playing outside, and in the dirt and stuff like the mud pit, sometimes these children go home in quite a state! Anyhow, parents are like, "Oh well, that's what they're here for."

These shared understandings about the experiences on offer at the center seemed to further contribute to relaxed educator-parent relationships, allowing the educators to feel less anxiety about risk or minor accidents. Reflecting upon her long tenure as Center Director, Christina explained, "Generally our community of parents is quite comfortable with what we do. Certainly no one has ever complained that I can think of." It emerged then that the quality of reciprocal trust that the educators were able to build in their relationships with the children's families influenced the nature-based play opportunities they were willing and able to provide for the children.

Beliefs About Children's Capabilities

In addition to the above differences, the educators described varying beliefs about the capabilities of the preschool children in their care. At the daycare, the educators seemed to default to a developmental stage-related conceptualization, largely referring to the children's capabilities in relation to their age. For example, being the oldest group at the center, the children were framed by Danielle as being more

competent than the younger children: "Not so much the young guys, but these guys will know if there is something sharp not to go near it." Along a similar vein, Donna drew attention to the children's limited capabilities in relation to adults: "A child's not going to differentiate [between dangerous and non-dangerous spiders]; I actually find it very hard to differentiate between them."

By comparison, at the community center, when Christina had facilitated the implementation of the EYLF (DEEWR, 2009a), it had resulted in a shift in mindset for Cath in terms of how she understood children and how they learn:

> Cath: It was a big change. . .I just thought, ". . .If we don't have things drawn and they don't learn to cut on a straight line, and then a semi-circle and then a circle, how are they ever going to do it?" And I thought, "Look this is fine. . . we'll start this, but at the end of the year I don't think we're going to have children with skills. . .ready for school." And it probably took a term and I was totally blown away, because I could not believe what they were cutting and what they were doing and it was because it was driven by them. . .I understood then that that was what it was all about, and their skills are amazing and what they can do is absolutely incredible.

Consequently, Cath now felt that children should not be limited by adults' pre-conceived ideas of their capabilities, and throughout the interview, she repeatedly described the children in her care as predominantly capable through statements such as "I think we just learn with them," "You never expect that they can't do it," and "I think sometimes people underestimate children."

In accordance with these beliefs about the children's competence, the educators at the community center worked with the children to develop their understandings of the risks associated with nature-based play and aimed to instill a sense of responsibility toward these. For instance, when talking about the "dry creek bed," a wide hollow at the center filled with large pebbles, Christina described trusting in the children's ability to play safely with the stones. She found that by extending trust to the children, they tended to react responsibly: "They don't tend to throw them. 99% [of the time] they're doing something constructive with them, occasionally someone might throw them, 1% of the time maybe." Through these everyday experiences with risk, Cath believed they could trust in the children's ability to react appropriately should a potentially dangerous creature appear in the playground: "They know, they can identify them [snakes, spiders], and they know that they get an adult."

At the daycare, Donna took a more cautious approach. She preferred not to allow the children to play with sticks, "because they tend to start whacking each other with them." Although, Danielle clarified that it is just the "big [sticks], just because they are quite rough these boys." She explained that they were allowed to play with small sticks as long as they did not "start running around after each other with them," if that happens, then they "encourage them not to play with [the

sticks]." In addition, Donna felt she could not trust the children to react appropriately if they encountered a dangerous snake or spider, something she attributed to their nature as children:

Researcher: How about the children themselves? Do you have a level of trust in them if there was a snake or something in the garden that they would react appropriately?
Donna: No.
Researcher: No?
Donna: No! (laughs).
Researcher: Do you think that is because it has not been tested? Or just through your experience...?
Donna: It's because they are children. They are going to touch whatever they want to touch, they really don't understand risk as such... It's like, "Oh God we just [talked / taught you about] snakes! You're not supposed to chase the snake." No, I don't trust them at all.

Overall then, it was clear that the educators' *beliefs* about children's capabilities influenced the degree to which they were willing to trust them, particularly in relation to navigating the risks associated with nature-based play. In particular, these underlying *beliefs* influenced whether and how the children were allowed to use natural objects in their play.

Approach to Play and Learning

The above themes highlight considerable differences in the educators' underlying values and beliefs between the two centers, aspects that are likely to contribute to their pedagogy outdoors. Further, it became apparent that there were fundamental differences in their approaches to play and learning, with the two centers interpreting the notion of collaboration quite differently.

At the community center, the educators explained that following the launch of the EYLF (DEEWR, 2009a), they made the decision to maintain routines but had done away with much of the structured planning at their center. The educators described with enthusiasm the way in which they actively sought opportunities for spontaneous collaboration with small groups of children, both inside and out:

Cath: You know most days what we think that we'll do, that might flow on from the day before, [well] something else kind of evolves, but...we follow them, listen to them, and follow them. And it's just not how it was, really, but...I think it's very good. It's much more creative.

This occurred in many different ways. On one occasion, Dr. M spotted that the cherry tomatoes were ripe on the vine. After tasting one, she approached an educator

who invited her to fetch the collection basket and helped her to wash them to serve at snack time. On another occasion, a parent dropped off an enormous cardboard box. An educator worked with a group of interested children outdoors to plan what they could use it for, and they spent the morning working together to turn it into a cubby house, carefully cutting windows and doors and decorating it. At other times though, the educators barely seemed to interact with the children at all, leaving them to develop their own play narratives with as little interruption as possible, just occasionally reminding them, for example, to turn off the tap on the water butt if they left it running for too long without using it.

At the daycare, the educators talked about observing the children while they were engaged in free play and drawing upon their interests to develop other activities. However, spontaneous collaboration was not described by either of the educators at the daycare, and none was observed outdoors. Instead, the educators explained that the children's play outdoors would sometimes inform the planning of themes for indoor play:

Donna: If they're collecting sticks outside and making [pretend] fires, we have brought that inside and made [pretend] campfires and added [cool boxes] and chairs and tables and tents and things.

Learning themes were often adopted for a week or more and sustained by the educators through structured art and craft activities, displays in the indoor space, or games and discussions to extend the children's conceptual knowledge. These structured activities were usually arranged for the whole class and planned often a week or more in advance, raising questions about the extent to which an individual child might recognize their contribution or experience a sense of collaboration in the process. Indeed, it was clear that collaborative opportunities were sometimes never followed up:

Danielle: They were quite into collecting those little nut seedy things from the trees, I don't know what they are. . .and we filled up quite a few jars of them last year.
Researcher: What did they do with them?
Danielle: They were going to use them for art and crafts but they never did they just sat in the jars! (laughs)

While the planned, structured activities usually took place indoors, occasionally the outdoor space was used, such as when the class went into the garden to catch spider webs and spray painted them onto black paper. Mainly though, the outdoor space was valued for allowing the children to expend "excess energy" because "it is a very long day when they are inside. . .and they don't like being inside all the time" (Donna). Weather permitting, free outdoor play was scheduled each day, and there

was a sense that being outdoors offered the children a break from the more structured indoor learning activities:

Danielle: It's more free play outside (long pause)...
Researcher: Why do you think you focus more on free play outside?
Danielle: Because normally it is very hard to get them to sit down when they are outside to do something (laughs), yeah they just like to run around. They are just happy doing their own thing rather sitting down doing a task that has been given...

As such, the educators described focusing mainly on supervision outdoors, interacting with the children predominately when they began to get "too unruly" in which case they would initiate structured playground games such as "What's the time Mr Wolf" or invite the children to listen to a story in the cubby house.

Therefore, the educators emerged as utilizing distinguishably different pedagogies: from spontaneous, flexible, collaboration with children indoors and out, to a more planned and bilateral approach delineating largely child-led play outdoors and educator-led learning activities indoors. These divergent pedagogies seemed to influence how the educators conceptualized the outdoor areas and the way in which they engaged with the children in these spaces.

Overall, the educators' values toward nature, their relationships with the children's parents, their beliefs about the children's capabilities, and their collaborative "teaching" behavior emerged as being considerably different between the two settings. While qualitative research conducted in sociodynamic contexts such as EC settings precludes the making of causal connections, the results of this study do strongly suggest that children's experiences of nature-based play within the naturalized playgrounds of EC settings cannot be uncoupled from their educators' pedagogy.

Discussion

The findings suggest that the various facets of educator pedagogy – the educators' values toward nature, their relationships with the children's parents, their beliefs about the children's capabilities, and their approach to play and learning – bear some influence upon children's opportunities for nature-based play within the everyday green spaces of early childhood centers. With reference to the continuum of nature-based play experiences, the various aspects of the educators' pedagogies may act to constrain or enhance the children's agency to reach the outer edge of the continuum and become fully "immersed" in nature-based play should they wish to do so. The scatter graph in Fig. 1 below has been generated as tool to help illustrate the nature-based play continuum and to further discuss the interplay between the children's experiences and the emergent aspects of educator pedagogy.

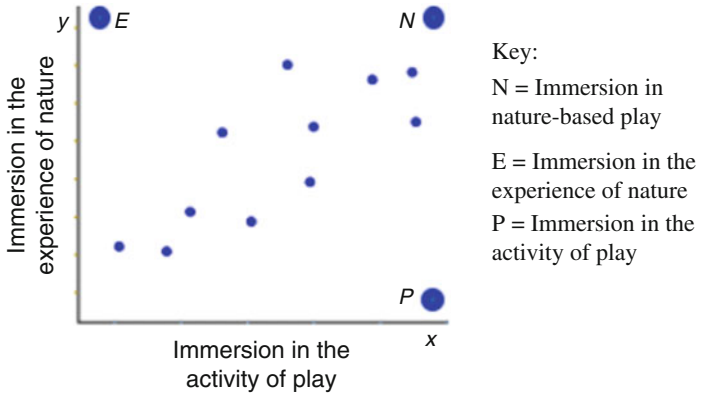

Fig. 1 Example representation of nature-based play continuum. Key: N = immersion in nature-based play. E = immersion in the experience of nature. P = immersion in the activity of play. Note. This graph is purely an illustrative aid for discussion. While the concept of the continuum arose from the findings and analysis, the points on the graph do not correspond to data gathered

As indicated by the x and y axes of Fig. 1, the analysis indicated that the children's experiences of nature-based play are reliant upon two critical conditions: their *ability* to become deeply and purposively *immersed in the activity of play*, i.e., *flow*, and the *opportunity* to become *immersed in the experience of nature.* Reflecting these dual layers, the experience of "immersion in nature-based play" would be situated at point N on the scatter graph and can be understood as an "optimal" childhood experience in nature, potentially offering the myriad wellbeing benefits reputed to be provided by flow and nature connection (Bowden et al., 2011; Csikszentmihalyi, 1997).

Three facets of the educators' pedagogy – their beliefs about the children's capabilities, their investment in relationships with the children's parents, and their own personal values toward nature – were identified as potentially bearing impact upon the extent to which the children were allowed to manipulate nature's polymorphic affordances in a hands-on way (e.g., the use sticks and stones in their play) and to experience nature in an embodied way (getting muddy, experiencing the rain, taking of their shoes, etc.). Therefore, these three facets of educator pedagogy can be understood to act in fairly direct ways upon the y-axis of Fig. 1, potentially influencing the children's opportunities to become *immersed in the experience of nature*.

Turning to the x-axis, the supervisory approach of the educators at the daycare might offer the children the freedom to become *immersed in the activity of play.* Certainly, adults' fond memories of playful outdoor adventures were usually times when they were playing freely and adults were not involved (Louv, 2008; Waite, 2007). However, the children at the daycare were rarely observed to be in a flow-like state in their play and on several occasions voiced frustration or boredom. This could be influenced by the confined nature of the setting, the necessity of certain rules in the group, the length of time the children spent at the daycare, and the absence of

older children to extend their ideas, creativity, and play skills, aspects that differ quite considerably from the play experiences of previous generations (Bodrova, 2008). Yet, frustration and boredom never arose during the fieldwork at the community center, and the children regularly seemed to become immersed (in a flow-like state) in their free nature-based play, something apparent in their creativity, deep and purposeful engagement, and enjoyment of this play (DEEWR, 2009a).

The greater freedom offered to the children at the community center to manipulate natural materials creatively may partly account for the differences in experience, offering them a greater sense of freedom. However, they most commonly used leaves, grass, or bark, which were also readily accessible to the children at the daycare. The difference in the type of setting may also have been influencing the children's experiences. The children at the community center had attended their center for a maximum of a year and a half; many did not attend every day, and opening hours were shorter. By contrast, some of children at the daycare may have attended the center for close to 5 years and may have been attending for full 5 days a week all year round. Yet, the type of setting cannot readily be changed. In fact, arguably it may be more important for children such as those at the daycare to have the opportunity to connect with nature and experience the well-being benefits of flow at their EC setting, given the dominance of this space to their early childhood experience. In a sense then, this places added impetus upon the educators to help facilitate these experiences for the children, pointing to the importance of educators' approaches to play and learning.

In considering the role of educators' approaches to play and learning upon the children's *ability* to become *immersed in the activity of play*, it is important to highlight that while the educators at the community center did sometimes collaborate with the children outdoors, it was not necessarily during these experiences that the children appeared to experience flow. As indicated above, this was most evident in their self-directed, socio-imaginative, or socio-constructive free play. Critically though, autonomously sustaining this play required the children to collaborate with *one another*, so that play narratives could fluidly evolve, and conflict could be resolved swiftly and not interrupt play. Sociocultural theory would suggest that the children at the community center may have been mirroring or reconstructing the collaborative pedagogy of their educators (Rogoff, 2003; Smith, 2013; Vygotsky, 1978). Or put another way, by modeling and engaging with the children collaboratively, Christina and Cath may have nurtured the maturity and self-sufficiency of the children's play skills at the community center, allowing them to remain more purposefully engaged – immersed – during periods of free play. This connection differs slightly from the ideas of Fleer and Peers (2012) and Bodrova (2008) in both intention and timing. Rather than fostering the children's collective imagination (Fleer & Peers, 2012) or ability to sustain characterization (Bodrova, 2008), the facilitation of collaborative skills has wide-ranging social application. It also does not require the educators, necessarily, to involve themselves in the children's free play directly. The skills are acquired (over time) in interactions with the educators and can then be appropriated later in free play, allowing this to be wholeheartedly child-led.

A complex dynamic of beliefs likely underpins this pedagogical approach. For instance, although the educators' beliefs regarding preschool children's capabilities emerged in the findings in relation to access to risky natural materials, implicit within these beliefs is the extent to which the children are recognized as competent partners to collaborate with (Siraj-Blatchford, 2008; Smith, 2013; Vygotsky, 1978). Hence, these beliefs likely underpin the educators' approaches to play and learning (Department of Education, Employment and Workplace Relations, 2009a). Somewhat similarly, while a commitment to a collaborative pedagogy largely supersedes the need for educators to personally value nature, it is likely that personal connections motivate educators to overcome any difficulties or barriers (such as safety concerns, parental resistance, or complaints) and actively seek to position their center as a space where children can experience immersion in nature-based play (Asah et al., 2012).

Educators' personal connections to nature aside, it was somewhat surprisingly that there should be such a divergence in the educators' beliefs about children's capabilities, their investment in relationships with the children's families, and their approach to play and learning. These are key areas in which the EYLF (DEEWR, 2009a) seeks to foster shared beliefs and values among educators nationally. However, as Cath described in her narrative and as existing Australian research has highlighted (Edwards, 2007), making the paradigmatic shift from developmentalism to sociocultural theory and embracing a collaborative approach in practice can be very challenging. Yet, rising to this challenge is critical. Even in something as seemingly innate as nature-based play, the results of this study demonstrate that, within the confines of EC settings, it is not enough simply to naturalize the playground, stand back, and leave the children to play. Educator pedagogy plays a critical role both in affording children the agency to really engage with the natural affordances *and* to develop the skills to achieve and sustain flow-like states in their nature-based play.

Conclusion

While only a small-scale study, the findings shed new light on how contemporary preschool children experience nature-based play within the naturalized playgrounds of EC settings. The results highlight that children's experiences in these environments range across a continuum from "nature as a backdrop to activities" to "immersion in nature-based play." Children's nature-based play experiences shift across the continuum depending upon their interests and the evolution of their play. However, the results of this study also clarify that for children to *regularly* and *consistently* experience immersion in nature-based play at EC settings requires more than just physically naturalizing the playground environment. Two key conditions must be met: (1) children need the opportunity to become *immersed in the experience of nature* (e.g., to freely engage with nature's affordances such as mud, rain, sticks, etc.), and (2) they require the ability to become (and remain) deeply and purposively *immersed in the activity of play*. The findings suggest that sociocultural

influences, in particular educator pedagogy, act to constrain or enhance children's opportunity and agency in both these regards. Specifically, educators' beliefs about children's capabilities, their investment in relationships with the children's parents, and their own personal nature-connectedness influence children's *opportunities* to become immersed in the experience of nature. In addition, educators' approaches to play and learning (underpinned by their beliefs about children) influence the development of children's autonomy to sustain collaborative play – their *ability* to become immersed in the activity of play. Therefore, while making environmental changes to the playground are a critical first step toward affording children opportunities to become immersed in nature-based play, these must be concurrent with a commitment to shifting mindsets and to working with intention to foster the children's autonomous collaborative play skills.

Cross-References

- ▶ Child-Nature Interaction in a Forest Preschool
- ▶ Children's Imaginative Play Environments and Ecological Narrative Inquiry
- ▶ Posthuman Theory and Practice in Early Years Learning
- ▶ Remembering and Representing the Wonder: Using Arts-Based Reflection to Connect Pre-service Early Childhood Teachers to Significant Childhoodnature Encounters and Their Professional Role

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Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature

69

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Abstract

Traditional nature-based experiences have gained increasing attention for their ability to foster in children a sense of Connectedness-with-Nature. What is often not acknowledged in contexts of cultural diversity is how nature-based pedagogies often subtly project Eurocentric environmental values onto children, inadvertently colonizing natural spaces. Drawing on a qualitative case study with 37 ethnically diverse children at an outdoor education center in South Africa, this chapter proposes a potentially transformative triad of decolonizing, ethics-led and embodied nature-based pedagogies to address calls for nature reconnection in this context. The tensions and resonances between children's sociocultural-historical value positionings and those of the outdoor education center are explored in relation to the embodied nature of children's on-site experiences which are designed to mediate their developing sense of Connectedness-with-Nature. Through semi-structured interviews with children and instructors, participant observation of two camps, and reflexive journaling, data were analyzed thematically drawing on Cultural-Historical Activity Theory. The analysis highlights the formative role of historically constituted, sociocultural elements in mediating children's material, embodied experiences with outdoor education programs. The authors argue that decolonized/decolonizing, socioculturally and socio-materially resonant, and ethics-led pedagogies are important dimensions in developing children's feelings of Connectedness-with-Nature and opening potentially transformative pathways for (a)mending the perceived human-nature disconnection.

Keywords

Decolonized nature-based pedagogy · Connectedness-with-Nature · Sociocultural-historical positionings · Socio-materiality

Introduction

This Chapter reflects on the potential of nature-based pedagogies that are (i) decolonizing, (ii) ethics-led, and (iii) embodied, to develop child-nature connections at a South African outdoor education center. These pedagogies are presented as a triad because their potential to create transformative learning processes and develop child-nature connections resides in their interrelatedness rather than in their selective or separate use.

The first section of the Chapter introduces the eco-psychological ideal of Connectedness-with-Nature (Zylstra, Knight, Esler, & Le Grange 2014) and considers how the triad of decolonizing, ethics-led, and embodied pedagogies in structured outdoor education programs has the potential to strengthen children's Connectedness-with-Nature. Throughout the Chapter, the authors draw on Connectedness-with-Nature in acknowledgement of Zylstra et al.'s (2014) work that framed earlier research on which this Chapter is based (Ward-Smith, 2018).

The features and aspirations of Connectedness-with-Nature, applied in this Chapter to children's experiences of nature-based pedagogies, resonate strongly with the book's overall theorization of childhoodnature. These theoretical propositions are elaborated in the second part of the Chapter which presents data from a case study of children's experiences of nature-based pedagogies at an outdoor education center in the Eastern Cape province of South Africa.

"Connectedness-with-Nature"

Calls for people to "reconnect with nature" have become common across various disciplines including Environmental Education, Environmental Ethics, Eco-psychology, and popular environmental discourse (Bonnett, 2004; Louv, 2010; McGarry, 2014; Weston, 2012; Zylstra et al. 2014). The multifaceted benefits of nature immersion and nature-based learning have been well-documented, ranging from enhanced health and wellbeing to self-growth and development and to environmental advocacy (Capaldi, Passmore, Nisbet, Zelenski, & Dopko, 2015; Gill 2011). In response to the cultural dominance of Minority western modernity which values scientific knowledge over intuition, verbal communication over bodily awareness, rational judgment over care, and action over introspection, nature-based experiences may offer a method to recentralize the importance of emotive embodiment through experiences within nature (Akhurst, 2010).

Among the many responses to the increasing challenge of children's disconnection from nature is the eco-psychological ideal of Connectedness-with-Nature which contends that a personal and emotional reconnection with nature is an important predictor of ecological behavior and subjective wellness (Mayer & Frantz, 2004; Nisbet, Zelenski, & Murphy, 2008). This is not to say that all human beings are literally physically or materially disconnected from nature but rather that there is an emotional and psychological disconnection which may in turn mediate a physical and experiential disconnection. The aim is for a steady state of consciousness comprising symbiotic, cognitive, affective, and experiential traits that reflect, through consistent attitudes and behaviors, a sustained awareness of the interrelatedness between one's humanness and the more-than-human world (Zylstra et al., 2014). This may be an evolving continuum comprising of information about nature, experience in nature, and culturally embedded nature-based practices over time, which all combine toward engendering a deeper, more committed connection with the natural world.

A central concern of this chapter is the extent to which outdoor education centers in South Africa (or any setting where nature-based learning processes are influenced by colonial legacies) can contribute to developing children's Connectedness-with-Nature. Below, we look briefly at the dominant cultural history of nature-based pedagogies in outdoor and environmental education centers in South Africa, before elaborating on how a triad of decolonizing, ethics-led, and embodied nature-based pedagogies may potentially develop children's reflexive engagement with their own

experiences in, and connections with, nature. The case study data presented through the lens of Cultural-Historical Activity Theory (CHAT) in the second part of the Chapter foregrounds the importance of pedagogies that resonate with children's lived experiences and traditional bio-cultural constructions of the natural environment.

Socioculturally and Historically Emergent Nature-Based Pedagogies

In South Africa, child-oriented, experiential nature-based pedagogies have tended to foreground environmental behavior change designed from a position of "expertise" where Eurocentric conservationist values are transposed into other contexts. In sketching a sociocultural history of outdoor and environmental education centers in South Africa, O'Donoghue (2007) recounts how nature-based programs in the 1980s emerged from colonially inspired nature conservation campaigns seeking to "create environmental awareness through hands-on learning in wild nature" (p. 144). To this day, children participating in such programs are commonly encouraged to take on environmental values that are external to their sociocultural, historical, and economic contexts, as well as from their everyday understandings of and experiences in nature, and their environmental concerns. Many children hence experience structured nature-based learning programs as contextually disembedded, perhaps even alienating interventions (Masuku van Damme & Neluvhalani, 2004; Muir, 2002; Zazu 2007). Few nature-based pedagogies work "from the ground up," embracing how children's immediate, lived experiences mediate their Connectedness-with-Nature.

Currently in South Africa, little has been researched and published about the role of decolonizing pedagogies in nature-based education. Ashwell (2010) suggests that appreciation for nature-based education in South Africa has receded in recent years as the concept of "nature" has been steadily replaced with more utilitarian or scientific concepts such as "natural resources" or "biophysical environment" in policies and curricula. Part of this diminishing focus on nature in South African environmental education programs may be, she suggests, due to the prominence and urgency of addressing environmental injustices and sustainable development agendas in the democratically emerging state. Additionally, critiques of nature-based education in the 1990s by prominent environmental educators may have also undermined confidence in the relevance and politico-ideological appropriateness of its typical pedagogies in a post-Apartheid setting, especially as nature-based education was historically associated with "whites only" access to nature reserves and national parks (Ashwell, 2010).

The post-Apartheid democratic turn from the 1990s introduced to nature-based education programs a culture of participation and emancipation, with the emphasis often focused on team-building exercises, "icebreakers," and collaborative problem-solving (O'Donoghue, 1999). Pedagogies struggled to break through to any profound engagement with learner's lived experiences and cultural capital. In light of

this complex, politically laden sociocultural history of outdoor and environmental education centers in South Africa, the perspectives and case study data shared in this Chapter are part of a tentative exploration of the role of nature-based pedagogies in mediating young people's connectedness with their natural heritage in ways that are generative and just.

Toward a Triad of Decolonizing, Ethics-Led, and Embodied Nature-Based Pedagogies

This section introduces the idea of a triad of nature-based pedagogies that seek to develop decolonized and ethically imbued child-child, child-adult, and child-nature relationships. This triad requires that we attend more closely to the ways children position themselves during outdoor education experiences in relation to their own historical, sociocultural, and socio-material circumstances and those of the outdoor education program.

Decolonizing Pedagogies

Postcolonial scholars such as Chakrabarty (2000), Santos (2007), and Kayira (2013) emphasize that colonialism's most powerful legacy is not geographical but onto-epistemological. Kayira (2013, p. 107) reflects how many post-independence African countries remain under the hegemonic influence of Minority western cultural and economic standards and "are construed as objects of elite benevolence, rather than as historical subjects possessing their own unique worldviews, interests and passions." These global patterns are echoed at community, classroom, and homestead levels, with the result that even community-oriented, nature-based education programs are commonly framed around Eurocentric accounts of people-nature relationships.

Decolonizing pedagogies refers to approaches to teaching and learning that help learners to recognize and disrupt the structure and powers of colonial influences on their lives and in their communities. Complex legacies of colonial narratives need to be interrogated, where relationships and practices have subordinated and controlled certain groups of people and the natural world. As authors, we use the present-continuous tense here (decolonizing) to signify the incompleteness of the project – nothing is yet truly decolonized. The term also reminds us of the need for expanding spheres of reflexive moral relationships not only with other people, communities, cultures, races, and faith groups but also with subjugated species, ecosystems, landscapes, and more.

Educators writing about decolonizing pedagogies point to the significance of open-ended, generative dialogue, reflexivity, and relationality to enable transformative learning processes. For example, Asher (2005) draws on post-colonial and feminist theories to propose spaces of *in-between-ness* in which children and educators are able to "validate their particular histories/life stories and at the same time to rethink relations of oppression" (p. 1103). Such approaches commonly seek to re-center Indigenous ways of knowing, doing, and relating and support change-

oriented, agentive responses in the world (McGregor, 2012). Decolonizing pedagogies can introduce a critical, reflexive edge to nature-based learning processes that might otherwise risk being little more than environmentally well-intentioned but socioculturally disembedded efforts to reconnect children with the natural world.

Ethics-Led Pedagogies

Educators' understandings of ethics-led pedagogies as open-ended, deliberative processes rather than as static codes of conduct (Olvitt, 2013) are central to this Chapter's proposition of a triad of decolonizing, ethics-led, and embodied pedagogies in nature-based education programs. A relational, dialogical, and contextually responsive foundation to ethics-led pedagogies may help to mitigate the risk of ethical and moral imposition that accompanies colonizing practices (where the colonizer seeks to impress "the right way" upon the other), such as those historically found in many South African nature-based education programs where the educator seeks to instruct children on "the right way" to understand and relate to nature. These ethical tensions, especially in post-colonial settings, are understood by Bauman (1993, p. 97) who cautions that: "'Stooping to' the weak by the self-confident strong is in the end the birth-act of domination and hierarchy: the reforging of difference into inferiority." Nature-based educators must tread a very fine line between pedagogies that unreflexively advance the rightness of a particular way of being with nature and pedagogies that *invite* – but avoid prescribing – ethical engagement with our relationships with nature.

Regardless of the specific form of the wide range of possible ethics-led pedagogies, in general terms these learning processes would be empathetic, care-filled, just, and grounded in relational understandings of the world. Ethics-led pedagogies engage explicitly and reflexively with the range of values and ethico-moral positions that people bring to each situation and seek to create challenging but safe spaces for learners to have ever-deepening conversations about what matters to them, why, and how that affects others, now and into the future (see, e.g., Jickling, 2005, 2009; Olvitt, 2013, 2017).

Embodied Pedagogies

Embodiment and the socio-materiality of nature-based pedagogies are important but often taken-for-granted dimensions of mediating children's Connectedness-with-Nature. Fenwick (2015) explains that learning is fundamentally a socio-material concern and that materials and material settings actively mediate learning as, ". . .there are no clear, inherent distinctions between social phenomena and materiality" (p. 83). As such, the sensual embodiedness and seemingly overt physicality of children's nature-based experiences are inseparable from the sociocultural-historical positionings that children and educators bring to each experience. Shifting from a subject-centered, cognitive view of learning to one that acknowledges how "objects,

bodies, technologies and settings...permit some actions, and prevent others" (Fenwick, 2015, p. 85) necessitates embodied approaches that lead children into relational, holistic, and experiential explorations of their dynamic relationships with the natural world. Further, it would suggest the importance of pedagogies that share and produce understandings of nature *through* (rather than in spite of) children's sensual embodiedness in the world.

A Complex History of Biocultural Diversity in the Eastern Cape

The outdoor education center case study that forms the basis of this Chapter is located in one of South Africa's economically poorest and most rural provinces, the Eastern Cape, where the dominant ethnic group is the AmaXhosa. The province's history reflects ongoing national struggles to transition from centuries of colonial oppression (since the early 1800s) to a fledgling democracy in which people and land can flourish.

Over a century ago, when South Africa was under British colonial rule, black people were restricted to owning a mere 7% of land (Ramphele, 1991). The Nationalist Apartheid government that came to power in 1948 then established reserves (known as "independent homelands" or "Bantustans") to strategically keep black people out of urban areas while providing a steady supply of labor for white-owned mines and farms (Durning, 1990; Ramphele, 1991). Most "homelands" were on marginal, unproductive land bearing the region's characteristic red, fragile topsoil. These "independent homelands" rapidly became places of environmental degradation, extreme poverty, deforestation, overgrazing, and failed crops: places where traditional family structures disintegrated under the economic pull of the commercial farms, factories, and mines to which people departed in search of employment. The pervasiveness of Apartheid rule across social, political, and economic sectors of South African life ensured the institutionalization of environmental racism, which has endured beyond the advent of democracy under black majority rule since 1994 (Olvitt, 2012).

In an extract from a book documenting the history of the Wildlife Society (an environmental NGO with an almost exclusively white membership), Pringle (1982, p. 256) reflects how the organization grappled with these tensions during the height of Apartheid:

> ... [In the late 1970s] the Society told its members. 'It surely behoves us to do all in our power to reach out to this section of the community... the black mind needs to be instilled with knowledge of the mutual benefits to be derived from striving to preserve instead of destroying nature.

This text is illustrative of dominant colonial perspectives in South African outdoor and environmental education centers, which persist (albeit in more nuanced or muted forms) even to today. Well-intentioned strategies to "reach out" to black communities so that their minds can be "instilled with knowledge" about how to live harmoniously and sustainably with nature reflect a deficit view of a perceived ignorant, destructive "other" (Kayira, 2015; Masuku van Damme & Neluvhalani,

2004). Typically, pedagogies associated with such perspectives were (and in many cases still are) transmissive and focused on value change and behavior modification (O'Donoghue, 2007).

The accumulated history of decades of land dispossession, forced removals, inequitable access to natural resources, and dehumanizing denial of access to health and sanitation services presents a picture of a province where people's relationships with the natural world might be characterized by disconnection. However, more recent research into biocultural diversity and nature-culture relationships in the Eastern Cape (Cocks, Dold, & Vetter, 2012; Dold & Cocks, 2012; McGarry 2008) indicates that the AmaXhosa people's close connections to nature remain strong but have until recently fallen outside of the explanatory capacity and implicit values frameworks of mainstream conservation discourses. Cocks, Dold, and Vetter (2012, p. 1) describe how the AmaXhosa people:

> . . . portrayed a strong, although not always easily articulated, appreciation for nature, especially *ihlathilesiXhosa* ('Xhosa forest', vegetation types within the Thicket Biome). Activities such as collecting fuelwood and other resources, hunting and time spent at initiation schools were described as key opportunities for spending time in nature. The benefits of being in nature were ascribed not only to the physical experience of the forest environment. . .but also to the presence of ancestral spirits. Being in nature thus contributes significantly to the physical, mental and spiritual well-being of local people, and is also integral to their sense of cultural identity.

In a similar study, Dold and Cocks (2012, p. 14) describe the importance of local forests and thicket as a learning environment for children: "Children collect fruit, hunt birds, swim, climb trees, make clay toys, carve fighting sticks and ketties (catapults), catch fish, and generally play in the forest."

Researching the role of natural resources in the lives of rural children impacted by HIV/AIDS in the Eastern Cape, McGarry (2008) reported that the quality of children's diets at home was, on average, 60% lower than the Food and Agricultural Organization (FAO) recommendations. However, he found that 62% of the 850 children interviewed supplemented their diets with wild foods, with 30% supplementing over half their diet with wild foods.

These snapshots of culturally and economically imbued people-nature relationships represent the lived realities of many of the rural children who attend camps at the Mystic Mountain outdoor education center. The following section turns to the case data of children's experiences of nature, mediated by activities at Mystic Mountain (Ward-Smith, 2018).

The Case of Mystic Mountain Outdoor Education Center (Name Changed)

The research explored how children from diverse sociocultural, economic, and historical backgrounds learned to connect with nature through experiential nature-based activities during 4-day camps at the Mystic Mountain outdoor education

center (Ward-Smith, 2018). Mystic Mountain is one of South Africa's longest established not-for-profit education centers that provides experiential nature-based learning to children from diverse backgrounds. The center seeks to respond to the concern that increasing numbers of South African children do not have close connections with, or intimate understandings of, nature. The center offers 4- to 6-day camps featuring a host of adventure and nature-based experiences, most of which take place in the natural environment. Activities include swimming in a natural pool, day and night hikes in the indigenous forests and commercial tree plantations, indigenous tree planting, invasive tree ringbarking, as well as a nature-based middle ropes course.

Mystic Mountain's main objective is to provide a safe and natural space for socioeconomically disadvantaged children to explore their identity, their skills, their own personal growth, and the natural environment around them. In recent years there has been a strong push toward experiential environmental education through nature-based activities such as hiking, tree planting, and swimming. Mystic Mountain seeks to provide nature-based learning experiences through which children develop their agency and self-efficacy.

The core values that influence Mystic Mountain's practices are loosely based upon Christian-based ethics of stewardship of care and respect for people and land, illustrating the adoption of a dominant worldview introduced through colonial expansion. Features of the center's core values include sanctity of life (not harming any human or other creatures or plants) and showing respect for the environment, for people, for the learning context, and for oneself. Thus, the experiential learning programs are guided by an explicit set of environmental values that promote colonially inspired conservation values and practices within a context of African cultural diversity.

Many of the camps are externally funded to sponsor children from socioeconomically disadvantaged backgrounds to explore themselves and learn about the natural environment through structured and unstructured nature immersion within a pristine natural setting. These camps are referred to by staff members as "underprivileged camps" or "UPCs" for short. This problematic labelling reflects a deficit understanding of the sponsored children who are perceived to be "lacking" in some way, thereby diminishing their potential assets and alternative everyday ways of knowing.

Research Methods

The qualitative case study that forms the backbone of this chapter draws on data collected over two 4-day camps at the Mystic Mountain outdoor education center in a rural area of the Eastern Cape. Data generation methods included semi-structured interviews and focus groups with instructors, staff, and selected participating children from both camps, participant observations during the camps, and reflexive journaling.

In total, 37 children, 7 volunteers, 3 instructors, and 2 managers were interviewed. Forty-minute pre-camp focus groups were facilitated to gain insight

into the children's unique sociocultural-historical contexts in relation to their descriptions of their Connectedness-with-Nature. Forty-minute post-camp focus groups were facilitated on the last day of the camps to gauge the effect of the camp experiences in relation to their thoughts about Connectedness-with-Nature. With participants' permission, these interviews were digitally recorded with a discreet audio recorder.

Participant observation entails the active and nonintrusive engagement of the researcher in activities in order to gain a deeper understanding of the interplay between participants and the activities they do (Cohen et al. 2007). In this study, participant observation of both camps' nature-based activities and procedures shed light on the instructors' pedagogies and orientations toward the children. Observing the children before, during, and after the nature-based activities provided an important background to their accounts of Connectedness-with-Nature that was discussed in subsequent interviews. The initial observations also provided useful content for shaping the post-camp interview schedules. The detailed handwritten observation notes provided important contextual detail that enabled the study's thick descriptions and underpinned the research findings.

These methods were complemented by reflexive journaling which acted as a stimulus for the researcher (Ward-Smith) to reflect on the camps' interactions, procedures, and dynamics and for a deeper understanding of the research process. Journaling is a strategy for researchers to write freely to examine their personal presumptions, biases, goals, subjectivities, and desires in relation to the research (Ortlipp, 2008). Its value lies in retrospection, generating new insights about researcher positionality and what is being studied.

Gaining Perspective Through Cultural-Historical Activity Theory

In addition to the above, Cultural-Historical Activity Theory (CHAT) provided valuable tools to help make visible the historical, cultural, and socio-material entanglements that require close attention in transformative learning processes. Drawing on Lev Vygotsky's (1978) account of sociocultural mediation, CHAT explains children's engagement with nature-based experiences, such as Mystic Mountain's camps, as processes of mediation through children's and educators' unique contexts and positionings. A CHAT-based analysis of the case study data helped to identify the historically accumulating tensions and contradictions between, for example, the cultural capital of children and the mediating tools used by educators in the activity system of the camp at Mystic Mountain.

Through a second-generation CHAT stance, the nature-based program at Mystic Mountain was conceptualized as an activity system. Second-generation CHAT (applied in Fig. 1 in relation to Mystic Mountain outdoor education center) shows how individual meaning-making and action can be better understood in relation to sociocultural and historical context and how society is in turn acted upon and changed by individual agency. The unit of analysis in second-generation CHAT is the activity system itself. The second-generation CHAT heuristic includes an

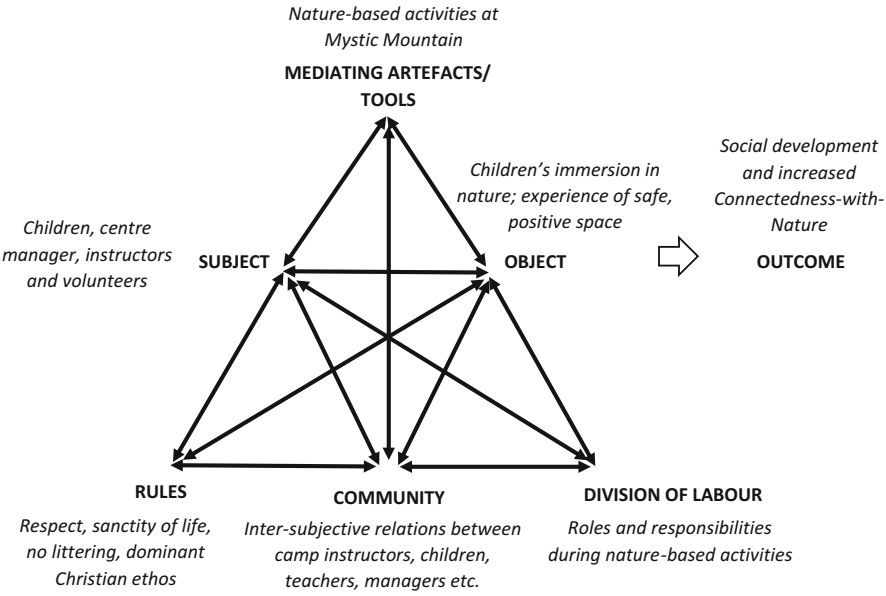

Fig. 1 Mystic Mountain represented as an activity system. (Adapted from Engeström, 1987)

expanded activity system comprising the subject and object of the activity system with mediating artifacts and tools in the top triangle, underpinned by rules and procedures, the community relevant to the activity, and the division of labor for conducting the activity. The subject and the object are interconnected in that the fulfilment of the object depends on the subject's motivation (Popova & Daniels, 2004). The object of activity is transformed through activity into outcomes. Mediating artifacts and tools refer to culturally produced means for changing the environment and achieving goals. The division of labor concerns both the horizontal interactions among the group members and the vertical division of power, resources, and status. The community concerns participants who share the common object, which shapes individual actions and the shared activity. Furthermore, within any community engaged in collective activity, there are formal and informal rules, norms, and established values, which enable and constrain the internal dynamics and accomplishments of an activity system. The subject-object relations of an activity system and their cultural mediation often result in historically accumulating tensions and contradictions which are recognized as the main drivers of learning and change within and across activity systems because actors respond to the disturbances (Cole & Engeström, 1993). As such, identifying and responding to tensions and contradictions within an activity system is integral to CHAT and its transformative potential. Contradictions can occur within a component of an activity system, between two or more components of an activity system or between multiple activity systems. Disturbances are usually the visible manifestations of systemic contradictions and also often provide vital opportunities for learning.

Within the case study context, an activity system analysis allowed for deeper insights into the mediatory relationship between contextual factors and the object of Connectedness-with-Nature (see Fig. 1 below). The components of the Mystic Mountain activity system included the subjects (Mystic Mountain staff), the mediating artifacts (various nature-based activities), the object of the activity system (child welfare and the development of children's Connectedness-with-Nature through experiential nature-based learning), the rules and norms (such as respect and sanctity of life), the community (intersubjective relations between all members underpinned by personal histories of children and the religious/cultural ethos of Mystic Mountain), and, finally, the division of labor (all those who participate in Mystic Mountain function in particular hierarchical roles). Conceptualizing activity in this manner allows for a nuanced, working image of the activity system in a way that highlights the dialectical, interactional, and historical nature of nature-based pedagogy at Mystic Mountain.

Nature-Based Pedagogy at Mystic Mountain

The case study conducted by Ward-Smith (2018) focused on two camps that took place at Mystic Mountain in the middle of winter in 2016. For ease of reference, we refer to the group of children at Camp 1 as "The Mountain Movers" and those in Camp 2 as "The Star Gazers."

Mystic Mountain outdoor education center was managed by two white South Africans (one male, one female) and supported by three instructors, long-term employees, who ran the camps and facilitated the activities. Two were young, black South African males, and the third was a mixed race female from a neighboring southern African country. Of the seven volunteers who assisted on camps (four male, three female), three were black South Africans, one was a white South African, and another three were Eastern European volunteers. Ward-Smith's (2018) initial interviews reported how some of the local volunteers had themselves attended camps as children and had returned as volunteers, due to their transformative experiences there, for example, Volunteer 7 noted: "In [this centre], nature is important to everyone, so since I was little, people were telling me that nature is part of us. . .." All the foreign volunteers had chosen Mystic Mountain as a placement because of their own transformative nature experiences during childhood or because they were passionate about working with children outdoors. Volunteer 2 said: "I have spent quite a lot of time in. . .mountainous environments during holidays. . .So I think I have always sort of had a sort of respect for these environments. And also we learnt a lot about them at school" (Ward-Smith, 2018).

Camp 1: The Mountain Movers

This camp took place in mid-winter. It included 60 children from a well-regarded, fee-paying school from a coastal town. Although the children were heterogeneous in

terms of race and gender, the majority were from middle-class backgrounds. The group was accompanied by two school teachers, and this camp focused on teamwork, confidence-building, and experiential environmental education. The weather was relatively cold but clear, with average daytime temperatures of 15 °C (59 °F), average nighttime temperatures of 2 °C (35 °F). Twelve children were interviewed, ages ranging from 12 to 14 years, with an equal number of boys and girls. Ethnically, six participants were white, four were black, and two of mixed race. (Racial identifications are noted here because, especially in the light of South Africa's Apartheid legacy, racial differences commonly reflect significant cultural and economic differences. This is especially so in the Eastern Cape, one of South Africa's poorest and most rural provinces where the sociopolitical and economic divisions of the country's colonial and Apartheid history have not changed substantively.) All 12 participants were proficient English-language speakers.

Camp 2: The Star Gazers

This second camp also took place in mid-winter. This camp was one of Mystic Mountain's two "UPCs" (underprivileged camps, as they were termed by staff members). Primarily, these camps focus on providing a safe and supportive space for children who are socioeconomically disadvantaged. As a secondary focus, the camps provide opportunities for transformative encounters with nature through experiential, environmental learning. The camps are also structured to develop agency through "self-initiated action plans" (SIAPs). During these SIAPs the children are divided into groups, and they plan what activities to do and when to do them. Thus, the activities become a self-driven competition, to activate the children's agency and develop their time management skills.

The weather during this camp was particularly cold and rainy with only one clear, sunny day. The children's ages ranged from 10 to 14 years, and they had a more limited understanding of English than the Mountain Movers. All of the children were black and either living in formal child care facilities or from socioeconomically disadvantaged backgrounds in peri-urban or rural settings. They were not accompanied by adults with whom they were familiar. Ward-Smith's (2018) observations were that many appeared to have low levels of confidence in this setting and had little access to, or experience in, pristine natural spaces. For many, coming to Mystic Mountain was their first holiday-type experience or their first experience in a nature-based setting. Twenty children who were sufficiently proficient in English participated in the pre-camp focus groups, and from these, five (three boys and two girls) were selected for the post-camp focus group. (Although in practice there were many difficulties during the interviews in terms of the English-isiXhosa language differences.)

It became apparent that the Star Gazers' sociocultural and historical positionings were disadvantaged in terms of finances and basic child rights such as individual care, support, and education. They seemed more inhibited, serious, and much less willing to talk, and they did not behave as carefree children. (We are aware that this

description of the Star Gazers can also be seen as a "deficit" description; however, these factors were noteworthy in terms of their lived realities of socioeconomic hardship and social stress and how that influenced their personal agency and developing sense of *Connectedness-with-Nature*. This is not to deny that the Star Gazers did not have alternative ways of being, doing, and knowing in relation to nature but that, from Ward-Smith's (2018) observations, these children did not appear to be especially playful or relaxed.) This was in contrast to the Mountain Movers who appeared to be more engaged, curious, and willing to converse.

Sociocultural-Historical Mediation of Connectedness-with-Nature

Ward-Smith's (2018) case study highlights the importance of contextual relevance and resonance in mediating Connectedness-with-Nature for the Mountain Movers and the Star Gazers. As will be illustrated in the sections below, the children's intersecting historical, social, economic, cultural, and religious positionings shaped their relations with and understandings of nature prior to attending the camps and influenced the mediation of their Connectedness-with-Nature. Excerpts from interviews are noted in italics, with the code to identify the participant noted after as SG (Star Gazer) or MM (Mountain Mover) along with the respective number to preserve anonymity.

Prior Educational Background

In both groups, it became evident that the form and content of the children's prior education influenced their understandings of environmental issues and their sense of Connectedness-with-Nature. On the one hand, the Mountain Movers attended a well-regarded state-funded school that not only exposed them to environmental knowledge through curricular subjects such as Natural Sciences but also physically enabled them to have mediated nature-based experiences such as camps and educative beach and forest excursions. As such, these children's discussions reflected understandings (albeit rudimentary and age-appropriate understandings) of ecosystems and human impacts on natural systems. These were mostly framed by concepts and terminology in the Natural Science school curriculum, augmented with personal experiences of having visited natural places or talking to a knowledgeable adult about environmental problems. The children in this group were generally able to explain the difference between indigenous forests and exotic plantations and lament the impact of sewage spillage on animal life. For example, one child explained: "…The sewage is…destroying the animal life … [I know about it through] mostly…the teachers, Mr. K talks about it a lot" (MM9), and another explained that: "…the indigenous forest is thicker in ground vegetation than the other one [exotic plantation] and darker at ground level…" (MM5).

The Star Gazers' schools, on the other hand, had provided far fewer opportunities to develop environmental knowledge or experience nature-based activities. The environmental knowledge that they were able to share during interviews was derived

almost exclusively from personal experience of social and environmental problems in their immediate environments (such as substance abuse, littering, and animal welfare). When asked what environmental problems they knew about in their area, several Star Gazers named social anxieties such as: "There are many strangers" (SG5) and "Many children in my areas are smoking drugs and that's a problem" (SG2). Thereafter, when asked specifically about problems concerning *nature*, one child suggested: "Poaching, uh, I think it's poaching" (SG1). When asked if they think their everyday activities such as eating and travelling affect the environment in any way, the same child responded: "No, those things don't affect the environment...." The other group members indicated that they could not answer the question.

A Mystic Mountain staff member suggested that the Star Gazers' environmental knowledge would be, "pretty much non-existent unless they have been to [us] before" but that: "You can't blame the kids [for not caring about the environment]; they don't have any exposure... Equally, the schools aren't teaching them." The educator added that: "The only other exposure that they get is counter [environmental]...If you are growing up in a township [the term used in South Africa to refer to high-density, low-cost, historically black residential areas] you are not going to have a lot of environmental education, or positive influences around you."

The dominance of these deficit accounts of the Star Gazers' prior environmental knowledge and their perceived inability to connect with nature contributed to the outdoor education center's starting point for developing the curriculum of its so-called "underprivileged camp" and its nature-based pedagogies. These stark differences in children's educational experiences, which are rooted in the historical legacy of Apartheid and more recently the post-Apartheid moral imperatives of equity, redress, and social justice, inevitably influence the object of educational activity systems, including those of environmental education and outdoor education programs. For example, the object of the Mystic Mountain activity system was not only the provision of nature-immersion opportunities for children but also the provision of a safe and supportive space for socioeconomically disadvantaged children. However, as crucial as such interventions are, Devlin (2011) cautions that a deficit-based approach may constrain the children's potential learning outcomes by reducing them to what they "lack." Lotz-Sisitka (2009) similarly reminds us not to confuse people's historical contexts with people's power and inherent capabilities for learning, resilience, adaptation, and change. The challenge for nature-based educators then lies in exploring pedagogies that nurture children's own profound and intimate connections with their everyday contexts, promote resonant learning processes, and enhance children's own sense of Connectedness-with-Nature.

Technologies and Everyday Activities

Children's home environments and everyday activities – often involving the use of technology – emerged as another important mediator of Connectedness-with-Nature.

The Mountain Movers, for example, recognized various nature-oriented lifestyles (such as living on a farm) and other more typical, everyday interactions (such as doing homework or socializing with friends) as ways in which Connectedness-with-Nature had been influenced. The children's accounts also included mobile phone technologies and television as significant factors influencing their perceptions of and relationships with nature.

Both groups had strong attachments to their mobile phones and television shows which they exclaimed they were missing while on camp. One Mountain Mover referred to addiction to his mobile phone: "...[Your mobile phone] is like a potion...It has to be right next to you" (MM8); and a Star Gazer exclaimed: "I miss my TV, I miss electricity...my phone, technology...we can't have our phones here!" (SG2). The influence of mobile phones may be addictive, particularly for children, which may constrain opportunities for embodied nature connections (Carbonell, Oberst, & Beranuy, 2013). In contrast, two children from the Mountain Mover group did note the value of prohibiting mobile phone use during the camp as it strengthened opportunities for quality social interactions, for example: "It is awesome without my phone...Because we have more time to communicate" (MM7).

Although some of the children did not have much embodied access to nature in their everyday lives, they had regular access to knowledge *about* nature through television. Some children reflected on how nature-based television programs had contributed directly to their environmental knowledge. These and other technologies are recognized here as historical mediating artifacts in the children's lives, the cognitive and affective legacy of which the children bring with them into the activity system of Mystic Mountain and which continue to mediate the children's understandings of and relationships with nature in indeterminate ways; some might hinder embodied connection with nature, while other technologies enable environmental knowledge acquisition. Sociocultural theories emphasize the impact of context, everyday activities, and practices as pivotal in shaping how and what we learn (Engeström et al., 1999). Everyday activities and technologies mediate our value positionings and modes of meaning-making. As such, our understandings of the environment emerge from our continuous participation in our everyday life-worlds.

Sociocultural and Economic Constraints on Nature-Based Experiences

The risk of crime in natural spaces and potential threats to personal safety mediated the children's willingness to explore natural spaces in their everyday lives. Many children expressed fear around this issue, for example: "You will get raped if you have to walk on the beach late; that stuff happens a lot" (MM9). These fears are quite legitimate in contemporary South Africa, where people visiting certain beaches, parks, forests, and mountain trails are vulnerable to crime. Females in particular are afraid of visiting natural spaces for fear of being attacked and rarely visit isolated places alone. These social realities further compound "human-nature" disconnections.

Some of the research participants' responses indicated that access to natural spaces is often further constrained by finances and/or race. One instructor noted that nature-based experiences are historically perceived by black people as being "white people's stuff" (Ward-Smith, 2018). Some participants highlighted financial means as a pre-requisite to accessing natural spaces and activities like leisure camping. This speaks to the privileged and sometimes idealistic notion of people "getting back to nature" (Mcphie & Clarke, 2015) when hegemonic sociopolitical structures, historical contexts, and modern, consumerist lifestyles constrain access to nature. These prior perceptions of nature as dangerous and as spaces of privilege illustrate how Connectedness-with-Nature can be socioculturally and socio-materially mediated in ways that hinder connection. Decolonizing nature-based pedagogies would need to deconstruct such historically laden notions and open up new spaces for embodied nature connections and ethics-oriented reflexive deliberations around people-nature relationships.

Also significant were the ways in which the children's prior perceptions and understandings of and relations with nature played an integral mediatory role in connecting with nature in their everyday lives. At a surface level, children from both groups perceived nature as something somewhat separate from humans, for example, "I think more of animals and plants and then I think of myself" (MM3). Such perceptions are commonly associated with the notion of the "bounded self," which has been linked to the perpetuation of the human-nature binary and thus the perceived human-nature disconnection (Frantz et al., 2005). However, a closer look at the children's nature perceptions reveals an undergirding link between culture and nature in terms of the ancestral spirits, gathering of foodstuffs and traditional use of plants to sustain the human self. The children alluded to a direct, yet discreetly spoken of, connection between the natural world and the spirit world of the ancestors. For some children, this was expressed as apprehension around occupying certain natural spaces, highlighting a practical, material connection between people and nature that is mediated through spiritual and cultural practices. For children who recognize the powers (and expectations) of the ancestors and traditional healers, natural spaces are sites of negotiation which in turn mediate perceptions of safety in natural spaces. Thus, it is clear that nature is not only an individualized, subjective phenomenon, but perceptions of nature and feelings of Connectedness-with-Nature are socially, culturally, and historically mediated and negotiated (Zylstra et al. 2014).

Religious positionings were also seen to mediate children's sense of Connectedness-with-Nature and associated moral responses to environmental concerns. For example, they believed that the Earth belonged to God or that humans should care for the Earth, as required by God. For instance, one Mountain Mover stated: "God, Adam and Eve said that we have to take care of the Earth...but it doesn't seem like [that's what] we are doing" (MM4). The staff members' environmental ethics were similarly guided by a strong Christian orientation, for example, one manager described: "....having been brought up as a Christian, it's...like: 'you are custodians of the Earth and...everything within it' so you should be looking after it..." (Ward-Smith, 2018). These resonances between the children's and the adults'

beliefs in relation to God and their relationships with the nature established a strong Christian-led value synergy that cut across all aspects of the observed camps. These eco-religious value positionings shaped children's perceptions of and actions toward nature, illustrating the strong sociocultural influence that faith systems can have on environmental values (Biel & Nilsson, 2005).

Empathy in Sociocultural Context

Connecting with nature may also be linked to empathetic processes since it requires perceiving and feeling from the perspective of the "other" (in this case, nature) in ways which require openness to emotion, feeling, vulnerability, sensation, and embodied identification (McGarry, 2014; Zylstra et al., 2014; Jickling, 2009). The Star Gazers and the Mountain Movers had experienced feelings of empathy for nature prior to coming to Mystic Mountain. These were expressed, for example, through concern for the death of an animal (such as a street animal or a carcass) because of its bodily pain or through affection for an animal (such as a pet). The former example speaks to feelings of embodied identification with the pain of a dying animal, highlighting a more ecocentric, material similarity between human and more-than-human animal pain.

In some cases, however, empathetic relations with nature were seen to be constrained by socioeconomic circumstances. For example, one Star Gazer exclaimed that he would feel happy if an animal were to die because its death would give him access to a protein-rich meal: "I would feel happy [to see a dead animal]. . .because I would want to eat it" (SG2). Vulnerable children in the rural Eastern Cape are known to depend more heavily on wild-food sources, including bush meat, for their survival than those living in more advantaged socioeconomic circumstances (McGarry, 2008). This child's socioeconomic circumstances (one of enduring poverty) directly mediated his attitude toward animals as fellow sentient beings.

This section has shared extracts from the case study data to show the significant extent to which the children's developing senses of Connectedness-with-Nature were socioculturally and historically mediated through prior education, everyday activities and technologies, sociocultural and economic constraints, and environmental empathy. These insights suggest the importance of pedagogies that are gently attentive to the sociocultural nuance of children's lives and able to guide children to (re)negotiate their relationships with the natural world.

Embodiment and Socio-materiality of Nature-Based Experiences

This section summarizes data related to the actual physicality of nature-based activities at Mystic Mountain. Factors such as the weather, the terrain, and the overt physicality of nature-based activities are important mediators of nature-based experiences. For instance, in this case study, they directly influenced decisions to

participate in certain activities; they stimulated feelings of fear, humility, inspiration, and frustration; and they influenced memories of the camp experience and the place. Together, these in turn mediated the children's feelings of Connectedness-with-Nature.

The weather was a major determining factor in the children's expectations, experiences, and reflections on their time at Mystic Mountain. The weather might even be regarded as an implicit mediating tool due to its invisible role in mediating the children's engagement with the object of the Mystic Mountain activity system: immersion in nature. Many of the children were apprehensive about the cold weather conditions prior to and during the camps. Rantala, Valtonen, and Markuksela (2011) consider the weather to be an unpredictable material force of nature that can mediate people's experiences and practices in, and connections with, nature. They suggest that the weather affects people's engagement with nature-based activities in three main ways: anticipation of the weather, ways of coping with the weather, and discursive practices related to the weather (narratives and emotions that the weather evokes). In essence, the weather maintains a particular type of material agency (Human agency in relation to the weather can also play an equally strong part in determining nature-based practices.) that can "manipulate human practices by narrowing down or extending opportunities for outdoor activities" (Rantala et al. 2011, p. 285).

In the two camps, some forms of weather (such as snow, which is experienced as a novelty in this region of South Africa) were seen to excite some children's desires for outdoor experiences, while other weather conditions such as wind and rain (commonly perceived as disabling and uncomfortable) remarkably dissipated children's enthusiasm for being outdoors. The perceived and experienced physical strenuousness of the day hikes was another major factor that negatively influenced the children's experiences of hiking in nature. For example, one Star Gazer exclaimed: "The road is way too long for me and there are big hills" (SG3). However, negative experiences were sometimes countered by the experienced beauty of some of the goal-points of the hikes (waterfalls or view sites). Most of the children reflected on these day hikes with a strong sense of physical accomplishment, for example: "It's a beautiful sight...I have now seen a waterfall, it's breathtaking actually...It's just...wow!" (MM4). In terms of the night hikes, the darkness (linked to fear of animal attacks and fear of injury) was a key factor that negatively mediated the children's perceptions and experiences of the night hike. However, upon reflection, some children appeared to have enjoyed the night hike as it encouraged them to use different senses.

These experiences highlight how embodied, socio-material, and sensual encounters with nature can mediate perceptions of nature (Dorwart, Moore, & Leung, 2009). Attending to sight and hearing in natural settings can heighten embodied connections with nature by helping children to build more detailed and exciting understandings of their surrounding context (Gooley, 2014). Johnson (2002) maintains that experiencing a sense of "beauty," through overcoming challenges during the experience, may help to engender spiritual peace, humility, and comfort in natural spaces, in turn contributing to a sense of Connectedness-with-Nature. It

was observed on the hikes with both groups of children that a sense of accomplishment after overcoming the strenuousness of the day hikes and fear of the darkness during the night hikes seemed to strengthen their self-efficacy, agency, and confidence in natural places.

However, only one Mountain Mover appeared to have genuinely enjoyed the overall experience of the day hikes. This she ascribed to the way it triggered positive memories of spending time with her grandparents in nature. Historical resonances, in this case nostalgic memories, can be evoked through experiences in nature (Dorwart et al., 2009) which again emphasizes the importance of emotion in learning to connect with, and perceive, nature (Jickling, 2009).

This section has illustrated how the embodied or socio-material elements of nature-based experiences tacitly but undeniably mediated the development of children's Connectedness-with-Nature. This points to the importance of being more explicit when designing nature-based education programs about the mediating influence of sensual or physically demanding experiences on children's connections with natural places.

Value Contradictions and Resonances Within the Activity System

The previous sections have highlighted how sociocultural-historical and socio-material context influenced the children's developing sense of Connectedness-with-Nature in powerful yet underemphasized ways. This section will now discuss how contradictions or resonances between values and ethico-moral positionings within the activity system also mediated children's learning.

The "rules" of an activity system convey explicit and implicit regulations, norms, and conventions which can both enable and constrain environmentally oriented actions (Olvitt, 2012). When these rules do not align with one another, or with other elements of their activity system, or with other related activity systems, they produce systemic disturbances, tensions, or contradictions. According to Engeström (2001, p. 137), contradictions are the "historically accumulating structural tensions within and between activity systems." They are seen as having generative potential in driving learning and mediating transformation in activity systems.

In the Mystic Mountain activity system, contradictions arose around several of the children's established perspectives and practices of littering and harming animals. Such practices are directly at odds with the "rules" of the Mystic Mountain activity system (such as no littering and respecting the sanctity of life) which are undergirded by nature conservation values. For example, in response to the ongoing problem of children dropping their rubbish around the center and on hikes, one manager described how, for the Star Gazers: "Something like not littering is absolutely new. . .because there [are] very limited refuse removal services where they are." Other staff members highlighted a lack of environmentally conscious role models in the children's communities. This indicates the center staff's efforts to acknowledge the extent to which the children's everyday environmental practices (such as littering) are influenced by their prior sociocultural-historical positionings.

Several staff members described tensions between children's cultural practices or beliefs about animals and Mystic Mountain's values of the sanctity of life. Manager 1 highlighted how killing specific animals, like snakes and owls, is often related to cultural beliefs that are at odds with the values Mystic Mountain promotes:

> Something like snakes, we would obviously never allow them to kill a snake...We would catch it, take it far away and release it. [Also] things like the owls ...for the Xhosa...there are all sorts of stigmas around owls and snakes, even tortoises...The fact that we say, No, tortoises must be protected', this does come as something new to them.....(Ward-Smith, 2018)

Manager 1 believed that the children's sociocultural backgrounds mediated their behavior toward the animal/plant life: "At home...they are encouraged to do it [kill a snake]...Killing something like a locust or...a frog...is *irrelevant* but killing something like a snake...an owl...you are encouraged to do it. [Also]...damaging the plants and the wildlife as you go along..." (JI1, [00:23:00.19]). Further, some of the instructors, from a rural Xhosa background, were able to shed light on the tensions that the Star Gazers might experience at Mystic Mountain: "Like for snakes...like where you grow up [in the township], the first thing you do is, you kill it...Because you don't know...what it is going to do to you!" Further, he described an encounter with a snake while living at Mystic Mountain and how juggling both of his roles was difficult, as an instructor and as a Xhosa man (accustomed to killing snakes):

> [At] Mystic Mountain ...there was a snake, and I was like 'Okay!' I had never thought how to catch a snake [because] ... for the people that grew up in the location, if you see a snake, you have to kill a snake... it's a dangerous animal. So, I was like.....okay now I am wearing another hat [the instructor hat], which means I mustn't kill a snake because a snake can help you with keeping away rats and mice...It's some of the stuff that I have learnt at Mystic Mountain ...Most of the guys who are growing up in the location, they don't *have* that much information [...] Especially with us Black people, [seeing a snake] means something else, like an omen. (Ward-Smith, 2018)

These examples highlight the value tensions between children's and some instructors' cultural beliefs about animals and Mystic Mountain's pro-environmental rule of sanctity of life. Such tensions also highlight some important challenges for Mystic Mountain's continued exploration of decolonized pedagogies. There is a need to engage critically, sensitively, and reflexively with conflicting values and ethical practices in ways that are not impositional and that do not delegitimize either the children's or the center's values, everyday practices, and cultural beliefs. Nature-based pedagogies need to create "hybrid spaces" of exploration and deliberation that help children and instructors to depart from alienating narratives framed by narrow positionings of "right" versus "wrong."

Olvitt (2012) cautions against foregrounding tensions and contradictions in activity systems without giving due attention to continuities or resonances, which also appear to provide traction for ethics-oriented learning. On the Mystic Mountain

camps, there was evidence of eco-religious synergies between the children's religious value positionings and the environmental ethics of the outdoor center. For example, the following prayer is displayed on the dining hall wall at Mystic Mountain and is recited before meals:

> ***Mystic Mountain's Grace***
> *O God who made the pleasant shade*
> *The blazing sun the streams that run*
> *The food we eat the friends we meet*
> *The games we play here everyday*
> *Our heads we bow to thank thee now.*

During interviews and focus group discussions, several children referred to this prayer and the way it resonated with their experiences of nature connectedness. One Star Gazer, for instance, commented: "I really like the grace because it tells everything that happens around Mystic Mountain so sometimes when I want to pray at home I just say, 'Oh God who made the pleasant shade. . .'" [SG1). Instructor 6 also noted:

> It's a nice prayer. . . it accommodates everyone. Most of the words are touching on nature. . . that's what Mystic Mountain is about . . . If you take all those words and align them with everything that you are going through here. . .that prayer, it tell you what is going to happen . . .Also most of us, we are religious people.

Biel and Nilsson (2005) maintain that situational cues (e.g., reciting this prayer before meals) partly determine which religiously imbued values influence environmental attitudes. Like other sociocultural positionings, resonance with religious values may be an important dimension of mediating children's sense of Connectedness-with-Nature.

This section has highlighted how the environmental values and passion of the staff members (which is understood here as an essential underlying component of the activity system's mediating tool of nature-based activities) were another implicit but powerful mediator of the nature-based activities and, by extension, the children's environmental learning and Connectedness-with-Nature. This passion was mediated by the staff members' own backgrounds and the environmental values they promote as well as the environmental values that Mystic Mountain itself promotes (Ward-Smith, 2018).

Conclusion: Toward Resonant, Decolonized Pedagogies

From the vantage point of CHAT, this Chapter has argued for a triad of decolonizing, ethics-led, and embodied nature-based pedagogies, drawing on Ward-Smith's (2018) case study data of two children's camps at Mystic Mountain outdoor education center. The children's Connectedness-with-Nature was shown to be mediated by the dialectical interrelationships of sociocultural-historical, socio-material, and

embodied elements. These included values-based, relational encounters (such as the camp instructors' passion for nature and environmental care), immediate cultural artifacts (such as the nature-oriented prayer hanging in the dining hall), and rules of the outdoor center's activity system (such as the center's rejection of littering and its explicit commitment to the sanctity of life). Larger societal structures (such as politico-economic systems and the inadequacies of the state schooling system to develop children as informed, agentive, and reflexive citizens of the planet) and cultural practices and norms (such as people-animal relationships and how to dispose of waste) were also seen to mediate children's Connectedness-with-Nature. The case study further showed how all of these elements are emergent from the complex sociocultural history of colonialism; Apartheid, democratic politico-economic reform; traditional and contemporary people-nature relationships in AmaXhosa culture; and the cultural history of outdoor education centers and their pedagogies in the Eastern Cape province. Importantly, the children's own positionings in relation to this rich milieu were found to mediate their perceptions of, and connectedness with, nature both prior to and during the Mystic Mountain camps. There, mediating factors included children's prior formal educational experiences; prior environmental knowledge; their familiar, everyday activities; and their direct and indirect experiences of nature.

The case study shared in this Chapter raises important questions about the connections between transformative learning processes, reflexive ethical dialogue, cultural history, and people's connections with nature that are relevant to contemporary global struggles for people and the planet to flourish. The triad of decolonized, ethics-led, and embodied nature-based pedagogies has the potential to open up more nuanced, contextually resonant, and potentially transformative pathways to (a)mending the perceived child-nature disconnection. Some starting points for considering what such nature-based pedagogies might look like include:

- Acknowledging the world's relational complexity
- Acknowledging that children's sociocultural-historical value positionings are multidimensional, interactional, and fluid
- Building on children's everyday lives and matters of concern rather than asking that they adopt external or socioculturally disembedded knowledge and practices
- Avoiding a deficit approach to children and the capital they bring to nature-based learning contexts
- Centralizing and celebrating children's sensual embodiedness in the world
- Adopting a stance of openness and plurality that acknowledges that children from all backgrounds are capable young people with their own socioculturally inscribed ways of doing, being, knowing, and valuing in the world
- Creating challenging but safe spaces to deliberate contradictory and resonant value positionings.

Nature-based pedagogies framed in this way recognize children's lived historically, politically, socioculturally, and socio-materially diverse realities as the *starting point* of environmental learning processes. They can open up vital spaces for

collaboration and ethics-led dialogue that heed the call for nature reconnection in critical, collaborative, and embodied ways.

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Third Culture Kids and Experiences of Places

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Oliver Picton and Sarah Urquhart

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Abstract

This Chapter explores the dynamics of place as experienced by third culture kids (TCKs) who spend their developmental years in multiple and diverse physical and social contexts. Traditional conceptualizations and assumptions about a singular localized sense of place are not congruent with the changeability of TCK experiences, and so the concept of sense of place is reexamined with TCKs as the focus. Readers are introduced to two research-based case studies on TCKs and their relationships with place. A study from Hong Kong identifies potential differences between TCK and local Hong Kong adolescents in terms of their relationships to nature and place attachment and considers how relocation has influenced TCK sense of place (Urquhart, An exploration into the environmental identities and sense of place of internationally mobile adolescents. Unpublished master's thesis. Retrieved from https://purehost.bath.ac.uk/ws/portalfiles/portal/187944920/Oliver_PICTON_final_Thesis.pdf). A second case study of TCK adolescents in Qatar explores how the "gatedness" of residential contexts can strongly impact TCK experiences of place and sense of place (Picton, International school students' experiences of their local environment: a case study from Qatar. Unpublished PhD thesis, University of Bath, 2016). For TCKs, mobility has the potential to both expand and simultaneously limit engagement and identification with place and non-human nature. This Chapter calls for the recognition that for TCKs, immediate contexts are intrinsically linked to a diversity of places in their past, present, and future. Key aspects of place-based education (PBE) and the potential pedagogical challenges and opportunities are considered within the contexts of international schools. PBE is highlighted as a way to promote relational conceptualizations of place to drive an inclusive and globally minded sense of place for TCKs.

Keywords

Third culture kids · Sense of place · Place attachment · Nature bonding · Place-based education (PBE) · International schools

Introduction to Third Culture Kids and Place

In an increasingly interconnected world, more and more children and youth are spending their childhood and adolescent years in multiple cities, countries, and environments. Furthermore, they experience diverse cultures and languages in varied geographies and ecologies. This Chapter looks to highlight the ways in which international mobility adds unique dimensions to a young person's sense of place and experiences of place that are worthy of exploration. Mobility and relocation challenge current discourse on sense of place that typically focuses on singular and prolonged places of connection and experience, which is incongruous with the reality of many internationally mobile children and young adults. This Chapter aims to justify an expansion of dominant conceptualizations of sense of place and

experiences of place to be more inclusive of multiple place experiences. We also explore the potential opportunities for place-based pedagogies, particularly within international schools, to help foster a sense of place from a childhoodnature perspective. In the same way the concept childhoodnature rejects anthropocentrism, this chapter rejects notions of TCKs being somehow separate from place, nature, and their environment of residence. If children are nature, then TCKs cannot be viewed as separate from their places of residence.

Who Are Third Culture Kids?

New York to Sydney, Hong Kong to Beijing, and Dubai back to Hong Kong: What reads like the itinerary of a world tour is actually an example of the places of residence and life transitions of an internationally mobile teenager from birth to age 17. Parental career choices are often the reason for childhood and adolescent transience, but changing family dynamics, evolving political and economic climates, and personal choice also impact mobility (Urquhart, 2016, p. 14). Characterizing and studying the lives of internationally mobile children is challenging, as the range of life experiences encompass a world of familial, cultural, ethnic, linguistic, and environmental possibilities and combinations. The term "third culture kid" was first used in the 1970s by Useem (1976) to describe the emerging group of children growing up outside of their "home" passport country and culture, with attachments to multiple cultures rather than one dominant culture. Internationally mobile children and youth are also sometimes referred to as "expatriate children" (Picton, 2016) or "global nomads" (Hayden, 2006), and each term has its own nuances in definition (McCaig, 2011, p. 47; Tanu, 2013, p. 5). To remain consistent with current discourse, this chapter will refer to internationally mobile children and youth as TCKs. It is also important to note that negative factors such as conflict and environmental degradation and change have also driven international mobility. Regardless of the terminology used, common characteristics are shared by these children and youth. Previous studies described the difficulties that TCKs can have in constructing social and cultural identities and in connecting to concepts of home because of their experiences living in numerous social contexts and having relocated multiple times (Fail, Thompson, & Walker, 2004; Grimshaw & Sears, 2008). The significance of this chapter will now be outlined by introducing some of the opportunities and challenges faced by TCKs in international school contexts and how experiences of environments and place can be shaped by mobility. The role of schools and the potentials of place-based practices will also be introduced. Both international education and "international school" are somewhat contested concepts with a number of definitions. International education is often equated with "cosmopolitanism" (Gunesch, 2004) and "global education" (Clarke, 2004). International schools are heterogeneous entities, but some broad generalizations are that they often cater for expatriates, employ teachers from overseas, are fee-paying, and offer international programs of study.

Chapter Significance

Instead of having one primary place of residence to connect with emotionally and cognitively, TCKs have lived in multiple locations and likely have difficulty identifying a singular home location (Nette & Hayden, 2007).This chapter therefore challenges sense of place discourse in environmental education and singular notions of place in place-based education (PBE). Pollock and VanReken (2009) argued that growing up internationally means that TCKs often have an expanded view of the world and strengthened cross-cultural skills (pp. 111–115), both of which are attributes described as having an "important and meaningful contribution to sustainable and tolerant societies" (UNESCO, 2006, p. 8). Yet TCK migrant status can also mean that there are potential language and cultural barriers which could limit TCK voice, community engagement, and ability to effect change within certain contexts. Additionally, TCKs can also live somewhat "sheltered" lives in gated communities or expatriate enclaves which can limit environmental engagement (Picton, 2016; Thieme, 2015). Here we see a duality; international mobility has the potential to both expand and simultaneously limit TCK engagement and identification with "place" and nature.

Research about identity formation in TCKs has previously focused on the social, cultural, and psychological aspects of child and youth identities (Fail et al., 2004; Grimshaw & Sears, 2008). While not independent from these dimensions, this Chapter focuses specifically on environmental and geographical place. Environmental education typically promotes a localized sense of place and has not yet given significant attention to how sense of place differs for those (like TCKs) that do not have a singular sense of home or place. This Chapter looks to address this gap and aims to contribute to a richer understanding of the experiences of TCKs. Specifically, this Chapter calls for an expansion to the "sense of place" concept to be more inclusive of multiple locations concurrently and to de-emphasize a singular and localized understanding of place. Although not directly included in the scope of this Chapter, there are potential implications here for other populations of children and adolescents that experience relocation, including immigrant families and refugees who likely have more limited choice in their relocations than TCK families due to political and social conflict.

The Chapter also explores the dynamics of place as it relates to international schools and pedagogy. The potential of PBE in TCK and international school contexts is outlined. A broad interpretation of PBE is adopted as learning where "lived experience of a local environment and community is a starting point for inquiry into the instability of meaning attributed to an always already mediated experience of the local" (Ruitenberg, 2005, p. 213). The power and value of PBE lies in how it can address "contextualizing knowledge and by resisting imperialist and homogenizing forces of globalized culture" (ibid.). For TCK teenagers who are potentially alienated or differentiated from their wider local community, this has a great deal of potential. PBE is at its core about "experience," placing emphasis on hands-on, real-world learning experiences. As a strategy for learning, PBE has been linked to increased academic achievement, helping students develop stronger ties to their communities,

enhancing students' appreciation for the natural world, and creating a heightened commitment to serving as active, engaged, and contributing citizens (Sobel, 2004).

Author Perspectives and Chapter Outline

Motivation to author this Chapter has been largely inspired by both of our professional careers as educators within international schools and our own personal experiences with international relocation. We have each lived and taught in multiple countries and have had regular contact with children who experience the challenges and joys of growing up as TCKs in multiple places. Both of us are employed at schools that offer the International Baccalaureate (IB) curriculum, and through the courses that we teach, *Environmental Systems and Societies* and *Geography*, students often share their personal stories that contrast their wide range of experiences (or lack of) with all types of environments.

Through our careers in education, we have both developed an interest in fostering environmental awareness and connection to non-human nature in our students. Research on sense of place and place experience has established that having a personal connection to an environment is a significant precursor to the formation of environmental values and pro-environmental behaviors (Kals & Ittner, 2003; van der Werff, Steg, & Keizer, 2013). In her analysis of a range of contemporary environmental philosophy, Heise (2008) summarized that "in spite of significant differences in social outlook, certain features recur across a wide variety of environmentalist perspectives that emphasize a sense of place as a basic prerequisite for environmental awareness and activism" (p. 33). Since a developed sense of place is a commonly referenced requirement for fostering pro-environmental proclivities, then we, as educators, have a responsibility to understand the TCK experience as it relates to place as fully and with as much dimension as possible.

Each of us began our explorations on the dynamics of TCKs and place separately, in the contexts in which we were teaching. Much of this Chapter is inspired by and based on our research case studies conducted with TCK students within international school contexts in Hong Kong (Urquhart, 2016) and Qatar (Picton, 2016). This Chapter will introduce readers to this empirical focus in section "Case Studies of Third Culture Kids and Place." The first study outlines findings about TCK relationships with non-human nature and place attachment in Hong Kong, and the second study examines how in the residential contexts of some TCKs "gatedness" can strongly impact place experience and sense of place. Although distinct studies, both examine TCK relationships with place, place identity, and local environmental experience. Few empirical studies beyond these examine TCK place experience and sense of place, highlighting the need for further research in the field (see, e.g., Sander, 2016). The studies presented both corroborate and conflict, likely in part because of the heterogeneous nature of TCKs, and the geographical contexts in which they live, learn, and play. Section "Third Culture Kids and Place" of this chapter will contextualize the research findings on TCKs and place within current theoretical frameworks. Section "International Schools and Place" then expands on the

dynamics and implications of place within international schools for TCK students. International schools tend to be preferred educational institutions for the families of TCKs, for several reasons that will be outlined. Lastly, section "Conclusions and Place-Based Potentials in International Schools" looks to summarize the potential for PBE in international schools and the pedagogical challenges and opportunities it poses in relation to TCKs. This Chapter concludes by examining how a relational conceptualization of place and environments can drive a more globally minded sense of place for TCKs and richer childhoodnature experiences.

Case Studies of Third Culture Kids and Place

The following two case studies are presented to explore some of the issues, challenges, and opportunities faced by TCKs in their environments of residence. The geographical and sociocultural differences between Hong Kong and Qatar also highlight the ways in which the complexities of place can potentially expand yet simultaneously limit TCK engagement and identification with "place." Discussion of how the findings from both students compare to one another and problematize traditional sense of place concepts will follow.

TCKs in Hong Kong: Relationships with Nature and Place Attachment

The intention with this study was to explore the presence and nuances of potential differences between TCKs and their more "local" adolescent counterparts in terms of relationships with non-human nature and place attachment. The findings for this case study came from mixed methods research on the experiences of secondary school students aged 14–18 residing and attending international schools in Hong Kong (Urquhart, 2016). The key research questions relevant to this chapter were:

1. What are the relationships, if any, between the number of international relocation students experienced and their general relationship to non-human nature?
2. What are the relationships, if any, between the number of years adolescents have lived in Hong Kong and their attachment to Hong Kong?
3. How does being internationally mobile impact TCK sense of place?

The first research stage used empirical analysis to explore any emerging quantitative differences between *local students* who have lived their entire lives in Hong Kong and students who have lived internationally in terms of how both groups relate to non-human nature and how attached they felt to Hong Kong specifically (to address research questions 1 and 2). The survey asked key demographic data and incorporated sections of two preexisting psychometric scales: the Nisbet, Zelenski, and Murphy (2008) *Nature Relatedness Scale* and the Raymond, Brown, and Weber (2010) *Place Attachment Scale*. The survey was distributed to students from five different international schools in Hong Kong which all offered the International Baccalaureate

program and reported a minimum of 30 different nationalities represented within their student population. The survey required students to respond to statements in a Likert scale rating system, and the resulting 213 responses from students with citizenship to 49 countries were analyzed for variance. However, surveys alone could not explain any identified differences between local and internationally mobile participants. The underlying reasons are much more multidimensional than a survey can reveal, and therefore 12 individual semi-structured interviews provided qualitative insight into the survey results in a way that highlighted participant voices. Interviews also addressed research question 3 about sense of place and allowed adolescent perspectives to be shared, which was crucial to understanding personalized constructions of sense of place and relationships with non-human nature.

Hong Kong is an ideal site of study for TCKs as there are a considerable number of international schools which reflects the large population of expatriate families and the desire of local Hong Kong Chinese families to have their children educated at schools with international curriculum and English-language instruction. The images and symbols associated with Hong Kong are often of the urban cityscape; however, Hong Kong also has a diverse ecological landscape with sandy and rocky shores, woodland, open grassland, and mountain ranges with a significant portion of geographical area preserved as country parks or marine parks. While these are accessible public spaces, the extent to which the participants from this study use them for recreation was difficult to determine. Opportunities for immersion into natural environments are available to residents, but conclusions about access cannot be made definitively. The following two sections outline key findings from this case study research.

Third Culture Kids Relationships with Non-human Nature

The question of TCK relationship with non-human nature was formed to address an assumption that this might be limited by mobility because of a suggested sense of being "unrooted," a term used occasionally in TCK literature (Eidse & Sichel, 2004). The Nisbet et al. (2008) *Nature Relatedness Scale* (NRS) is a tool used to empirically describe an individual's connectedness to the natural ecological world and "encompasses one's appreciation for an understanding of our interconnectedness with all other living things on earth" (p. 718). When student scores were analyzed for demographic differences using two-tailed t-tests and ANOVA, minor differences were found between school population and gender. More significantly, when grouped based on the number of relocations experienced in their lifetime from 0 to 3+, the results indicated that respondents who had experienced three or more international relocations were more likely to have a higher nature relatedness score from the survey than their peers. This indicates that the most mobile TCKs were more likely to express an appreciation and recognition of the interconnections and significance of natural systems in their survey responses (Urquhart, 2016, pp. 66–72). It is not possible to prove causation to conclude that high levels of international mobility were the reason for a stronger relationship with non-human nature. These results do, however,

indicate that international mobility does not negatively correlate with an adolescent's relationship with non-human nature as expressed in the survey responses. As research has linked environmental relationships with nature as a requirement to developing environmental values and behaviors (Kals & Ittner, 2003; Nisbet et al., 2008), we can suggest that internationally mobile TCKs have a similar capacity to behave and think in an environmentally conscious way as their less mobile peers (Urquhart, 2016, p. 106). One challenging dimension of this research was the TCK definitions of nature. When asked about their understanding of the term nature, the TCK participants typically shared an understanding of the concept of nature that echoed that of Clayton and Opotow (2003): "Environments in which the influence of humans is minimal or non-obvious, to living components of that environment (such as trees and animals), and to non-animate nature environmental features, such as the ocean shore" (p. 6) (Urquhart, 2016, p. 96). It is recognized that these understandings of nature often distinguish place from humans and are innately anthropocentric; however, TCK conversations about nature did tend to reflect this perhaps dominant human-nature dichotomy that childhoodnature looks to challenge (Malone, 2016).

Interview responses provided insights into TCK experiences of non-human nature, and three themes emerged that suggest potential reasons for a strong nature relatedness score: the significance of early family experiences in nonhuman nature; experiences in diverse environments; and an appreciation of impermanent contexts (Urquhart, 2016, pp. 74–77). Several TCKs who had relocated internationally shared stories of experiencing natural environments with family at a young age and engaging in outdoor activities such as hiking, camping, or going to the beach with parents and siblings. One TCK student shared her perception of her parents: "I don't think my family is the kind of people who are disassociated from the environment that we live in. We are pretty eager to immerse ourselves in the places we live in" (Urquhart, 2016, p. 105). This affinity for families to explore and a desire to fully experience diverse places would likely be values and attitudes transferred along to mobile children and adolescents. This is consistent with the writing of Louv (2005) who identified the significant role that parents play in introducing and normalizing experiences in non-human nature for their children. The role of family in introducing TCKs to such experiences was not an original focus of this Hong Kong case study but is worthy of recognition as a potential reason that TCKs are able to form equally as strong relationships with non-human nature as their peers who have not experienced international mobility.

Another theme which emerged from interviewing the Hong Kong-based TCKs was that life in multiple countries generated a diversity of environmental experiences, through engaging with a range of biomes, witnessing a variety of issues, and seeing diverse approaches and attitudes to environmental management. One TCK participant explained:

> I think actually why it [participant awareness of the environment] has evolved so much is because I have seen so many different environments. I have maybe a deeper appreciation. Had I lived in just one place seeing, for example, a tropical rainforest, then I wouldn't have an appreciation for, like environments with mountains and stuff like that. Because I have

> seen lots of different environments, I think that's something that really explains why I care about the environment. (Urquhart, 2016, p. 75)

A few TCK participants identified that an appreciation for a particular place originates from wanting to savor the experience of that place. Knowing that a location is unlikely to be permanently accessible encourages TCKs to be aware of the place, explore it and revel in it. Another participant shared that as a TCK, "since you move around a lot, you enjoy it [current environment] much more because it's precious time and it won't last for very long. . . You have to take advantage of it and appreciate it that much more" (Urquhart, 2016, p. 76).

Experiencing the similarities and differences between different geographical locations can provide a chance for adolescents to see firsthand the environmental issues and successes in the places they have resided. Thomashow (2002) argued, "Ecological transience offers a perceptual opportunity–a means to observe and internalize the diversity of peoples and landscapes" (p. 164). With the exception of philosophical perspectives like those of Thomashow (2002) above, there is a noticeable lack of research on the potential benefits of mobility as a way to experience environmental diversity and foster environmental concern. If mobility can provide TCKs with the diversity of experiences to conceptually view the world as a larger system, then this could positively impact their relationship with non-human nature. To further this, living in places for short periods of time generated in some TCKs a desire to make the most of their time, and they chose to engage fully with the places around them.

Third Culture Kids Place Attachment (Hong Kong)

The question of TCK attachment with Hong Kong was intended to address the assumption that the number of years of residence in a place will have a direct correlation with an adolescent's attachment to that particular location. The Raymond et al. (2010) *Place Attachment Scale* (PAS) was used to consider if correlations exist between the amount of time that an adolescent has spent in Hong Kong and the levels of connection they feel to Hong Kong. Responses to the PAS were analyzed holistically using a single PAS score and also separately by two of its dimensions: place identity and nature bonding. In reference to the PAS survey tool, place identity is defined as "those dimensions of self, such as the mixture of feelings about specific physical settings and the symbolic connections to place, that define who we are" (Raymond et al., 2010, p. 426). The nature bonding dimension specifically required students to consider their "feelings of belongingness or membership to some part of the non-human natural environment" (Raymond et al., 2010, p. 426).

When student survey PAS scores were analyzed for correlation, the number of years that a TCK had lived in Hong Kong has no statistical influence on how attached they were to Hong Kong as indicated by their overall place attachment scores. To analyze the data further, the subcategories of place identity and nature bonding were analyzed separately using divided groups based on years of living in

Hong Kong to complete a chi-squared analysis. The results indicated that there was sufficient statistical evidence to conclude that there was a relationship between the number of years an adolescent has lived in Hong Kong and his or her place identity score: adolescents who had lived in Hong Kong the longest had the highest place identity scores, and those who were newer to Hong Kong were more likely to have a low place identity score (Urquhart, 2016, pp. 81–83). While this trend might not be surprising, what was more surprising was that when the dimension of nature bonding was examined based on length of residence in Hong Kong, there were no discernable differences between those responses from longtime residents versus new residences based on how bonded they felt to the non-human natural environments in Hong Kong (Urquhart, 2016, pp. 83–84). The TCKs that participated in the interviews made statements that aligned with these empirical findings about time and place attachment. One TCK participant shared:

> I think the longer you live in a place, the more you will be attached to it because you have more memories. Locations are better memorized, and you can walk around it with your eyes closed. Since I have been in Singapore more, I feel more attached to it. In Dubai, I was only there for 1 year, so I don't feel attached to it.

Another participant elaborated on the idea of relating to a place and identified a sense of being attached to many places, but not with the same depth of identification:

> I feel like when you move around to so many different places, and you spend a good amount of time between them, in a way you can sort of relate to everything equally, but on the other hand, you can't really relate to them [places] as deeply as someone who has lived there a much longer time.

These two TCK students, along with other interview participants, connected the length of time spent in a place with increased familiarity and intimacy.

However, this relationship between length of time in a place and connection was not found when looking at the subcategory of nature bonding specifically. The following themes emerged through interviews as possible reasons why: the accessibility of Hong Kong for exploration (in both rural and urban contexts); a sense that feeling connected to a place is distinct from nationalism or patriotism; and a perceived difference in attitudes to nature between TCKs and their more local longtime residing peers. Many TCK interview participants felt as though Hong Kong's public transportation availability, relative personal safety, and lack of significant language barrier for English speakers made living and traveling in Hong Kong easy, especially when compared to other places the adolescents have lived prior to Hong Kong. The ease of accessing a place, particularly rural contexts, could explain the nature bonding dimension of place attachment as even adolescents who are newer residents of Hong Kong are not impeded to access natural spaces by barriers that may be present in other places (Urquhart, 2016, pp. 87–88).

A second theme that emerged from TCK interviews was an articulated dislike for perceived nationalism and patriotism. One participant shared, "I can't really hold too much of an alliance or love or a patriotism to any single country because they are

all. . . they have all in a way built me up to the person I am today" (Urquhart, 2016, p. 88). Participants made it clear that feeling a sense of loyalty to a place is not necessarily linked to being influenced or connected to a place. Thus, TCKs are able to experience, appreciate, and connect with a place despite not having a preexisting sense of identification, and perhaps identification is not as significant a prerequisite to establishing place connections as previously assumed.

One final result from the interviews was that several TCKs perceived a difference between themselves and their local peers in that TCKs noted that they themselves had more frequent encounters with the rural and natural place in Hong Kong than their peers who may have been born in Hong Kong. In most cases where this distinction arose, participants saw this to be of concern and expressed interest in encouraging others to engage more with Hong Kong's environments:

> I really think that it is important, for Hong Kong students especially, that they need to get outside more! Out hiking, but not just hiking, but even get to the beach, you know? Get outside. I think that is something that Danish students have but that Hong Kong students lack is that ability to be more alone and just be by yourself. . . Get out hiking or exploring and being in touch with nature.

Exploration of Hong Kong, inclusive of natural areas, is a technique used by TCKs to build familiarity and attachment with Hong Kong. Although participants did not explicitly identify cultural influences as a distinguishing factor, it was hinted at in the interviews. The willingness and interest to experience the natural side of Hong Kong is perhaps a way to compensate for the reduced amount of time mobile adolescents had lived in Hong Kong.

This Hong Kong case study made it evident that internationally mobile lifestyles have impacted TCKs who hold memories and experiences within diverse places. The findings of this research challenge the assumptions that a sense of "unrootedness" automatically limits a TCK's ability to form relationships with non-human nature and shows that mobility does not necessarily negatively impact his or her connection to the natural world. One important reminder is that the context of Hong Kong was likely a significant factor when shaping TCK relationships with non-human nature and attachment to place in this case study. TCKs likely benefit from Hong Kong's linguistic accessibility and internationalism, thus opening opportunities for TCKs to engage and explore. As seen in the next case study on the TCK experience in Qatar, not all international experiences afford TCKs the same level of social and physical access to place.

Third Culture Kids in Qatar: Gated Communities and Third Culture Kid's Experiences of Place

Picton's interpretive case study examines how students aged 13–14 attending an international school located in a large gated company township/compound in northern Qatar experience their local environment of residence. Where Urquhart's study

focused on relationships with non-human nature, sense of place, and place attachment, this study was framed as a study of environmental *experience*. A range of terms are used in literature to describe how people understand and experience their world, and many of these overlap. Some are somewhat "everyday," for example, "understandings," "knowledge," and "perception." Others are more technical and grounded in academia and various epistemologies, for example, "discourse," "representations," and "imaginative geographies." Experience was chosen to frame this study because of its all-encompassing nature, with many of the other ways of understanding the world foregrounded in *experience* of the world.

The research revealed the importance of understanding how "gatedness" impacts environmental experience for some TCKs. A growing volume of research from a variety of disciplines, notably urban planning studies, cultural geography, and anthropology, have started to explore gated communities as a feature of living spaces across the world – often for wealthy nationals and expatriates in countries with more extreme inequalities in wealth distribution (see Brunn, 2006; Glasze, 2006; Low, 2003). There is now also some interest in how these residential forms are impacting children's sense of place and place experience (e.g., Sander, 2016). The significance of understanding gatedness in TCK experiences of place lies in the understanding that physical space produces the preconditions of social space. As previously noted, the lives of many TCKs can be both highly unbounded on a macroscale, experiencing frequent moves and high levels of international mobility, yet in everyday terms be restricted by various types of boundedness or gatedness – real and imagined, physical, and more sociocultural. A range of factors can inhibit or encourage place and non-human nature interactions for TCKs, including safety, language or cultural barriers, family and school attitudes to host environment, climate, and type of home residence.

The research presented here was conducted at a large British international school in the north of Qatar, owned by the national gas companies. The school and students' homes were both located within a walled and gated housing community with over 10,000 expatriate residents from over 60 different countries. Using qualitative methods – map drawing, concept mapping, walking as method, and focus groups – and a participatory data analysis framework with 58 Year 9 (13–14 year old) students over 2 phases of research, the study revealed the importance of acknowledging how gated living can impact place experience and sense of place for TCKs. Although such levels of physical gatedness are not universal for TCKs, it is common for migrants and TCKs to live in gated complexes, apartments, or compounds all of which restrict entry/exit and act as a semipermeable residential form. This may be for safety, convenience, or cultural reasons. The research used a process of co-analysis with participants to develop categories of place experience. Across two phases of research, the participants themselves developed 13 "categories" of place experience, encompassing a range of physical environments, imagined spaces, and types of experiences. These are summarized in Table 1.

Using a process of co-analysis and researcher theorizing five key findings emerged in the research. These have implications for understanding childhood place experience for TCKs, in particular those living in similar geographical and

Table 1 Categories of place experience identified by third culture kids in Qatar (Picton, 2016)

Category of place experience	Examples and detail
People and cultural places	Encompassing the territorialization of space and ethnic stereotyping in the community, as well as territories based on company (employer) allegiances
Economic places	The social importance of shops as sites of socializing
Gates and walls	Physical boundaries and the importance of gatedness. Children noted feelings of imprisonment but also more positive notions of gatedness including sense of safety and security. Some gates were more imagined with nonphysical boundaries also perceived. Walls were also used as sites for play
Religious places	Both formal religious sites (mosques) and more metaphysical places with spirits
Social places and recreation	The street, youth clubs, sports facilities – all often gendered in their use and perception
Transport and roads	The physical morphology of roads and transport. The impact of car dependency in the community was reflected with many having a very nodal sense of place – disparate locations experienced and connected by car transportation with little understanding of their relative locations
Health	Health center (local clinic) and healthy places
Home and homes	Understood on many scales from bedrooms and belongings to home as homeland or place of belonging
School	Experienced as a place of learning, friendship, and socialization. Valued but also often disliked
Time	The *process of place* – time of day, seasons but also related to time perception. Notions of time being experienced at different "speeds" in different places. Also encompasses change and continuity of environments more generally
Online world	Online lives and their significance for identity formation and maintenance for TCKs were noted
Safe places	Spaces of fear and comfort, as well as the presence of security personnel, were significant. In many senses this category is linked to "gates and walls"
Environment/the outdoors	The importance of nature, wastelands, secret places, green spaces, and the outdoors more generally. A small minority of participants had strong connections to the physical environment

sociocultural contexts, for example, compounds or expatriate enclaves in the Middle East.

1. **Gatedness impacts children's experiences of local environments**: the research found that the everyday lives of TCKs were impacted by the presence of gates, walls, and security patrols. These limited independent mobility and as a result severely limited knowledge, understanding, and experience of wider nature beyond the immediate area of residence.
2. **Binaries matter**: the local environment was often experienced and understood in binary terms between the "real" and "imagined," oppositional understandings of

"us" and "them," "natural" and "unnatural," and understandings of the known and unknown in spatial terms. Such binaries would support notions of children being separate from nature.

3. **Borders and boundaries lead to transgressions**: areas such as wastelands and other derelict spaces were often special and hidden places for participants in the study. The children created their own microgeographies, challenging power structures and dominant uses of space and place. The appropriation of space and subversive use of places was a means of challenging inherent power structures.
4. **Othering needs challenging**: in the multiethnic and multicultural community under study, the children developed "territories" based on a range of factors, most notably nationality and company allegiances (parent employers). Some evidence of xenophobic attitudes emerged in data from some participants, highlighting the wider issue of cultural conflict in international communities, and international schools.
5. **Environmental experience is inherently temporal**: experiences of place, nature and sense of place, were found to be time dependent. Experiences of places changed depending on time of day and season. Notions of the passage of time itself being experienced differently in different places (slow time vs. fast time) emerged. Children also noted change and continuity in the environment, acknowledging landscape changes both in physical and human terms. Here it is useful to conceptualize place as process, where place is "made up of the social constellations (local as well as global) that unfold at a given location at a given time, which entails that places *do not hold stable identities*; rather, they are continuously reconstructed through the social processes that intertwine in a given location" (Christensen, Mygind, & Bentsen, 2015, pp. 591–592 own emphasis added).

There are multiple implications of these findings for understanding childhoodnature. Certainly binary understandings of place and othering need to be challenged, with more opportunities for TCKs to deconstruct binaries of place, for example, through critical place-based pedagogies in their local area of residence. Similarly, acknowledging the potential difficulties that TCKs have in voicing concerns and ideas about their environment of residence needs consideration. These challenges emerge from their frequent moves, which can lead to loss of "voice" because of lessened community knowledge and embeddedness – both prerequisite for developing voice and having it heard. In some TCK contexts, the controversial politics and power geometries of "indigenous," "hybrid," and "non-indigenous" voices add, potentially, a further problematic dimension to listening to TCKs. If their voice represents, and is perceived as one that is "nonlocal" or even colonial, this is a huge challenge to placemaking and place-engagement. Despite these obstacles, which are likely both real and perceived, the importance of TCK voices in the creation and maintenance of child-friendly environments is an important theme.

Bridging the Findings

Both the Hong Kong and Qatar case studies highlight the complexities of mobility and the implications for place that are inherent in the experiences of TCKs. Initially, they may seem to contradict: the Hong Kong participants expressed equal if not elevated relationships with non-human nature and nature bonding, whereas the TCKs in Qatar felt their experience of place and non-human nature was limited by gatedness, borders, and "othering." However, both findings can coexist. The point remains that the TCK experience and sense of place come from a unique perspective that may be simultaneously limited and expanded due to their circumstances. The heterogenous nature of TCKs and their environments of residence means that further investigation into their experiences and everyday lives in different contexts is needed and encouraged. The remaining sections in this Chapter aim to consider these findings within current theoretical frameworks on place and then highlight the potential of place-based pedagogies for TCKs.

Third Culture Kids and Place

Conceptualizing Place

As we consider the experience of places by TCKs in the above case studies from Hong Kong and Qatar, reviewing the concept of place itself is of great importance. Place is a useful lens through which environments, and experiences like those of TCKs, can be viewed. Somerville and Green (2015, p. 36) note:

> as a conceptual framework, place provides a bridge between the local and global, real and representational, indigenous and non-indigenous, and different disciplinary approaches. Place itself is theorised in different ways according to the perspective of each person. Children have their own theories of place… Rather than defining and delimiting what place means, we ask what can place enable in our thinking and empirical research?

This support for place as a conceptual framework for understanding childhood and adolescent experiences touches upon many of the issues central to this chapter: How do the constructs of local and global intersect in the lives of TCKs? How do "indigenous" and "nonindigenous" knowledges intermingle? How do children's real and imagined places combine? While these issues are explored in Urquhart (2016) and Picton's (2016) studies, this is still a neglected field of study requiring further exploration. Massey (1994) is perhaps the first author to challenge the more singular and conventional understanding of sense of place and argued that the character of a place:

> can only be constructed by linking that place to places beyond. A progressive sense of place would recognize that, without being threatened by it. What we need, it seems to me, is a global sense of the local, a global sense of place. (p. 156)

Massey's (1994) call for a broader sense of place has been echoed by Heise (2008). After her critique of the limitations of the sense of place concept in a globalized world, Heise (2008) identified the need to find ways to understand narratives that reveal a "new kind of eco-cosmopolitan environmentalism that might be able to effectively engage with steadily increasing patterns of global connectivity" (p. 210). Although we are not promoting the use of additional ambiguous neologisms such as "eco-cosmopolitan" to be applied to TCKs, we agree with the sentiment of her conclusion: the need to include a multiplicity of places into one's sense of place is becoming increasingly common. This justifies the need to update assumptions about sense of place, and to recognize that for TCKs, immediate contexts are intrinsically linked to those places of an individual's past and future. In this Chapter, place is understood as constructed when an individual attaches meaning to a physical location, and like Malpas (1999) and Massey (2005), we do not wish to neglect the physicality of the environment. Similarly, with our focus on TCKs, we do not advocate a static understanding of place nor a singular one. Instead we want to emphasize the fluidity, openness, multiplicity, hybridity and changeability of place, and thus experiences and perceptions of the environment. We align our understandings of place with those of Massey (2005): place should be understood as relational – as process, unbounded and negotiated. It is when TCKs attach meaning to their physical location that place is constructed and experienced, in multifarious ways. When place and the inner self meet, there are diverse relationships which are constantly in flux – a negotiated process. It is an emotional relationship dependent on the body – hence the significance of embodied geographies of place – this embodiment of place is even more significant for children who often experience the landscape in more physical ways than adults through outdoor play and exploration (Cele, 2006).

Conceptualizing Sense of Place with Third Culture Kids

The discussion about place is inherently linked to sense of place research, which considers the depth to which individuals and societies understand their immediate surroundings and build cognitive and emotional ties with a place. For this Chapter, we propose that sense of place is a key component that contributes to an individual's identity. Philosopher Arne Naess (1985) stated, "The nearer has priority over the remote – in space, time, culture and species" (p. 268). Heise (2008) noted that Naess is not alone in prioritizing the immediate local context. She summarized that many environmental thinkers make associations between the concepts of "spatial closeness, cognitive understanding, emotional attachment, and an ethic of responsibility and 'care'" (p. 33). The limitation of prioritizing one local context is that many TCKs do not associate themselves purely within one physical context. Another challenge is that with emerging environmental concerns spanning across national boundaries, having a sense of place with a particular location may not be enough to provide the impetus to respond to issues that impact the world on a global scale.

Sense of place is a psychological construct that is developed over time with a variety of virtual or physical experiences and is heavily mediated by social contexts. Sense of place is itself a nebulous construct and often incorporates multidimensional experiences. More recent usage of sense of place with a psychological approach considers how connected an individual feels with a certain place (Kudryavtsev, Stedman, & Krasny, 2012, pp. 230–231). Two main components of sense of place are identified: "place attachment" (Kudryavtsev et al., 2012, p. 231) and "place meaning" (pp. 232–233). Kudryavtsev et al. (2012) define place attachment as the bond between people and a place or, in other words, the extent to which a place is important to people (p. 231). Place meaning refers to the symbolic significance that an individual ascribes to a place from their life experiences (p. 231). In other words, "place attachment reflects how strongly people are attracted towards places, while place meaning describes the *reason* for this attraction" (Kudryavtsev et al., 2012, p. 233). Both place attachment and place meaning are highly individual and remain fluid as they evolve through a person's life.

This process of ascribing and renegotiating place attachment and place meaning is ongoing, and an individual's sense of place is the result of an amalgamation of all experiences. For TCKs specifically, this process involves multiple geographical places. It was found that relocation is not comparable to resetting an individual's sense of place back to a blank state of detachment (Urquhart, 2016). Instead, relocation requires an adjustment period in which negotiation processes incorporate the current environments into previous contexts. If authentic attachments begin to form between adolescents and their environments, then that place becomes amalgamated into their overall sense of place (Urquhart, 2016, p. 109). The incorporation of multiple places into a sense of place is distinctly different than the construct of "placelessness" (Gruenewald & Smith, 2010, p. xvi) or "unrootedness" (Eidse & Sichel, 2004) and challenges the suggestion that mobility could weaken the sense of place of TCKs.

When our understanding of sense of place is expanded to include multiple places, this means that we need to let go of the premise that sense of place is experienced only as an immediate singular construct. In his discussion of place-based transience, Thomashow (2002) concluded:

> Yet I am not willing to let go of this place-based philosophy. Not only does it make good pedagogical sense but it speaks to the possibility of ecological fidelity, and lends me a sense of rootedness (however transient) in a world of ceaseless motion. (pp. 176–177)

Here, we both agree and disagree with Thomashow (2002): we challenge the term "ecological fidelity" (p. 176) which promotes singularity and we argue that fostering an individual's engagement and connection with one context essentially strengthens their connection to all of the places that are incorporated into his or her sense of place. If, however, the sense of place concept can be expanded to be inclusive of multiple places all at once, then we agree with Thomashow that it makes pedagogical sense to foster sense of place through PBE, as we will outline in the next section of

this chapter. Sense of place becomes a more holistic concept of understanding oneself in relation to the multiple places that compose identity.

International Schools and Place

Significance of International Schools

TCK's engagement with place in terms of childhoodnature, sense of place, place interaction, and place experience is unique for two key reasons: TCKs experience the *process* of place as they transition from place to place, and their migrant status and potentially "sheltered" lived experiences can lend itself to a lack of community voice or engagement because of language, cultural, or physical barriers. These dynamics of place for TCKs often manifest in the arena of formal education. International schools, international education, and the experiences of TCKs are themselves bound up in complex negotiations of place and different environments. Both international education and "international school" are contested concepts with a range of definitions (Hayden, 2006; Hayden & Thompson, 2013). "National" schools can embrace international education – the term is inclusive. International schools are not homogenous entities – but some generalizations are that they often cater to expatriate families, employ teachers from overseas, are fee-paying, and offer international programs of study. However, in some countries it is now very common for international schools to cater for an almost exclusively "local" market or even to have "international programs" within national schools. Many TCKs attend international schools as internationally mobile families often view international schools as more culturally inclusive in comparison to local public education systems around the world because of student and staff diversity and/or use of international curriculum. English is often a language of instruction (Hayden, 2006; Hayden & Thompson, 2013). Additionally, for highly mobile TCKs, international schools can also provide stability through their common features like values, aims, and curricula, even though country context may have changed significantly. Typically, the students who attend international schools come from families that have a middle to upper socioeconomic status which often has implications of privilege. The two studies presented earlier in this chapter emerged from the context of international schools.

Negotiating Place in International Schools

Both TCK experiences and international schools are bound up in complex negotiations of place and environments. Decisions about place, including curricular decisions, combine to shape the TCK understanding of place. Globally mobile parents and their employers make choices about places to live and travel, while educators and schools also make choices about the places students will study. Through these parameters, TCKs make everyday choices and negotiate various environments.

Place and the local environment in international school and TCK contexts can be explored in three interrelated ways:

1. **Practical pedagogies of place**: the role and potential of PBE, place-situated pedagogies, place-conscious education, and how place is negotiated in the curriculum.
2. **Curriculum places**: the landscape and topography of place and environments in the (written) curriculum itself and different conceptualizations of place in education as linked to different educational ideologies.
3. **School embeddedness in environments** (physical and social; local and global): school interactions and interconnections with the wider local environment and community, as enmeshed in the bundle of trajectories – human and non-human – that make up place. International schools often engage with non-human nature, place, environments, and communities on multiple scales – nearby (e.g., through field trips and local language learning) and much more distant, for example, through membership of regional school organizations and sporting events. Ideologies of community embeddedness are likely to impact both 1 and 2 above.

Practical Pedagogies of Place (Place-Based Education)

PBE is not an uncontested concept, but some of the key features include that it is locally based, student-centered, experiential, and interdisciplinary (Ormund, 2013). As Sobel (2004) notes, "One of the core objectives [of PBE] is to look at how landscape, community infrastructure, watersheds, and cultural traditions all interact and shape each other" (p. 9). PBE is a reaction against what is perceived as "placeless" curricula, decreasing outdoor experiences for children and decreasing attachment with non-human nature. The assumption of PBE, rather like bioregionalism, is that rootedness and attachment to place are preferable to placelessness or weak place attachment, a humanistic understanding of boundedness and the importance of "home" (Picton, 2016). The importance of nature in PBE is central, although PBE is not exclusively reserved for educational experiences in the "wild" and is inclusive of neighborhood and urban exploration. Nature is found in many environments including urban ones. Indeed, PBE in the research literature appears to focus on place-interactive education in primarily (a) "Minority western" contexts and (b) temperate environments – woodlands and wetlands in particular, therefore neglecting the environmental and social realities of many regions of the world where TCKs live. Somewhat romanticized and anthropocentric ideas of getting children "out" into the environment are not universally straightforward for environmental, social, and safety reasons. This does not, however, mean PBE cannot be introduced in the classroom in such contexts, but these challenges must be acknowledged.

David Gruenewald's (2003a, b) articles about place in the curriculum focus on a more critical pedagogy of place. For Gruenewald, the concept and physical reality of place are "profoundly pedagogical… as centres of experience, place teaches us about how the world works, and our lives fit into the spaces we occupy. Further,

places make us: as occupants of particular places with particular attributes, our identity and our possibilities are shaped" (Gruenewald, 2003b, p. 647). Somerville, Kerith, and de Carteret (2009) propose a new pedagogy of place taking Gruenewald's ideas of decolonization and reinhabitation, but with a renewed focus on moving away from binary constructions of thought, something necessary when exploring place with children in schools (Picton, 2008). Further contesting of PBE concepts has come from writers like Malone (2016) and Ruitenberg (2005). Malone (2016, pp. 53–54) has critiqued, from a broadly posthumanist perspective, current conceptualizations of place-based practices and children's interactions with non-human nature, and place more generally, for sustaining nature-culture binary understandings and for being anthropocentric. Here Malone "decenters" anthropocentric and romantic views of "reinserting" children in nature, instead analyzing the complex interactions between children and the "more-than-human" world. The exceptionalism of humans is challenged by Malone, and writers in this Handbook, in favor of viewing humans – including of course children and young people – as part of nature rather than separate from it.

Other critiques have also emerged which are particularly relevant to TCKs. Critically examining concepts of "local" and the privileging of the local in PBE is important. For example, Ruitenberg (2005, p. 218) outlines the concept of a "radical pedagogy of place":

> A radical pedagogy of place is a pedagogy of "place" under deconstruction, a pedagogy that understands experience as mediated, that understands the "local" as producing and being produced by the trans-local, and that understands "community" as community-to-come, as a call of hospitality to those outside the *com-munis*. In a radical pedagogy of place, students are taught to see the multiplicity of and conflicts between interpretations of a place, the traces of meanings carried by the place in the past, the openness to future interpretation and meaning-construction. A radical pedagogy of place does not pretend to offer answers to or "correct" interpretations of hotly contested places.

The critique of the "local" here is significant, in a time when local/global/indigenous/nonindigenous/hybrid forms are blurred. Concepts of "local" are certainly challenged by TCKs and transnationalism, where the "hereness" of the local is inevitably "contaminated," to use the words of Ruitenberg, by the "thereness" of the nonlocal because of globality. These ideas certainly resonate with Massey's (2005) view of place as relational and as a nexus. Where a relational and fluid approach is adopted, it is argued that a richer view of place emerges, as opposed to absolute or relative views – where place is defined and made by their "outsides" as much as by their "insides." Distinctions between people and place are also nicely resolved by Massey in her global sense of place with "bundle of trajectories" where the mix of people (and absence of people) and interaction with physical space and objects is an integral part of place. This brings Massey's theorizing back to the more relevant scale of pedagogies, childhoodnature, and the breaking of nature-child binaries. Here we can apply her ideas to the context of PBE, where emphasis on the local and bounded must not preclude relational understandings of place – where if place is a "collection of stories," PBE should be a reading of these layered stories. This is

reminiscent of Somerville et al.'s (2009) conceptualization of our relationship to place as constituted in stories and other representations. Section "Conclusions and Place-Based Potentials in International Schools" in particular will further discuss the potential of PBE for TCKs.

School Embeddedness in Places: International Schools and Their Environments

Concepts of "local" in international schools attended by many TCKs are blurred by mobility, access, and communication. In some contexts, what is perceived as local and local community may be, in geographical terms, distant and vice versa. International schools engage with their wider environment in a number of ways. Since there is so much diversity in international schools, there is a great deal of diversity in the ways such schools engage with place, some of which may include service learning experiences, fieldwork, host country student enrolment, integration of host country curricula (including language learning), physical structure of buildings, and host country teacher engagement (Picton, 2016). Therefore, TCKs and the international schools many attend do not exist in isolation, but are embedded, to various degrees, in communities of migrants and nationals, often identifying both with internationalism and more locally based identities.

It is clear that PBE and school embeddedness in place are contested but significant fields. These interactions are co-implicated in how TCKs and international schools are themselves "place-situated" through their educational experiences. The relationships between TCKs, school embeddedness in environments, and pedagogies of place impact upon, and are reflected within, each other.

Conclusions and Place-Based Potentials in International Schools

A child's experience with place and non-human nature is fundamental to their learning. Attempting to understand TCK perspectives is required by educators when developing engaging, relevant, and rigorous curricula. Studies such as those presented here as case studies are beginning to explore TCK's sense of place and environmental experiences. The contrasting findings of the two studies from Hong Kong and Qatar presented earlier in this chapter highlight the heterogenous nature of TCK experiences of place. This is also underpinned by the "view that education can happen anywhere: through informal as well as formal experiences; in homes, communities, and environments; through interactions with the human (parents, friends, and classmates) and the nonhuman (physical objects, parks, woodlands, and buildings) world" (Martin & Pirbhai-Illich, 2016, p. 355).

However, there are unique challenges for TCKs and international schools in incorporating place-based practices into the curriculum. International schools

face the challenge of providing education for children, often TCKs, for whom the local environment (physical, sociocultural, political, economic) will often not, at least initially, be known to them through extensive childhood exploration and intergenerational knowledge. In contrast, children growing up in less mobile communities may grow up in the same or similar environment, developing detailed knowledges of the local area and culture, building relationships, observing, and being a part of processes of change. It is not suggested that mobility is limited to TCKs, but their experiences of it are certainly intensified and accelerated. It is argued here that critical PBE, place-conscious or place-situated curriculum, may help international school students know, experience, and value their environments of residence in a more intimate way and therefore provide opportunities to develop attachments to place and develop their own sense of place and place identity – shifting from residing in to inhabiting place.

What is clear, as international educators, is that a place-situated and place-conscious pedagogy for TCKs and internationally mobile children must be especially globally minded and progressive, grounded within a relational understanding of space and place. This involves exploring places not in absolute or relative terms as bounded, isolated, nodal, or disconnected, but as process, negotiated and unbounded. This goes somewhat against the "new localism" of some PBE, with its risks of a somewhat parochial and conservative notion of place. Indeed, for some students, excessive focus on the "local" in international school contexts could be intellectually isolating. Here, it is useful to return to three of Massey's (2005) relational understandings of place – as process, unbounded and negotiated – and how these might shape and influence place-based pedagogies for TCKs. Any place-based practice or pedagogy need to be framed within a clear concept of space and place – place as process, unbounded and negotiated.

PBE for TCKs in international schools should start by considering the students themselves. These are children and youth who are, through their everyday lives, often deeply embedded in multiple places. Place-conscious education in international schools should embrace and celebrate local-indigenous voices on and of place alongside hybrid international-migrant perspectives. Educators should also recognize that sometimes there may be conflict emerging in these dialogues and that this should be embraced. Using PBE as a means to develop a singular construction and identity of place or nature is not desirable since this leads to seeing places as bounded with *insides* and *outsides*. This is a clear challenge to humanistic notions of place as deeply rooted and bounded. It is suggested that focus on home locality in PBE "runs the risk of encouraging parochialism, a loss of solidarity with other places and peoples, and even xenophobia which is inimical to the practice and achievement of global sustainability" (Morgan, 2011, p. 96), although we would hope this would be less likely in the intercultural and cosmopolitan contexts of many TCKs. Instead, as Massey proposes, places should be explored and understood as being relational – defined and made by their "outsides" as much as by their "insides." This has identity implications (where identity for

TCKs is defined by both "outsides" and "insides," however this is conceptualized), and with implications for PBE:

> No longer is identity (on the broader canvas, 'entities') to be theorized as an internally coherent bounded discreteness. Rather it is conceptualized relationally – with implications both internal (in terms of fragmentation, hybridity, decentering) and external (in terms of the extension of connectivity). (Massey, 2006, p. 37)

Therefore, something akin to a "global sense of place" is desirable or a "place-based global curriculum" (Kenway, 2009) which is both inward and outward looking, with emphasis on "links and interconnections to that beyond" (Massey, 1994, p. 5). Educators who work with TCK students need to make conscious and thoughful efforts to prompt students to consider how local learning connects to larger issues that space multiple places. If this is done well, then PBE can be used to support the development of sense of place so that all experiences with place can be carried by TCKs along their mobile journeys.

Although research exploring TCK identity and concepts of home certainly exists, few studies beyond Urquhart (2016), Picton (2016), and Sander (2016) directly examine TCK experiences of place and nature and try to uncover the dynamics of their everyday lives. We hope this Chapter encourages more researchers – from a variety of fields of study – to examine the unique perspectives and experiences of TCKs. It is clearly a challenge to generalize TCK nature/environment experiences because of the inherent heterogeneity of TCKs and their diverse experiences, environments of residence, and mobilities. Indeed, TCKs challenge many theories and understandings of place – sense of place, place attachment, and place identity – by virtue of their mobilities. Additionally, the dynamic nature and evolving negotiation of an individual's environmental identity mean that conclusions about TCK and place relationships may hold true in one place and time but not in another. A consideration moving forward is how to conceptualize child-non-human nature and child-place interactions for TCKs while also deconstructing these very binaries. In particular concepts of local-nonlocal, indigenous-nonindigenous, and attached-detached need exploration – and going further to examine TCK experiences from a less anthropocentric perspective. If children are nature, then TCKs by extension cannot been seen as somehow separate from their communities and environments of residence but as fundamental parts of these.

Cross-References

- ▶ Impact of Significant Childhoodnature Experiences on Environmental Identity Formation for Globally Mobile Children Attending International Schools
- ▶ Toward Decolonizing Nature-Based Pedagogies: The Importance of Sociocultural History and Socio-materiality in Mediating Children's Connectedness-with-Nature

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Part X

Ecological Aesthetics and Childhoodnature Research

Section Introduction: Ecological Aesthetics: New Spaces, Directions, and Potentials

71

David Rousell and Dilafruz R. Williams

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Abstract

In this final section of the Handbook, we turn to ecological aesthetics in response to radical changes in both *the nature of childhood and the nature of nature* in the contemporary world. Artistic and aesthetic approaches have become increasingly relevant as children encounter a world typified by the acceleration of social, technological, and environmental change, and the mutually reinforcing conditions of planetary instability, inequality, and precarity. Anthropogenic climate change, the mass extinction of plant and animal life, and the chemical contamination of air, food, soil, and water resources are transforming not only what we might think of as "the environment," but also the aesthetic qualities and environmental sensibilities that constitute the experience of *being alive*. For many scholars these changing conditions of Earthly life have taken on the name of

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'Anthropocene', an epoch defined by the total imbrication of human life with more than human planetary systems and technologies. The authors in this section take up ecological aesthetics as a relational, experimental, and theoretically adventurous field which aims to grasp the experiential qualities of life under these changing conditions, and to imagine alternatives. With chapters focusing on the role of movement, nature-study, poetry, pattern, sense-awareness, and the creation of experimental works of art, this section highlights interdisciplinary research and pedagogy which attends to richly textured compositions of childhoodnature experience through a diverse range of material, social and conceptual practices. In drawing together a range of Indigenous, speculative, sensory, cultural, empirical, and artistic approaches, the range of chapters collected in this section attests to the diversity and emergent shaping of ecological aesthetics as a field that is still very much in the making.

Keywords
Ecological aesthetics · Indigenous philosophies · Childhoodnature · The speculative turn · New empiricisms

The black moon
turns away, its work done. A tenderness,
unspoken autumn.
We are faithful
only to the imagination. *What the*
imagination
seizes
as beauty must be truth. What holds you
to what you see of me is
that grasp alone.
– from "Everything that Acts is Actual," Denise Levertov (1979, p. 43)

Introduction: A (Re)turn to Aesthetics

It seems that our world becomes more strange with each passing moment, refusing to settle into any recognizable pattern that might conform with our previous intentions, expectations, or understandings. Is it any surprise that we find ourselves (re)turning to poetry, art, music, dance, and philosophy as ways of feeling, imagining, and thinking the world anew? In this final section of the handbook, we negotiate such a (re)turn to aesthetics in response to radical changes in both *the nature of childhood* and *the nature of nature* in the contemporary world. We live in times, now, where there is growing concern about qualities of life at the planetary scale. Anthropogenic climate change, the mass extinction of plant and animal life, and the chemical contamination of air, food, soil, and water resources are transforming not only what we might think of as "the environment" but also the

aesthetic qualities and environmental sensibilities that constitute the experience of *being alive*. What's more, today's children inhabit a world in which the very nature of life is being reconstituted through biotechnological transformations associated with genetic manipulation, ubiquitous computing, and machine learning, such that the boundaries between human and nonhuman, life and nonlife, and natural and artificial have become eroded if not completely dissolved (Braidotti, 2013; Povinelli, 2016). We (re)turn to aesthetics at a time when we are "living in suspense" among social and environmental catastrophes, a time which calls upon us to develop "new powers of acting, feeling, imagining, and thinking" (Stengers, 2016, pp. 22–23).

For many scholars these changing material conditions of Earthly life have taken on the name of "Anthropocene," an epoch defined by the total imbrication of human life with more than human planetary systems and technologies (Rousell, 2016; Steffen et al., 2015). Other scholars have been hesitant to adopt a term so saturated with the association of "Anthropos" and its aftertastes of human dominance, supremacy, and exceptionalism (Colebrook, 2014). Some have characterized the total subsumption of Earthly processes under a capitalist political economy in terms of "Capitalocene" (Moore, 2017); others have emphasized the chthonic, nonhuman powers of the Earth itself under the terms of "Chthulucene" (Haraway, 2016); and still others reject the Anthropocene as a conceptual and material artifact of Western (mis)thought, which continues to deny the profound insights of Indigenous cultural practices and metaphysical understandings (Demos, 2017; Horton, 2017; Todd, 2015).

Despite their differences in terms of emphasis and approach, a number of arguments are loosely shared across these various accounts of the contemporary moment. First, there is a general consensus that we live in a time that is radically different from previous times on Earth. The illusions of psychic, social, political, and climatic stability have dropped away, and we are faced with a world that is intricately entangled, complex, precarious, unpredictable, and messy (Morton, 2013). Second, there is an agreement that these disorientating conditions call for a complete overhaul of dualistic conceptual categories and onto-epistemological hierarchies which have dominated Western thought for millennia. Any kind of a priori separation between nature and culture becomes untenable under these new conditions. This has led to renewed engagement with Indigenous and non-Western philosophies, as well as a growing series of rapprochements between the environmental arts, humanities, and sciences (Cajete, 2006; Haraway, 2016). Third, there is an emerging sense that a more expansive, experimental, and theoretically promiscuous account of *aesthetics* is necessary if we are to grasp the experiential qualities of life under these changing conditions and to imagine alternatives (Shaviro, 2014). This makes such a (re)turn to aesthetics intrinsically ecological, as it is concerned with an aesthetic of relation and coexistence. In other words, it is an aesthetic that is concerned with the sensible qualities of relations between and among bodies, environments, societies, and technologies within complex assemblages that exceed the limits of human cognition and knowledge. The (re)turn to

aesthetics is thus a (re)turn to the wonder of felt relation and to the sensibly distributed *nature* of experience as entangled with the wild variety of other creatures with whom we share our ecological worlds.

In some ways this movement constitutes a return to the ancient Greek roots of the word "aesthetic":

1. *Aisthetikos*, meaning "of or pertaining to αἰσθητά, 'things perceptible by the senses, things material', as well as 'perceptive, sharp in the senses'"
2. *Aisthanesthai*, meaning "to feel, apprehend by the senses" (Oxford English Dictionary, 2017, n.p.)

In these two ancient definitions of aesthetics, we see the original inclusivity of meaning which combines the material causality of the empirical world with the subjective experience of feeling and sensuous apprehension. *Aesthesis*, in this originary sense, includes both the subjective act of perception and the objective nature of that which is actually perceived. To take up aesthetics in this key is to resist what Alfred North Whitehead (1967) diagnosed nearly a century ago as "the bifurcation of nature." This is the bifurcation that separates the objective world of natural causality out from the subjective world of qualitative experience, imagination, and interpretation. "Everything perceived is in nature," Whitehead writes. "We may not pick and choose. For us the red glow of the sunset should be as much a part of nature as are the molecules and electric waves by which men of science would explain the phenomenon" (2004, p. 20). In resisting the bifurcation of nature, the red glow of the sunset is both *what* it is objectively and *how* it appears subjectively, at one and the same time. The color red, the sensation of red, the feeling of red, the intensity of red, the idea of red, the molecular materiality of red, our past associations with red, and the way that a certain shade of red appears at this particular time and place: these all become elements of nature as inseparable from aesthetic experience or *aesthesis*.

In the seventeenth century, the study of aesthetics came to be associated with dualistic theories of cultural "judgment" and "taste" and was relegated (at least in mainstream Western philosophy) to specialized subfields associated with the philosophy of art. However, over the last 10 years, there has been a veritable revival, what some have even called a *renaissance*, of interest in aesthetics as the basis for speculative realist and materialist theorization (Debaise, 2016; Hansen, 2015). Often drawing extensively from philosophers such as Whitehead, Deleuze, and Guattari, scholars and artists associated with the current speculative turn have brought aesthetics back into the center of philosophical thinking and inquiry (Debaise, 2017; Kolazova, 2016; Shaviro, 2014). This speculative expansion of aesthetics to encompass both the cultural and the natural, the subjective and the objective, and the artistic and the scientific is what we name an "ecological aesthetics." It is an aesthetics that operates across scales of space and time, from the microtemporal entanglement of quantum events to the geo-social movements of planetary epochs and evolutionary life processes (Yusoff, 2015).

The Indigenous and the Speculative

We concur with scholars such as Protevi (2013), Haraway (2016), and Debaise (2017) who have argued that the geo-eco-onto-biocultural transformations of contemporary life call for an aesthetics that is radically environmental, speculative, empirical, relational, and inclusive of all forms of life and modes of existence. We also note the particular resonance of such a (re)turn to aesthetics with Indigenous ontologies, cosmologies, and practices that have been in existence for millennia. Geo-ontological analyses of Indigenous art, philosophy, and culture by feminist scholars such as Grosz (2008) and Povinelli (2016) highlight an emerging sense of compatibility between the "traditional" aesthetics of Indigenous peoples and the "new" aesthetics proposed by today's speculative theorists, artists, and scientific practitioners. We acknowledge that many Indigenous cultures have already been thinking and working through such an ecological aesthetics for millennia and offer a plethora of place-based and culturally responsive resources for grappling with the challenges of social and ecological crises at the planetary scale. We can also thread a speculative history of ecological aesthetics back to prehistoric cultures and the territorial behaviors of the animal world, including the cave art of early hominids and the ritual performances and habitat constructions of mammals, birds, and myriad other forms of life. And yet we also acknowledge that the material conditions of the contemporary world are *undeniably new*. As Hansen (2015) notes in his analysis of the experiential impacts of twenty-first century media technologies, "we literally live in a new world, a world characterised by a vastly expanded and deterritorialised sensorium" (p. 161). There is no place on Earth that is unaffected by human enterprise and technological expansion. The sheer number of human bodies continues to grow, even as the numbers of other Earthly creatures continues to decline. The cumulative sensing capacities of micro-computational media networks have become powerful agencies and elemental components of everyday existence. Nobody has ever experienced anything like what we are experiencing at present. So what do we do? Can we (re)turn to the past and the future at the same time? Can we collectively craft an old/new ecological aesthetics that co-implicates the Indigenous and the speculative?

While there are strong resonances between the theoretical positions of speculative and Indigenous thought, their modes of aesthetic actualization can also appear to be in tension. Some of these tensions become palpable in reading across the chapters that make up this section. We find tensions, for instance, between rapid acceleration and deceleration, between acknowledging the past and imagining the future, between symbolic representations and worldly sensibility, between cultural traditions and technological mediations, between biographies and multiplicities, between practical engagements and theoretical speculations, and between the "Great Mystery" (▶ Chap. 76, "Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective") and the "aesthetic order of nature" (▶ Chap. 74, "Uncommon Worlds: Toward an Ecological Aesthetics of Childhood in the Anthropocene"). Rather than setting up these terms as binary distinctions between categories, we would like to think of them as tensions that produce new potentials for aesthetic experience. We would like to think of them as *productive tensions* that stretch and blur the "frictional spaces" between different modes and manners of existence.

Rehabilitating the Concept of "Nature"

What remains central to our approach to this section is a focus on aesthetic modes and processes, rather than on ontological substances or essences. We are specifically interested in how this theoretical shift can provoke renewed or rehabilitated concepts of "nature." As Rousell and Cutter-Mackenzie write in ▶ Chap. 74, "Uncommon Worlds: Toward an Ecological Aesthetics of Childhood in the Anthropocene" (this volume, p. 5), ecological aesthetics is concerned with "differences in 'becoming' (as the aesthetic mode or manner of existence) rather than differences in 'being' (as the ontological essence or substance of existence)." This shift in register recognizes the primacy of embodied experience as a constitutive process, a movement that finds resonance with many Indigenous traditions as well as recent findings in the life sciences. Postgenomic research in contemporary biology, for instance, reveals the ways that environmental and social conditions have transgenerational impacts on biological functioning, cultural development, and gene expression (Frost, 2016). This means that place-based and culturally situated experiences have effects on the biological constitution of living bodies not only over the course of a single lifetime but across generations and also across species. Recent findings in embodied cognitive science further reveal the ways that sentient, perceptive, cognitive, emotional, and social experiences are inseparable from biological processes, such as sensorymotor activity, directional motility, biochemical gradients, and precognitive affective responses (Protevi, 2013). These findings gesture toward the capacity for entire bodies and societies to sense the world aesthetically, including the ability for cells, proteins, and even genes to sense and dynamically respond to the environments and milieus within which they are embedded.

However, if we are to maintain a commitment to a *speculative* ecological aesthetics, then even our embodied, culturally situated, and sensory experiences can't reveal the whole story. If ecological aesthetics is to graft onto "nature" as the immanent ground, plane, or continuum for all experience, then it must also account for the speculative conditions under which experience occurs, conditions which *are never directly perceived or experienced* by humans (Debaise, 2016; Hansen, 2015). Perhaps it is in the speculative space of pure potential that the concept of "nature" might be rehabilitated for our times. Nature would, in this sense, simultaneously compose, sustain, and vicariously exceed experience in every direction. As Cajete and Williams discuss (▶ Chap. 76, "Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective"), nature is *intrinsic* to all experience even as it remains "the Great Mystery" of existence itself. Whitehead, Rousell, and Cutter-Mackenzie (this section) theorize nature as the "aesthetic order" of the universe, an extensive continuum of vibratory intensities and potentials that includes all things and their felt relations. Phillips (this section) describes feeling the "infinite alterity and ethicality" of nature in the touch of a child's hand in the streets of Chiang Mai, Thailand. In each of these speculative accounts, we encounter a "nature" that is never static, passive, or predictable but always changing *as our experiences change* (along with the experiences of all other creatures, cultures, places, and times). The speculative conditions under which life takes place are revealed to be just as contingent as life itself, just as permeable, malleable, and intricately enmeshed. Perhaps the

Indigenous and the speculative have always been intertwined within the aesthetic "matrix that embeds" us all (▶ Chap. 77, "CineMusicking: Ecological Ethnographic Film as Critical Pedagogy"). And maybe the emerging field of ecological aesthetics can offer a nexus or meeting place for conceptualizing and working with this matrix, for bringing a speculative metaphysics of nature into direct and consequential contact with embodied, sensorial experience – in all its wild proliferations and potentials.

Ecological Aesthetics, Childhood, and Learning

This brings us to the focus of this section of the Handbook, which is the intersection of ecological aesthetics with childhoodnature relations, encounters, and learning experiences. To our knowledge this is the first book-length treatment of ecological aesthetics as applied to the learning experiences of children. As demonstrated by the chapters collected in this section, ecological aesthetics provides fertile grounds for interdisciplinary research and pedagogy which attends to richly textured compositions of childhood experience through a diverse range of material, social, and conceptual practices. Such approaches have become increasingly relevant as children encounter a world typified by the acceleration of social, technological, and environmental change and the mutually reinforcing conditions of planetary instability, inequality, and precarity. In attending to the sensuous, creaturely, and affective qualities of children's encounters with and *as* nature, multiple sites are opened up as vital spaces for children to respond to these changing material conditions of everyday life. As the chapters in this section attest, these sites expand beyond places commonly associated with "nature," such as national parks, remote wilderness areas, nature schools, or community gardens. They also include art galleries, museums, urban landscapes, everyday domestic spaces, science laboratories, and digital environments, among many other settings. Each of these sites of encounter can be considered intrinsically ecological and aesthetic environments that condition the very possibilities for children's movement, learning, sensation, perception, imagination, feeling, and thought.

While this ecological aesthetic perspective supports methodological turns toward artistic, creative, and sensory practices across diverse educational and research contexts, it should not be confused with an advocacy for "arts-based methods" as narrowly and instrumentally defined in relation to "nature." Rather, this section works to expand the purview of aesthetics to encompass the rich histories of the environmental arts, humanities, and sciences, along with Indigenous practices of making and knowing that are associated with bioculturally embedded understandings of place. Hence, we see the turn toward ecological art and aesthetics as a turn toward environmental awareness as a mode and manner of sensory attunement and response. To become attuned to one's environment is to inhabit an artful disposition, a sensory apprenticeship with the naturalcultural environment that establishes the very conditions under which learning becomes possible. This is to embrace nature itself as a creative force that is embodied in the fearful wonder of a child as a lightning storm approaches or the subtle adjustments of a child's body to catch a

different perspective on a vista or a painting or a science experiment. Such an ecological aesthetic lurks everywhere, in the potentials for a more artful attunement to the everyday experiences of children, and indeed, to all forms of life.

Drawing Together the Seed Bag

In drawing together the chapters for this section, we sought contributions that put aesthetic experience at the center of childhoodnature research. We saw this as a process of gathering experiential seeds of potential to spread with the wind, akin to Haraway's (2016) "seed bag" approach to collecting and crafting new figurations, tropes, and concepts through speculative philosophy, science, art, biography, and fiction. Rather than delimiting the field through preestablished criteria and boundaries, we wanted to see how ecological aesthetics might sprout new possibilities for understanding the interconnectedness of childhood and nature through sensory, affective, and creative practices. We cast our net as widely as possible and were fortunate to receive submissions from scholars, artists, educators, and practitioners hailing from diverse cultural and geographical locations. The authors of the chapters in this section also represent a wide range of academic career stages, including early- to-mid-career researchers, artists, and educators as well as substantially established scholars and internationally recognized experts in various fields. The range of chapters collected in this section attests to the diversity and emergent shaping of ecological aesthetics as a field that is still very much in the making. We feel that this incipient curiosity for what the field might become stirs at the heart of each of the chapters to follow.

The section opens with ▶ Chap. 72, "Sticky: Childhoodnature Touch Encounters," as Louise Phillips presents a series of eco-aesthetic encounters with *touch* drawn from her lived experiences of child-led walks in Chiang Mai, Thailand. "The Walking Neighbourhood Hosted by Children" is a project that has been held in several countries across three continents and is designed by a team of artists to rethink the geography of fear that limits children's access to public spaces and that devalues children's capacities and competence. Phillips shares her sensory ethnographic research by bringing to life a series of "human-plant-place relations" as she is led by children on three walks. Through her embodied and emplaced sensorial research, she captures how children's attention to the sensuous and affective qualities of nature comes to matter through material affordances and constraints. She develops an eco-aesthetic account of childhoodnature touch in relation to Karen Barad's quantum physics-informed theory of agential realism, in which "all particles are entangled in the void, so that every degree of touch is touched by all possible others," (▶ Chap. 72, "Sticky: Childhoodnature Touch Encounters"). As we walk with Louise and the children, we are invited to imagine their entanglements and appreciate the stickiness of touch.

In ▶ Chap. 73, "Rachel Carson's Childhood Ecological Aesthetic and the Origin of *The Sense of Wonder,*" David Greenwood traces the history of Carson's development of a "sense of wonder" through her immersion in nature and in the nature study movement, as well as in early twentieth century children's literary magazines

such as St. Nicholas. He invites us to consider two of Carson's most significant teachers: her mother and a 64-acre rural property that had "orchards and gardens, groves and fields, hills and hollows," with ample room to wander. While known for *Silent Spring* (1962), in prior years Carson had published *Under the Sea Wind* (1941) and *The Sea Around Us* (1951) and published her final book, *The Sense of Wonder*, in 1965. Examining the evolution of her works, Greenwood finds that "what made Carson's nature writing unique was not her politics, but her rare ability to combine the skills, gifts, and discipline of a scientist with those of a literary artist." For Carson, books of nature study encouraged not just curiosity for natural objects but also immersive experiences as well as aesthetic and ecological imagination. He points to the significant role of an adult (her mother) in facilitating her sense of wonder even as opportunities were available to Carson "to combine recreation, environmental learning, and an ethic of reverence toward the natural world." In asking, "What does Rachel Carson have to teach us that we might have to remember?" this chapter foregrounds the significance of *aesthetic experience* in evoking a sense of wonder.

In ▶ Chap. 74, "Uncommon Worlds: Toward an Ecological Aesthetics of Childhood in the Anthropocene," David Rousell and Amy Cutter-Mackenzie draw upon Alfred North Whitehead's (1978; 1967) speculative philosophy of nature to develop an alternative theoretical approach for posthumanist studies of childhood. In the first part of the chapter, the authors make the case for a new aesthetics of childhood that is responsive to the environmental changes of the Anthropocene epoch, highlighting the need for a more intensive and affirmative engagement with non-Anthropocentric and non-representational aesthetic theories and practices. Combining Whitehead's philosophy with recent research in the life sciences and media studies, the authors theorize the relationship between the "common world of nature as a vibratory continuum" and the "uncommon worlds" of children as "creatures of becoming." The second part of the chapter extends this theorization through the analysis of children's photographs produced during the 3-year *Climate Change and Me* project undertaken in regional NSW, Australia. Rather than working with images as "representations or analogic signifiers for children's experience," the authors explore how each photograph "co-implicates children's bodies and environments through affective vectors of feeling." The chapter concludes by considering the pedagogical implications of children's photographic practices, focusing on Whitehead's (1967) concept of the "art of life" as a guiding proposition for the aesthetic cultivation of environmental awareness.

Lucinda McKnight's ▶ Chap. 75, "Tin Shed Science: Girls, Aesthetics, and Permeable Learning" further develops a relational and diffractive approach to environmental learning in the suburbs of Melbourne, Australia. Combining "fragments of original pedagogical intent" with the polyphonic voices and material agencies of a backyard science club, the chapter works to assemble a posthumanist conceptualization of learning that emphasizes the radical permeability of human and nonhuman bodies and environments. The chapter not only draws on new materialist theories of embodiment, aesthetics, and agency but also puts these theories to work in the construction of a multilayered and diffractive account of learning that "is

always about the earth, and an awareness of the processual making of earth through intra-action." In doing so, McKnight works creatively to disrupt her own authorial voice and pedagogical intentions with "the voice of the earth," including the geological ruptures of poetic utterances and strange theoretical "unearthings and blendings." The chapter thus offers a strikingly original take on what science education might become if exposed to the wildness of posthumanist aesthetic practices, as the "becomingearth" of the child provokes a (re)turn to dirt and the permeability of organic bodies.

Discussions of Indigenous ecological knowledge and aesthetics are largely missing from mainstream sciences education, arts education, and environmental education. ▶ Chap. 76, "Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective" presents a conversation between Tewa scholar, educator, and artist Gregory Cajete and eco-educator Dilafruz Williams of East Indian origin, about the nature of eco-aesthetics, metaphor, story and symbolism in Indigenous thought and reality. Aspects of the Indigenous mythopoetic tradition are discussed as part of the traditional education practices of Indigenous cultures. The conversation draws upon the lived cultural experiences of the authors as they discuss the rich use of metaphor, story, symbols, and art to convey notions of eco-aesthetics in the teaching and learning process and the education of children. Acknowledging that oral traditions "used stories for millennia to evoke a sense of place and a deep understanding of interconnectedness of all life," they point to stories also as a means for "connecting past with the present and encouraging imagination." Exploring the environmental, mythic, visionary, artistic, affective, communal, and spiritual dimensions of Indigenous education through Cajete's writings, the conversation concludes with a discussion of how Indigenous ecological thoughts may be expressed through contemporary art forms to show possibilities for childhood and nature as interconnected.

The section's engagement with Indigenous ecological aesthetics continues through the contribution of filmmaker and ethnomusicologist Michael MacDonald. In ▶ Chap. 77, "CineMusicking: Ecological Ethnographic Film as Critical Pedagogy," MacDonald develops "Cinemusicking" as an ecological approach to ethnographic filmmaking that he has developed through film projects with Indigenous elders and urban youth. Drawing on theories of biosemiotics and "the matrix that embeds" from ecological thinkers such as Bateson, Luhman, Maturana, and Varela, this chapter offers both theoretical and practical insights into ecological aesthetic education as a transformative process of co-creation and interpenetrating systems. A series of richly drawn examples are portrayed through MacDonald's ethnographic descriptions of musical and cinematic engagement, including the rhythmic ciphers of inner city "hip hoppas" and the traditional ecological knowledge (TEK) practices of Cree peoples in Northern Canada. In linking systems theories with critical pedagogy and Indigenous philosophies, MacDonald writes that "the process of engaging with the *matrix that embeds* is part of the practice of life called *Pimachihowan*, experienced as sacredness." This chapter thus offers a fresh vision of ecological aesthetic education that links the sacred with everyday embodied experience and aesthetic practices of life-living.

Teacher educators Shelley Hannigan, Anna Kilderry, and Lihua Xu bring their diverse disciplinary lenses from arts education, early childhood education, and STEM to challenge the dominant anthropocentric view and paradigms in education as they explore ▶ Chap. 78, "Patterning in Childhoodnature". Critiquing the discipline-based compartmentalization of education, they conceptualize childhoodnature through patterning as a transdisciplinary approach for exploring the intricate relationships between organisms and their environments. Patterns, for them, are the "regularities and repetitions of actions, units, or shapes in space, time, and/or behaviour." They discuss how children's bodies are physically made up of biological structures and patterns, as are children's behavioral patterns, movements, and cognitive schemas. Highlighting patterns of sameness and difference through examples from Indigenous culture and contemporary art, they propose a biophilic and transdisciplinary approach to pedagogy and curricula to revive the aesthetic knowledge of patterning among children. For these authors, knowledge about patterning could enable children to make complex connections with their selves and the environment as ecological and aesthetically engaged learners.

Questioning the educational trend that considers the child and nature as a narrowly constructed dichotomy, Patti Pente offers alternative configurations of childhood in education by theorizing how the nanoscale can expand the imagination of what our human relationship with the planet might become. In ▶ Chap. 79, "Nanotechnology, Anthropocene, and Education: Scale as an Aesthetic Catalyst to Rethink Concepts of Child/Nature," she invites us to consider "what we might create with our bodies in space and time if the perceptions of the world stretch to the nanoscale and geological time." Jogging our memories, she reminds us of scale, explaining that nanotechnology is the study and use of materials at the small range of 1–100 nm, where 1 nm is equal to 1 billionth of a meter. With this awareness of the invisible nano-world, we are encouraged to consider how, "through a shift in scale to include the very large and the very small, dichotomous thought is eschewed for a concept of life understood as continual, material process." Pente posits that nanotechnology can surface the relationship of "invisible" materials at the small nanoscale with the visible character of the human-scale, offering a challenge for educators to enlist the creative imagination in order to confront our taken-for-granted Anthropocentrism. Scale therefore serves as an aesthetic catalyst to rethink childhood and nature concepts and relationships for education, art, and research.

Exploring concepts of childhood and nature in motion, Martha Eddy and Ann Moradian propose an aesthetic of embodied movement as both the physical and metaphysical ground for learning. In ▶ Chap. 80, "Childhoodnature in Motion: The Ground for Learning," they advocate the moving body as critical to celebrating and deepening childhoodnature relationalities. In proposing a life-long somatic relationship with our bodies in motion, they support a reclaiming of wholeness that "intensifies not just self-awareness, self-knowing, self-care and self-regulation, but also moves us to act and interact with greater awareness and care for others and our world, including the places we inhabit and share." The role of movement is crafted as a reminder that the body itself holds many of the lessons in establishing life-affirming relationships. Through a series of vignettes, they offer examples of

problems, solutions, and research through an analysis of intervention into bodily disassociation and disembodiment and propose an ecological revitalization of thinking, feeling, and living through the body *in* and *as* movement. Their deep and wide-ranging treatment of an ecological aesthetics of movements provides a valuable resource for educators and researchers interested in childhoodnature studies and embodied practices.

Movement also serves as the basis for inquiry in the section's final chapter, entitled ▶ Chap. 81, "Propositions for An Environmental Arts Pedagogy: A/r/tographic Experimentations with Movement and Materiality". In this chapter, authors David Rousell, Lexi Lasczik, Rita Irwin, and Peter Cook undertake a series of creative experimentations that investigate the relations between movement and materiality in the development of an environmental arts pedagogy. Drawing on new materialist theories of matter and movement as vibrant and creative forces, the authors devise a series of four experimental art processes that "explore the relational spaces between art, environment, and pedagogy." As a methodology that operates through relational practices of artmaking, researching, and teaching/learning, they take up a/r/tography as "an ecology of practices in which human and non-human agencies are always entangled with distributed processes of co-composition, negotiation, and constructive functioning." Through a/r/tographic renderings that combine elements of speculative theory, poetics, and visual imagery, the authors put the concepts of "corridor," "flight," "viscosity," and "construction" to work in ways that connect "movement with matter, body with environment, and imagination with empirically-observable phenomena." Bringing together creative practices associated with choreography, drawing, installation, and social practice art, the authors conclude with a series of speculative propositions for an environmental arts pedagogy.

Frictional Spaces and Relational Overlaps

The editorial process of drawing together this fertile "seed bag" of chapters has revealed to us the rich diversity of theories and practical engagements that are currently being undertaken to shape the field of ecological aesthetics in relation to childhoodnature studies. As mentioned in the opening sections of this introduction, we have welcomed the relationships and the tensions that have emerged between and among these diverse offerings. Indeed, we have endeavored to actively multiply the possibilities of how ecological aesthetics might transform studies of childhoodnature rather than attempt to achieve a consensual framework or agreed-upon set of parameters. In closing this section introduction, we highlight some of the dynamic frictions and discontinuities, along with relational overlaps, that have emerged through the differential concepts of childhood, empiricism, sensation, pattern, and movement.

We can see various relationships emerging in the spaces between Greenwood's biographical treatment of Rachel Carson's early twentieth-century childhood and the diffractive multiplicities of twenty-first-century childhood that we encounter in

McKnight's "Tin Shed Science club." In the "frictional spaces" between these two chapters, we see onto-epistemological differences being multiplied across decades, as civil rights, literary, artistic, and environmentalist movements coincide with radical technological revolutions and catastrophic ecological destabilizations coincide with post-truth political regimes. While the early twentieth-century world of Carson's childhood may no longer exist, the transformative power of her sense of wonder lives on in McKnight's Tin Shed Science club, even as the authorial control of the human(ist) voice "collapses into soil, understands the child as soil." We are reminded that there is no going back after each turn. The environmental turn, the feminist turn, the material turn, and the ontological turn: each of these turns is not simply a shift in human ideology and ethics but a turning of the Earth itself that never turns back.

The frictional spaces between the speculative and the Indigenous also begin to coalesce over the course of reading this section to inform different variations of an ecological aesthetic **empiricism**. Rousell and Cutter-Mackenzie's speculative account of nature as a vibratory continuum both resonates with and disturbs the traditional ecological knowledge (TEK) systems invoked by Cajete and Williams and in MacDonald's account of the "matrix that embeds." Each of these ecological aesthetic accounts pivots relationally on the centrality of embodied and enactive engagement with the world as empirically experienced. The friction between these approaches emerges in the different ways that they resist reductive understandings of empiricism rooted in Western scientism. For Rousell and Cutter-Mackenzie, the development of a "speculative empiricism" allows them to account for the virtual, immanent, indeterminate, and unknowable elements of potential that form the underlying conditions for childhoodnature experience. Cajete, Williams, and MacDonald, on the other hand, evoke the "Great Mystery" of nature through Indigenous spiritual beliefs and practices that are intimately connected with trans-generational experiences of place, community, art, and ritual. These authors describe what might be called a "sacred empiricism" that infuses everyday aesthetic practices such as breathing, walking, and noticing with a profound spiritual significance and connection with the whole of nature.

Another frictional space can be found in the ways that various chapters focus on the role of **sensation**, a space where sensory experiences of childhood and nature make aesthetic contact. Phillips writes of the "sticky sensation" of holding a child's hand while walking through the streets of Chiang Mai, while Rousell and Cutter-Mackenzie describe the "ecologies of sensation" that emanate from the surfaces of children's photographs. In thinking the sensation of childhoodnature beyond the human, these two chapters provide alternative perspectives on the ways that nonhuman senses and sensors are entangled with childhood experiences, including the sensorial agencies of plants, buildings, mushrooms, and digital cameras.

Pattern also emerges as a frictional space that problematizes aesthetic issues of scale, complexity, and differentiation, as emphasized in chapters contributed by Pente and Hannigan, Kilgerry, and Xu. Pente brings our attention to the nano-scale as a potential catalyst for childhoodnature pedagogy and artistic practice, while Hannigan, Kilgerry, and Xu draw out the life-size implications of patterning across

biological, cultural, and ecological systems. These chapters offer productive tensions between patterns of repetition and patterns of difference, revealing the ways that patterns operate across multiple levels and scales of organizational complexity, many of which are ordinarily hidden by habitual modes of perception and thought. Both chapters share a commitment to extending the connections between science and art, using pattern and scale as conceptual figures that can transform the ways that children learn through aesthetic engagement with the elements and forces of the natural world.

The final two chapters in the section each contribute to a frictional space concerned with the ecological aesthetics of **movement**. Both chapters acknowledge the primacy of movement in matters of life, learning, aesthetic experience, and environmental awareness, but the differential contrasts between their approaches also generate a series of productive tensions. Focusing on the centrality of the moving body as the experiential locus for environmental learning, Moradian and Eddy offer a complex range of theories and empirical examples that link embodied self-awareness with ecological sensibilities and capacities for interconnection. For these authors, the body operates as a phenomenological conduit and interface for engaging with the whole of nature through movement, leading them to propose a somatic pedagogy predicated on the dynamic balancing of psychological, social, and ecological systems. Rousell et al., however, take an alternative approach that experiments with movement as a distributed environmental force that is inextricably linked to dynamic material processes and interactions. Rather than emphasizing the conscious movement of the individual human body, these authors foreground the intercorporeal materiality of choreographic movements that come to compose an environmental arts pedagogy.

We hope that this brief introduction to the section's core components has provided a helpful series of entry points for thinking within, across, and among the various chapters collected here. We conclude by extending our deep gratitude to all of the contributors who have made this section possible, as well as the lead editors who have supported our efforts to bring a fresh, experimental, and, in many ways, untested approach to childhoodnature studies.

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Sticky: Childhoodnature Touch Encounters 72

Louise Gwenneth Phillips

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Abstract

Children's attention to sensuous and affective qualities of nature-matter affordances and constraints is the focus of this chapter, along with related possibilities for movement, learning, and thought. An eco-aesthetic account of childhoodnature touch is developed in relation to Barad's quantum physics-informed theory of agential realism. By this account, all particles are entangled in the void so that every degree of touch is touched by all possible others. Encounters of childhoodnature touch are drawn from the author's lived experiences of child-led walks in Chiang Mai, Thailand. These are performative walks from "The Walking Neighbourhood Hosted by Children" project, in which arts workers supported primary school-aged children to locate places of connection in urban landscapes for curating and leading walks as public performance. Sensory

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ethnographic attention to the encounters were privileged due to limited mutual language sharing. The eco-aesthetics of childhoodnature touch encounters in three child-led walks of Chiang Mai are storied from the author's lived encounters to invite "possibilities of engaging the force of imagination in its materiality" (Barad, Differ J Fem Cult Stud 23(3):206–223, 2012). Poetics and storying are purposefully offered to entice readers to imagine sensing the insensible – the indeterminacy of the entanglement of matter. By doing this, experiences of childhood connections with nature can be (re)imagined, foregrounding the affect of eco-aesthetics in provoking appreciation and care for the entangled other.

Keywords
Childhoodnature · Diffractive analysis · Intra-actions · Sensory ethnography · Spacetimemattering · Storying · Touch · Walking

Kraing (age 11) is leading me with a group of about eight adults and children down an alley lane in Old Chiang Mai; I wonder where we were headed. The only clue I hold is "sticky," as *Sticky Duang Dee* is the name of Bai Bua (9), and Kraing's walk and Bai Bua had already taken us to Wat Duang Dee. Suddenly, Kraing stops near a large concrete wall bordering a hostel. He invites us to admire an ivy vine that was growing all over the wall (Fig. 1).

Kraing is fascinated by how it *sticks* to the wall. He invites us to stop and marvel at the beauty of the vine and wonder at its capacity to cling and adhere to the wall – as if we are encountering vines for the very first time. I have seen this vine before; in fact, something similar grows on a wall in my own garden. But, in this moment, following Kraing's invitation, I notice how the leaves diminish in size toward the end of a branch, reaching out with fine tendrils and how the branches grow over each other sticking with fine stem roots clinging to other leaves as well as the wall. I marvel at the aesthetic of its irregular tangled quite flattened form – noting the relationship between vine (nature) and concrete (manufactured). Nature pervades urban development, discretely crawling and clinging to its surfaces. However, it is not as simple as that – the binary of nature and development are troubled and diffracted.

English ivy is an introduced plant to Thailand. Though Thailand was not claimed as a colony, the colonizing forces of the British and French Empires surrounded it and so introduced species surreptitiously crept in – the metaphoric entanglements of past-present colonialisms. Along with the historical questions of how the vine came to be, I searched for scientific explanations on how the tiny stem root hairs thread into fine cavities in walls, learning how the root hairs grow in a spiral-like locking formation with hooklike ends fastening the connection (Bourton, 2010). Ivy vines are known aggressive invaders, just as concrete invades nature. The concrete wall conquers space as a divider between private and public property. Though the vine has an aesthetic appeal, and this is what Kraing notices and wants others to notice, recognizing the histories of both matters, it is not as simple as nature permeating the manufactured; both are in response to the other and both are in tension to the other, as

Fig. 1 Sticky vine

what Barad (2007) refers to as intra-acting. These diffractive readings collide in and out of my mind – visual and tactile wonderings that would not have occurred, without Kraing's invitations to notice and wonder. I came to notice human-plant-place relations in the everyday lives of children through immanent materialized connections (Bellacasa, 2009). Through heightened sensory awareness, ethicality in being and knowing is awakened, alerting my recognition of entanglement of alterity, vine, concrete wall, of child and adult, and of past and present, as what Barad (2007, 2010) names as spacetimematterings. These different relations provoke a rethinking of human-plant-place relations, of colonizing entanglements, to be emplaced differently, as Nxumalo (2015, 2016) too experienced in her childhoodnature encounters. Kraing invites attention to the vine – a caring appreciative relation that emerges in the ordinary to consider the inherent material connections between each tendril of the vine and its chosen habitat.

I open with this story, as it was this encounter that inspired this chapter and my ponderings on the stickiness of childhoodnature touch. Kraing chose the ivy-vined wall as his walk destination for the social practice (or participatory) arts (see Bishop, 2012) project *The Walking Neighbourhood hosted by Children* (To date *Walking Neighbourhood hosted by children* (http://thewalkingneighbourhood.com.au) has taken place in Brisbane, Darwin, and Sydney in Australia, Chiang-Mai in Thailand, Seoul in Korea, and Kuopio in Finland.) when it took place in Chiang Mai, Thailand at the Chiang Mai City Arts and Cultural Center in May 2013. *The Walking Neighbourhood* was designed by Lenine Bourke (Artistic Director) and a team of co-artists to provoke rethinking of the geographies of fear (Valentine, 2004) that control children's limited access to the public sphere (e.g., see Gill, 2007, Malone & Rudner, 2011) and perpetuate commonly held perceptions of children as incompetent becomings (e.g., see Coady, 2008). *The Walking Neighbourhood* arts project confronts the public imaginary through public performance of child-led neighborhood walks that foreground children's visibility and independence in public spaces. However, the politics of children in public spaces is not the focus of this

chapter; instead I zoom in to diffractively read intra-actions in childhoodnature touch encounters that emerged in the child-led walks in Chiang Mai in May 2013.

Following Kraing's invitation, I savor the eco-aesthetic appreciation of stickiness in childhoodnature touch. And like the growing body of work in more-than-human geographies (see, for instance, Ginn, 2014), I examine how heterogeneous materials become sticky and cohere into broader webs of relation. To explore and tease out the entanglements of a sample of childhoodnature touch encounters, I first briefly explain Karen Barad's (2007) feminist quantum physics theory of agential realism to consider what happens with the action of matter touching itself. Key concepts and understandings of intra-actions, agential cuts, and spacetimemattering are explained with reference back to my sticky encounter with Kraing. I then define the focus of touch in childhoodnature and the applied methodology of diffractive analysis through sensorial ethnographic storytelling. These explanations set the scene for further sensory readings of another two childhoodnature touch encounters in Chiang Mai. I then close the chapter with childhoodnature touch offerings on eco-aesthetics, responsibility, and indeterminacy toward ethico-onto-epistemology.

How Matter Matters in Intra-actions and Agential Cuts

I look to Barad's (2007, 2010, 2012, 2014) writings because she seeks to "understand the nature of nature and the interplay of material and discursive, the natural and cultural, in scientific and other social practices" (2007, p. 42). Her work offers a commitment to the material nature of practices and how they come to matter. In her theory of agential realism, matter is an active participant in the world, which "is a dynamic intra-active becoming that never sits still" (2007, p. 170). So to understand the tensions, possibilities, and dynamics of childhoodnature touch, I look to materiality at play to broaden understanding and insight. More specifically, I look at what Barad refers to as intra-actions.

Contrary to the concept of interactions, *intra-actions* do not assume prior existence of independent entities. Emphasis instead is on what emerges from actions, not on the preexistence of child, adult, vine and wall, and all predetermined meanings ascribed to these constructs. Intra-actions involve all types of matter: natural, synthetic, corporeal or incorporeal. When examining intra-actions the primary ontological units are not things but "phenomena – topological reconfigurings/entanglements/relationalities/ (re)articulations of the world" (Barad, 2007, p. 141). The phenomena of attention in this chapter is the eco-aesthetics of childhoodnature touch. Through intra-actions "the boundaries and properties of components of phenomena become determinate and particular concepts (that is, particular material articulations) become meaningful" (p. 139). Attention to intra-actions reads distinct entities, agencies, and events as emerging or materializing through or from the intra-action, rather than existing in their own right prior to the intra-action (Barad, 2010). Entities do not preexist; they are agentially enacted and become determinately bounded and propertied within phenomena. Agencies are only defined in relation to their reciprocal interconnection. The vine and the wall and their relationship only

became defined when Kraing invited my attention to them. The boundaries and properties of the vine and wall became determinate, and specific articulations of the world became meaningful through Kraing's invitation. Others engaging in this childhoodnature touch moment would sense different intra-actions producing different phenomena. "The dynamics of intra-activity are non-linear, causal and non--deterministic" (Barad, 2007, p. 240). No individual agents cause change; rather it is in the intra-action that change can emerge. It was the coming together of Kraing's aesthetic appreciation of vine and wall and my openness to wonder that the everyday vined wall became a provocation for recognizing the entanglement of children, aesthetics, subversive invasions, nature, and urban development. The storied intra-actions of childhoodnature touch encounters in child-led walks that I share in this chapter invite differing meanings regarding children, nature, place, and touch to emerge.

Intra-actions enact agential cuts, that is, the subject and object within the phenomenon become determined. It does not produce absolute separations but rather a "cut together-apart (one move)" (Barad, 2014, p. 168), the quantum entanglement of matter, in that matter can be both together and apart with one move. It is through material intra-activity that concepts "enact the differentiated inseparability that is a phenomenon" (2010, p. 253).

In agential realist ontology, neither materiality nor discursivity takes priority, welcoming both material and discursive readings of phenomena that emerge in intra-actions. The primary units of analysis are thus material/discursive practices (e.g., walking, touching), not words. Outside of agential intra-actions – things are indeterminate. Through attention to what happens and what matters in the intra-activity (Barad, 2007) of childhoodnature touch, I see and feel what sticks, that is, what retains as a resonant memory – what lasts and what is sticky as in troubling because of its viscosity – it clings and lingers.

Childhoodnature Touch

In attending to this handbook's focus on childhoodnature, I have chosen to specifically look to what happens in children's touch encounters with nature, that is, moments when children initiate attention to touch in and with natural matter. I look to what emerges (intra-actions) in childhoodnature touch encounters, because "[s]o much happens in a touch: an infinity of others—other beings, other spaces, other times—are aroused" (Barad, 2012, p. 2006). The entire history of physics "can be understood as a struggle to articulate what touch entails," pursuing a myriad of questions, such as "How is a change in motion effected?" (p. 208). Kraing named his walk destination "sticky." It was how the vine stuck to the wall that intrigued him. In classic physics, all touching is repulsion; the electrons of the atoms that make up whatever is touching and being touched electronically repulse each other. The sensation of touch is an effect of electromagnetic repulsion. Matter is made up of particles that repel each other – mutual repulsion that to the naked eye looks like they are sticking together. While I am not a physicist, Karen Barad (2012, 2015) offers

these explanations as a base to build and contrast quantum physics explanations of touch. In quantum physics, particles act and react in the void; they are entangled with the void so that "all material 'entities', are entangled relations of becoming . . . materiality 'itself' is always already touched by and touching infinite configurations of possible others, other beings and times" (p. 215). What this means is that "[e]very level of touch, then, is itself touched by all possible others" (pp. 212–213) so that "[a]ll touching entails an infinite alterity" (p. 214). To contemplate the expansiveness and complexity of the entanglement of all matter magnifies the profundity of touch beyond imagination and measurement.

This notion of infinite alterity also defies classical definitions of space and time. What Barad refers to as spacetimemattering invokes the differential patterns of mattering across different times and spaces (Barad, 2010). History (spacetime) is understood as a linear unfolding. In spacetimemattering, past, present, and future are threaded through one another – "a topology that defies any suggestion of a smooth continuous manifold" (p. 244). Time, instead, is understood as diffracted. Take a moment to contemplate, sensing touch of multiple times and places at once, the spiralled hook grasping of vine root hairs interlocking with rock, sand, and gravel taking place in millions of places over Earth across thousands of years and the millions of children across times and places wondering how vines stick.

Barad (2010) further explains that relations define responsibility as the ability to respond, that is, a matter of inviting, welcoming, and enabling the response of the Other. Attention to specific intra-actions in childhoodnature touch in child-led walks acknowledges and makes such *relata* (potential preceding components of relations). "Responsibility is not an obligation" and "is not a calculation to be performed. . .It is an iterative (re)opening up to, an enabling of responsiveness" (p. 265). What Barad calls response-ability "is a relation always already integral to the world's ongoing intra-active becoming and not-becoming. . .an enabling of responsiveness. . .an iterative reworking of im/possibility; an on-going rupture" (2007, p. 265). Response-ability flows out of the cuts that define phenomena in intra-actions. Through attention to how matter relates and intra-acts in childhoodnature touch, irreducible relations of response-ability are read as entanglements with others: not as mere connections but rather as indebtedness to difference and how such debt permeates our sense of self. An ethico-onto-epistemology (ethically knowing through being) of entanglement with all others provokes an ethic of care for all others. It is through widespread embracement of such an ethico-onto-epistemology that I see offers hope for sustainability of Earth.

Diffractive Sensorial Storying

The multiplicity of difference in intra-actions can be read through diffractive analysis (Barad, 2007). Agential realism enquires "into how differences are made and remade, stabilized and destabilized as well as their materializing effects and constitutive exclusions" (Barad interview with Kleinman, 2012, p. 77). To move away from Cartesian/positivist representation and reflection, I explore diffractive readings.

In physics, diffraction is a process in which light or waves spread in multiple directions once they pass through a narrow aperture. Barad proposes that the concept of diffraction in analysis is applied to produce multiple and diverse perspectives elicited through differing meaning-making, such as through narratives, graphics, poetics, the political, the spiritual, the sociological, and so on. Diffractions map where the effects of differences appear, to study how differences are produced, how they matter, and the entangled effects these differences make. In this chapter, I apply diffractive analysis to explore different ways of childhoodnature touch and being with touch "and sensing the differences and entanglements from within" (Barad interviewed by Kleinman, 2012, p. 77).

I share diffractive analysis of intra-actions of matter in child-led walks through diffractively storying performative accounts of material bodies (human and non-human), because I agree with Cronon (1992) that narrative is "our best and most compelling tool for searching out meaning in a conflicted and contradictory world" (p. 1374) and with Cameron (2012) that telling stories "can move, affect, and produce collectivities" (p. 575). Through a storied approach to inquiry (Denzin, 1997), I seek meaning in the stories and encourage active reader engagement with the stories. I hope, as Haraway (2008) proposed, for readers to be touched by these stories so to inherit different relations and begin to live different histories and provoke alternative worlds and new realities as Gibson-Graham (2006) proposed for geographical storytelling.

Performative accounts place our "thinking, observing and theorizing as practices of engagement with, and as part of, the world in which we have our being" (Barad, 2007, p. 133), as opposed to above or outside in a representational view. A performative account advocates for "relationality between specific material (re) configurings of the world through which boundaries, properties and meanings are differentially enacted (i.e., discursive practices in my posthumanist sense) and specific material phenomena (i.e., differentiating patterns of mattering)" (p. 139 – italics as per original). Phenomena are thus read as an ontological entanglement of intra-acting agencies, with openness to indeterminacy so that differing ways of seeing and understanding can emerge, pushing aside or muffling preconceived notions through attention to being. Knowing through being is studied, that is, an "onto-epistem-ology" (Barad, 2007, p. 185). I am looking to understand what differences matter in nature touch proposed by children, how they matter, and for whom within a shifting entanglement of relations while acknowledging that I am part of the differential becomings. Attention to these differences includes the aesthetics, affects, sciences, and politics of touch.

With limited knowledge of Thai language, I let go of privileging meaning-making through words and actively heightened my sensory awareness to make meaning through visual, auditory, tactile, gestural, and olfactory modes. Following Ingold's (2011) proposition, I draw from animist ontologies and embrace openness to being "alive and open to a world in continuous birth" (p. 64), engaging with the world as a source of astonishment. Such a way of being is curious and welcoming of the new and unknown. It could be argued that many children readily embrace such an ontology, whereas adults have experienced years and years of cannons of Western

thought conditioning, to be "sealed by an outer boundary or shell that protects their inner constitution from the traffic of interactions with their surroundings" (p. 68) as we consistently define, construct schema, classify, and set parameters of how we know the world. Through a more open (animic) and sensorial way of being, I endeavored to welcome all that the children wanted to share to experience new ways of sensorially being in neighborhoods of Chiang Mai with others.

When I accompanied the children on their walks, I recorded video and embodied memories of which I journaled later the same day. I drew from Pink's (2009) principles for sensory ethnography (perception, place, knowing, memory, imagination) as a framework for engaging with sensory data gathered through walking. My sensory *perceptions* were read as interconnected in alignment with the ontology of agential realism, with no one sensory modality dominating and multiple socially, culturally, and biographically specified meanings intersecting. These sensory perceptions defined *places*. The children's nature touch encounters were very much emplaced, with the intra-actions in space defining *places* of meaning (Creswell, 2004). I drew on my sensory memories of previous visits to Thailand, of previous walks with children, of previous walks in general, and of previous lived experiences. My embodied sensory *memories* of ethnographic data of childhoodnature touch were not merely reported but rather reactivated, imagined, mused over, and linguistically played with. Insights (*knowings*) were generated through the creation and sharing of stories of emplaced sensory memories of children's nature touches. "'Imagination' is implicated in everyday place making practices" (Pink, 2009, p. 39), not just visual imagining but multisensory imagining. I imagined each child's experience of the walk, and their previous experiences of the walk, imagining what she/he was interested in, thinking, and feeling. Collectively, these principles guided my attendance to the sensoriality and materiality of another's way of being in the world, by aligning my body and rhythms and ways of seeing and listening with theirs so that I could become similarly emplaced to come to be with the children's sensations, understandings, and imaginings.

Through embodied and emplaced sensorial research of *The Walking Neighbourhood hosted by Children*, I have been alerted to the ongoing responsibility to the entangled other (Barad, 2007, 2010) that I am entangled with other people, animals, plants, things, and places. I am affected; I am not separate from but rather blurred with others. Such heightened awareness of whole of body in place with others invokes relationality. Allow me to take you on two further walks with children in Chiang Mai.

Childhoodnature Touch that Initiates Movement

As we walked down Ratvithi Road, Pang Pound (9) asked us to stop and to notice hundreds of golf ball-sized seedpods on the ground. She then invited us to roll on them like a skateboard or roller skates. The walking tour group of about 15 then experimented with rolling on seedpods, skating along the footpath of Ratvithi Road. Rather than be bothered by the slippery hazard of seedpods interrupting the

path designed and made for humans to walk along, Pang Pound invited us to relish the very quality considered as a nuisance by pedestrian safety auditors. As Ranciere (2010) noted, urban design and civil services commonly demand that pedestrians "move along" so that the only permissible activity is walking through public spaces. Being spherical invites diverse movement. We played with moving differently – sliding rather than stepping. Pang Pound invited us to notice what can happen if we work with the touch of our shoe-clad feet on the spherical seedpods. We worked with the offer of the seedpods. They scattered, and many crunched, cracking the pod open – a necessity to perpetuate the dispersal of the seeds and the ongoing life of the tree. Wajuppa Tossa (Thai co-researcher) relayed in her version of the walk that Pang Pound said, "I don't want to leave this place. It's so much fun" (Phillips & Tossa, 2017, p. 22), reflecting childhood's stickiness with nature.

As we turned the corner to Khang Ruan Jum Road, Pang Pound and her accompanying walk hosts Jenny (age 7) and Kwan (age 9) warned us with nose blocking gestures that we were passing open rubbish bins. With the intense damp heat, the rotting organic matter was pungent. For a moment, through embodied sensation, the pervasion of the odor and suffocating humidity felt like being in literally a compost bin, being with organic matter in the slow lingering process of decay, like Haraway (2016) invites us to be with in *Staying with the Trouble*. This sensation was only fleeting as we did not stay with the decomposing matter for long but turned the corner to be refreshingly aroused with the fragrant aroma of Thai cooking from street stalls.

Pang Pound then led us to the Mueang Chiang Mai District Office, a place where she played when she was little, when her Dad worked there. In the open space to the left of the office building, Pang Pound pointed to a statue of the King of Thailand, her embedded dutiful practice. She then invited us up the front steps of the office building to collect leaves from the ground under a large overhanging yellow India tree and throw them in the air. The leaves were like feathers with an embedded pealike seed at one end. "It falls like rain," exclaimed Pang Pound. No government officials were to be seen. The grounds were quiet aside from our group playing with leaves on the front step. It was Saturday. There was much laughter and chatter as we delighted in throwing leaves in the air in the forecourt of government offices. This was a space of power and authority, yet Pang Pound invited us to contrast this with the carefree action of throwing leaves in the air. Her association with this space was as an open play space. There are no playgrounds in Chiang Mai, so the car park and forecourt of the government offices were to Pang Pound a space to move and explore. The regulatory space was disrupted by a child's invitation to hold and throw leaves and admire the beauty of their wafting drift to the ground.

Pang Pound invited us to see and experience an institutional space differently, by not permitting its authoritative nature to feature or intercept with aesthetic sensory pleasures. Pang Pound could have asked us to throw leaves in the air at any site, but this wasn't any site. I indulged in the playfulness of throwing leaves in the air against the backdrop of the sterility of government offices. The exquisite irony was not lost in this moment of childhoodnature touch.

Pang Pound's provocations of seedpod sliding and leaf throwing were delightful playful offers to enjoy and appreciate qualities of these plant parts. What emerged in these intra-actions was an honoring and celebration of the seedpod and leaf's qualities – how they can bring joy and wonder while at the same time enacting their dispersal to perpetuate the life cycle of the plant. The entangled effects of noticing these differences with adult sensibilities of the typical patterns of human privileged and policed usage of public spaces sparked readings of the politics of space and how childhoodnature touch can provoke the reconfiguring of spacetime-matterings with playful humor. Pang Pound's childhoodnature touch provocations furthered my embodied commitment to ethico-onto-epistemology – I sensed the differences of child, adult, seedpod, footpath, decaying organic matter, leaves, and offices and their entanglements from within.

Human and Nonhuman Touch

A couple of days earlier, Seemie, all of 6, with a sparkling smile, dressed in a pink dress topped with a crocheted white bolero and wide koala-shaped thongs (globalization is alive and well), held her hand out to accompany me. I entered the walk with a post-humanist ontology of openness – letting go of preexisting conceptions of Seemie as child and me as adult, of me as foreigner (farang), and of Seemie as a local; rather we were beings engaging with the streets of Old Chiang Mai. Seemie wrapped her hand in mine to take me on the walk.

I felt the delicate nature of Seemie's small hand in mine. My senses alerted to the weight, texture, and warmth of her hand that is neither a subject (i.e., to be used for a purpose, e.g., guide me in direction of walk) nor an object of observation. I sensed a "proximity of otherness that brings the other nearly as close as oneself. Perhaps closer… an infinity of others—other beings, other spaces, other times" (Barad, 2012, p. 206).

Her hand is matter intertwined with the matter of my hand, engaged in the intra-activity of handholding. The affect of connection to another was created. My embodiment was integrally entangled with Seemie's. *This is not to say that I experience this when I hold hands with anyone or that the act of holding hands automatically produces such; that is too simplistic an application of agential realism. I am sharing my perceptions and sensations of this moment of being with participant and with data. My predefined identities as mother and early childhood teacher that would be readily socially welcomed in the action of adult woman holding young girl's hand are not foregrounded in my perceptions. The moral panic of adult and child touch that has risen in recent decades* (Tobin, 2004) *was not present in the moment; rather, I, like Tobin, am willing to state publicly that I appreciated being affectionately touched by a child. By examining intra-actions, our entities were not predetermined; they emerged from the action. Instead I am attending to the wave of sensations: warmth, softness, tenderness, and delicateness.* In that moment of my hand being taken in Seemie's, I had an ethico-onto-epistemological awakening, that is, in caring in knowing, and in being, which opened corporeal

awareness of connectivity and entanglement: entanglement of alterity, of generations, of child and adult, and of interculturalism.

Seemie was leading the walk; she was responsible for me. Or as an adult, does the default for responsibility always defer to me? *In agential realism I am embodied, I am with Seemie, I am not an outsider observing in, I am in the moment with Seemie. I am engaged in walking along streets of Old Chiang Mai with Seemie. I am adult and child at the same time; binaries blur.*

Our only shared words were greetings (sawatdee-ka) and gratitude (korp-kun-ka). By not sharing a language – the emphasis on words diminished; materiality and performativity claimed more space. My senses heightened to the new urban landscape. All I knew from an adult's explanation before we set off on the walk was that Seemie was taking us to a mermaid house. Fresh to a foreign city with sensory ethnographic sensibilities, I existed in the indeterminacy of quantum causality at the heart of Barad's (2007, 2010) concept of intra-actions. With openness to instability and impossibility, I searched for some threads of stability and possibility in my sensory memories for balance and for meaning. A mermaid house, what could that be? I imagined what a mermaid house might be. Is it a museum where Thai folklore of mermaids was stored and documented? Was it someone's home inspired in design by mermaids? Is it a building with a mermaid painted on it? Being in touch with more-than-human imaginings in intercultural folklore, images of half-fish-half-human beings across cultures floated in and out of my mind as Seemie led us onward.

As we walked down narrow footpaths frequently obstructed by obstacles, such as electricity poles, trees, and rubbish, I wanted to engage with Seemie to make conversation, such as "How much further?" and "Where is the mermaid house?" I guess driven by previous patterns of walking with another, you converse. Without Thai, all I could do was point, and Seemie smiled and nodded. Committed to holding my hand, Seemie led the way. With the anticipation of the unknown and unfamiliar and the rising temperature and humidity, sweat slipped between our hands, yet Seemie continued to carefully attend to holding my hand. Beads of sweat developed on her petite forehead.

> . . .touching, sensing, is what matter does, or rather, what matter is: matter is condensations of response-ability. Touching is a matter of response. Each of "us" is constituted in response-ability. Each of "us" is constituted as responsible for the other, as the other. (Barad, 2012, p. 215)

I felt from Seemie a commitment to being responsible for me and the group. She was diligently committed to holding my hand and leading the walk to her desired mermaid house. I wondered if she was perspiring from the heat alone, or was she anxious about leading the walk and having responsibility for a *farang* (foreigner)? She continued to smile sweetly at me and carefully hold my hand.

The entire group of 11 followed Seemie's lead. I had no idea where we were going yet was comfortable in the adventure of being led to the unknown by a young child, well, aside from prickly discomfort of the heat. We crossed the road and turned

Fig. 2 Mistaken mermaid house

into another road where Seemie stopped across from a carpentry workshop; let go of my hand to approach the translator, Kimmim; and spoke in Thai, which Kimmim relayed as "It's not there!!" (Fig. 2)

An agential cut, the indeterminate phenomena of the mermaid house became determined through local causal structure (Barad, 2007). Though determined as absent – as missing! – our willing curiosity to see the mermaid house was stumped. Could this, what appeared to be a manufacturing workshop, be differently materialized as a mermaid house at another point in time? Spacetimemattering, that is, the differential patterns of mattering across different times and spaces (Barad, 2010), rearticulated this workshop as the mistaken mermaid house. A few of us took photos to archive this puzzle.

I responded with empathy to Seemie's disappointment through a convivial offer of a grimace. She shyly smiled, seemingly un-phased by not locating her mermaid house. The workshop to which Seemie had led us had a panel near the roof, with a shadowed mark suggesting a previously adhered decorative piece, but it was dirty and well-worn and looked like a well-established workshop for construction. It was puzzling that it could have changed from a young girl's perception of a mermaid house within 2 days. The accompanying translator and Australian arts worker (Nathan) talked about what to do. Nathan suggested they talk about it at the group debrief on return.

Sai then led the group onto his destination. Seemie retrieved a camera from her cloth shoulder bag. We then shared intra-activity between human and nonhuman apparatuses (i.e., cameras). This became our new way of interacting, a shift from the physical connection of hand holding to sharing visions of interest. Seemie photographed lotus flowers in a decorative pond on the footpath, sparkly signs, gates, and flowers. . .flowers and more flowers all within two blocks. Like Hultman and Lenz Taguchi (2010) who diffractively read photos of preschool children in an outdoor playground using a relational materialist methodology to enable shifts in habits of seeing children, I too focussed on visual data with a view to glean insight to Seemie's

Fig. 3 Seemie taking photo of flowers

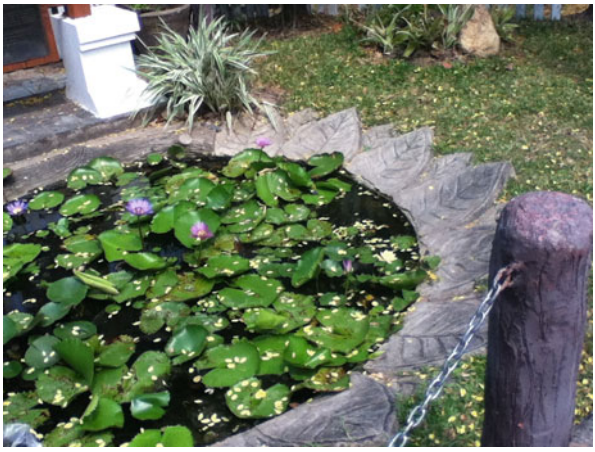

Fig. 4 Lotus flower pond that Seemie photographed

interests and to know her connections with matter in public spaces. I photographed her photographing and what she aimed her camera at, noticing her connections with places, to build understanding of the phenomena of inquiry: children in public spaces (Figs. 3 and 4).

I regarded matter that I would have otherwise passed. Seemie taking photos of matter in the urban environment physicalized her connection to the neighborhood, and I taking photos of Seemie connecting to matter drew me in as another thread in a web of entangled connections with Seemie and with lotus flowers so that I became with the data (Hultman & Lenz Taguchi, 2010, p. 534). I visually honored with Seemie what she deemed worthy of archiving.

Then we crossed the road and turned up a narrow road, and Seemie suddenly stopped. I saw her looking at a large copper mermaid painting on a black wall behind a gate. “Is this the mermaid house?” I asked and she nodded affirmatively (Fig. 5).

Fig. 5 Seemie with her sought-after mermaid house

The open arms and curving body of the mermaid were alluring. Seemie smiled delightedly, yet she dutifully did not pass the gate. Seemie knew the boundaries of space; even the tantalizing enticement of her object of desire (the mermaid) did not intercept her compliance with the public/private space divide (adapted from a version of Walking with Seemie previously published in Phillips, 2016).

My walk with Seemie produced attention to intra-actions of childhoodnature touch between human and human, between human and more-than-human, and between human gaze and flowers. In the child-holding-adult-hand emerges appreciation of the sensations of warmth and tenderness, commitment to reciprocal responsibility (in a Baradian sense of inviting, welcoming, and enabling the ability to respond to each other), and the politics of adult-child touch. The boundaries of each other's being blurred to be entangled in pursuit of the mermaid's house. Being in touch with the pursuit of the mermaid house invited the spirits of mermaids across cultures to accompany the walk. As a storyteller of more than 25 years, I have read, heard told, and told myself folktales of mermaid encounters. A dear friend, Narelle Oliver, published a book "Mermaids Most Amazing" (2001), which collates the folklore of mermaids for child readers. In the book, Narelle recounts half-human-half-fish creatures in the mythology and folklore from Arnhem Land, Babylonia, Polynesia, Native America, the Philippines, Mexico, Japan, Ukraine, Scotland, Ireland, Ghana, and Germany. These images and stories along with many others that I had read and heard were aroused and present as I was held in suspense as to

what and where Seemie's mermaid house was. The intrigue of indeterminacy was enticing. The questions of whether mermaids exist did not surface. The commitment of the search for the mermaid demonstrated an enduring commitment for a mixed group of children and adults to support Seemie's desire – her wish. Does childhoodnature have to be only about what is scientifically proven? It was the aesthetic – the beauty of the mermaid that – Seemie appreciated, just as she appreciated the beauty of the lotus flowers, as too have been appreciated across mythology.

Childhoodnature Touch Offerings Toward Ethico-onto-Epistemology

These diffractively storied encounters of childhoodnature touch are shared not to idealize or romanticize childhoodnature touch but rather to witness the possibilities of awakenings that emerge. The children did not offer these childhoodnature touch encounters because of an explicit focus on nature; rather these encounters were entangled and located within what sparked their interest in their neighborhood walks of Chiang Mai. What is at stake is "what counts as nature, for whom, and at what costs" (Haraway, 1997, p. 104) and how. Through animic openness and heightened sensorial awareness to the childhoodnature touch provocations of my child walk hosts, the children alerted me to what matters – to what counts as nature. It is not the untarnished wilderness but rather in the everyday – the ordinary (vine on wall, seedpods underfoot) but also in the extraordinary – the (im)possible (mermaids). Emerging from these childhoodnature touch encounters is attention to eco-aesthetics and the feeding of responsibility toward others, through openness to indeterminacy for an ethico-onto-epistemology. The following discusses understandings gleaned on these three concepts emerging from the above diffractive storying of childhoodnature touch encounters.

Eco-Aesthetics

Kraing, Pang Pound and Seemie invited sensation with nature: not with what is readily visible and visceral but with that which creeps into crevices, rolls underfoot, hangs to the side, and hovers on the boundaries of existence. The stealing of surreptitious moments to sensorially connect illustrates the inseparability of children and nature. With fewer years of Western conditioning to separate mind from body, Kraing, Pang Pound, and Seemie did seem to have an enhanced attunement to sensorially read and be with organic matter. Or was it simply that they were given the luxury of time to walk and wonder in their local neighborhood as a source of astonishment (Ingold, 2011), as opposed to traversing through spaces, to get to a predetermined destination?

The Walking Neighbourhood hosted by Children involved arts workers facilitating workshops with primary school-aged children who self-volunteered (or their

parents volunteered them) to participate. The series of workshops involved drama games for the group to get to know one another and build rapport with one another, lots of observational neighborhood walks, photo documentation of the walks, collecting artifacts on the walks, interviewing neighborhood residents, and group meetings to reflect and debrief on walk experiences and the process of developing a curated walk for adult audiences. The arts do invite us to look closer – to observe – to explore. The whole project invited relational aesthetics (Bourriaud, 2002), through artists and audiences manipulating everyday practices to provoke (re)thinking about these practices so that the everyday is engaged with not as predetermined but rather as indeterminate.

The experience of the aesthetic is an intangible, emotive experience that humans struggle to shape into words. By referring to the Greek root *aisthe*, which means to feel or apprehend through the senses, Baumgarten coined the term in 1750 (Abbs, 1987; Barilli, 1993). Sensorial meaning-making is at the core of aesthetics, so it is not just sensory perceptions alone but rather how they are combined with our interpretations or readings of our sensory perceptions (Diaz, 2004). To explain the aesthetic experience, Dewey (1934) applied the metaphor of a stone rolling down a hill that is looking forward to the journey, relishing the encounters along the way, and relates the end of the journey to all that went before. This explanation breathes more-than-human sensibilities, inviting a stone and inclined landform to illustrate interconnected and relational qualities of aesthetic experiences. Though rolling down the hill implies speed, I suggest that slow lingering is far more desirable for the relishing of aesthetic encounters. And it is in these moments of relishing, of savoring, that shifts in understandings can be provoked cultivating a sensuous, analogical, and poetic mode of knowing (Abbs, 1989; Greene, 1995). The symbolism and sensuousness of the aesthetic encounter possess great power for new insight, especially when time is allowed for musings over the sensory perceptions (Marcuse, 1978). The language of aesthetics makes "perceptible, visible, audible that which is no longer or not yet perceived, said, and heard in everyday life" (p. 72). By this Marcuse claimed that the language of aesthetics can communicate what is not communicable in any other language.

The childhoodnature aesthetic encounters of Kraing, Pang Pound, and Seemie's walks communicated beyond what I have been able to share through words in a linear chapter. Though these encounters may seem a simple, small gesture, they are imprinted within, as I can so viscerally reimagine being in each encounter. Although they occurred more than 4 years ago, they continue to provoke sensuous, analogical, and poetic knowing. They provoke what Maxine Greene (1995, 2004) referred to as wide-awakeness, arousing vivid, reflective experiential responses by releasing imagination through the arts. This state of wide-awakeness is not about sudden or short bursts of shifts in consciousness but rather an ongoing deeper awareness of what it is to be in the world. These childhoodnature touch encounters aroused an openness to be with child, to be with vine, to be with seedpods, and to be with mermaid – to sense their pulses. The addition of eco to aesthetics brings the aesthetic attention to nature or ecological concerns (Miles, 2014), "to cross the contested terrain that makes up the natural world and humankind's relationship

with it" (Finley, 2011, p. 312). Though Kraing, Pang Pound, and Seemie did not communicate any explicit sustainability agenda in their childhoodnature touch encounters, the experience of each certainly aroused a deepened sense of responsibility for the other, for which I am eternally grateful for their invitations to admire the beauty of vines, the movement of seedpods, the touch of skin to skin, and the welcoming of mermaids. And it is through cultivation of appreciation that we then care, that we then have the ability to respond to another, that we ethically know through being with others (ethico-onto-epistemology).

Response-Ability: Having the Other in One's Skin

From such an ethico-embodied position, one cannot escape responsibility to all other beings – an ethics of worlding – by bringing the sciences into democracy, acknowledging the politics of nature, flattening the hierarchy of human privilege, and recognizing that all beings share common worlds (Latour, 2004). By reading intra-activity in childhoodnature touch, all bodies came to matter – the tenacious claws of the vine come to matter; the ambiguous and elusive mermaid comes to matter; and the playful movement possibilities of seed pods and seeded leaves come to matter. It is about being entangled with all matter—"having-the-other-in-one's-skin" (Barad, 2007, p. 392). From an agential realist position, "we (but not only "we humans") are always already responsible to the others with whom or which we are entangled, not through conscious intent but through the various ontological entanglements that materiality entails" (p. 393). Kraing, Pang Pound, and Seemie brought conscious attention to our entanglement/stickiness with nature. Although much of the human project has tried to disconnect us from nature, vines continue to creep into manufactured structures, seedpods continue to roll underfoot, mermaids continue to hover on the peripheries of existence, and children seize these surreptitious moments to connect.

Whole of body sensing of interconnectedness/interrelationality evokes ethicality, that is, "hospitality to the stranger threaded through oneself and through all being and non-being" (Barad, 2014, p. 163). In this space, self-interests dissipate, and the attention is to "being with." Such responsibility entails "an ongoing responsiveness to the entanglement of self and other, here and there, now and then" (Barad, 2007, p. 394). In the shift from humanism to post or more-than-humanism, the ongoingness of responsibility is hard to sustain especially in our age of extreme consumerism and social media-fuelled narcissism. And it would be idealistic to suggest that Kraing, Pang Pound, and Seemie sustained responsibility to the organic matter of their touch encounters. It is difficult to say. There was certainly a desire to linger as expressed by Pang Pound about the seedpod rolling touch with "I don't want to leave this place." But they also quickly moved on, though probably in response to adult corralling to keep to predetermined time schedules. As Ginn (2014) expressed, "the aim of more-than-human geography to rethink the ontological and ethical entanglement of life is long term and ambitious" (p. 541). The awareness of the responsibility to all others is a beginning of "facing our responsibility to the infinitude of the other,

welcoming the stranger whose very existence is the possibility of touching and being touched, who gifts us with both the ability to respond and the longing for justice-to-come" (Barad, 2012, p. 219). It is hoped by those of us who have begun to sense, and those for whom such sticky, entangled ethicalities are deeply rooted in our cultural DNA, that response-ability to the infinitude of the other is contagious and spreads and heals the vast injuries of human privilege.

Conclusion

To close, I propose that it is through openness to indeterminacy that holds the space for ethically knowing and being with others: an ethico-onto-epistemology. As Barad (2012) asserts, "being in touch with the infinite indeterminacy at the heart of matter, the abundance of nothingness, the infinitude of the void that is threaded in, through and around all spacetimemattering opens up the possibility of hearing the murmurings, the muted cries, the speaking silence of justice-to-come" (p. 216). To sit with the unknown/the ambiguous/the indeterminate is a core attitude for creative practice (Piirto, 2011). It is the ambiguity that invites exploration – which invites openness to see the hidden, to hear the murmurings, to feel breath on skin, to smell ghosts, and to taste the notes of earth in water. And it is through the imagination that the arts and aesthetics put "us in touch with the possibilities for sensing the insensible, the indeterminate" (p. 216). I invite you to embrace indeterminacy in childhoodnature touch encounters that are offered your way, to relish and linger with sticky sensations and to embody touching infinite alterity and ethicality.

Cross-References

- ▶ Artists as Emplaced Pedagogues: How Does Thinking About Children's Nature Relations Influence Pedagogy?
- ▶ Embodied Childhoodnature Experiences Through Sensory Tours
- ▶ Exploring Space and Politics with Children: A Geosocial Methodological Approach to Studying Experiential Worlds
- ▶ In Place(s): Dwelling on Culture, Materiality, and Affect

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Rachel Carson's Childhood Ecological Aesthetic and the Origin of *The Sense of Wonder*

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Abstract

From early childhood onward, Rachel Carson's relationship to nature was both imaginative and scientific, involving both literature and firsthand investigations of her homeplace. Later in life, Carson shared in a speech that, "I can remember no time, even in earliest childhood, when I didn't assume I was going to be a writer. Also, I can remember no time when I wasn't interested in the out-of-doors and the whole world of nature. Those interests, I know, I inherited from my mother and have always shared with her" (Carson, Lost woods: The discovered writings of Rachel Carson. Beacon Press, Boston, 1999, p. 106). Carson's mother recognized her daughter's gifts and surrounded her with opportunities to learn in two complementary directions: creative writing and nature study. This chapter examines the development of Carson's famous "sense of wonder" through her own childhood immersion in the early twentieth-century nature study movement, as well as through her relationship with children's literary magazines, particularly *St. Nicholas*. Like other exemplars of literary environmental history, Carson's

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early childhood experiences nurtured the development of an artistic sensibility as well as a responsiveness to, and curiosity about, the more-than-human world. Carson's aesthetic made her a best-selling author who catalyzed the modern environmental movement with *Silent Spring*. But her success as a writer and legacy as an activist were rooted in "the sense of wonder" – a phrase that would become the title of her last, posthumously published book. Today, *The Sense of Wonder* remains an ecological manifesto that summons learners and educators of all ages to keep alive this vital sense in our own lives.

Keywords
Rachel Carson · Nature study · Literature · The sense of wonder · Children

Introduction: The Past Is Not over

> All history becomes subjective; in other words there is properly no history, only biography.
> – Ralph Waldo Emerson (1982, p. 153), from his 1841 essay, "History"

Why bother to look at the past? What can we learn from the elders – the *ancestors* of the environmental movement? Where, in the life of someone like Rachel Carson, was the meeting ground between the aesthetic and ecological imagination?

People who know of Rachel Carson most often remember her as the author of *Silent Spring*, her 1962 classic exposé of chemical pesticides, and the industry behind them, that helped launch the modern environmental movement. *Silent Spring* did in the 1960s what no one book had ever done before and will likely ever do again: it radically changed the terms of the conversation between people and nature in the public imagination, in media, in science, in business, and in government. It galvanized a massive public outcry about the impacts of technology on human and nonhuman health, it led to a series of national policy shifts around environmental regulation (in more than one country), and it became an enduring symbol of the need for citizens to both heighten our awareness of ourselves as environmental watchdogs and also to recover our sacred obligations and connections to the earth. Translated into many languages, *Silent Spring* quickly became an international best seller and signaled a new era of global environmental politics. Technological "progress" and the interests of business would from then on be questioned on a planetary scale by a growing group of concerned citizens, scientists, and policymakers who would become known as environmentalists.

What most people do not remember today, however, is that *Silent Spring* did not make Rachel Carson's reputation as a writer and household name. She was already the beloved author of three best-selling, and largely apolitical, natural histories of the oceans. Carson's popularity as a nature writer, her status as a much-loved observer, and scientific interpreter, of the natural world, put her in a unique position to become an international spokesperson for the environment. Her notoriety, and, from her publisher's perspective, her marketability, ensured that *Silent Spring* would be published, publicized, and widely read and that its charges against chemical pesticides would be seriously considered.

It is hard to imagine the environmental movement as we know it without *Silent Spring*. And it is impossible to imagine *Silent Spring* without the success of her Carson's previous three books: *Under the Sea Wind* (1941), *The Sea Around Us* (1951), and *The Edge of the Sea* (1955). The most important of these was *The Sea Around Us*. Published over 10 years before *Silent Spring*, this is the book that changed her life and that made Carson's reputation as a major nature writer. Sales from *The Sea Around Us*, along with the constant stream of requests for new writing and speaking engagements, gave Carson the financial freedom to quit her government job, build her cottage on the coast of Maine, and become a full-time writer – her lifelong dream realized. She benefitted from the massive publicity behind the book, which included serial prepublication in *The New Yorker* (*Silent Spring* would receive the same privilege), a Book of the Month Club selection (ditto for *Silent Spring*), the John Burroughs Award, and the National Book Award. The accolades and awards were the fruition of a long effort to write while holding down a government job as a scientist and supporting her extended family. But most of all, Carson's success reflected her literary gift to communicate her own sense of wonder through poetic prose that somehow married imaginative vision with vivid natural history, unbridled enthusiasm, and the careful reasoning of science.

In today's intellectual environment, postmodern, ecocritical, and critical humanist scholars are sometimes hasty to condemn the writing of canonical environmental thinkers. Often, writers such as Henry David Thoreau or John Muir are dismissed as expressing a narrow, white, male, and privileged view of romanticism that does not reflect the cultural diversity of thought and experience in today's environmentalism. Though such critiques are of course sometimes warranted, they are less convincing when they become ad hominem attacks on personalities (often based on excerpted or "cherry-picked" passages) that lack careful engagement with an author's biography and his or her larger body of work in its historical context. This is especially true with Thoreau, who was recently lampooned in *The New Yorker* in an article titled "Pond Scum" (Shultz, 2015). While this chapter does not seek to enter into a debate about the relative merit of canonical environmental literature in the context of today's intellectual trends, it does explicitly focus on the biography of Rachel Carson as related to her writings that still resonate with large audiences. What does Carson still have to teach us that we might need to remember?

At a time when "nature writing" is sometimes critiqued for not being critical enough to address the enormity of today's cultural and ecological crises, it is worth remembering that the transformative power of Carson's *Silent Spring* had its origins in an *aesthetic*, rather than a *political*, genre. In both academic and political contexts, aesthetic experience and expression are often marginalized in favor of discursive and rational argumentation. From the perspective of the arts and humanities, such marginalization limits the possibilities of what it means to be an imaginative and creative human being, just as it frequently excludes imaginative thinking from politics. The life of Rachel Carson – as artist and activist – demonstrates the vital necessity of aesthetics to political life and to the environmental movement. What made Carson's nature writing unique was not her politics, but her rare ability to combine the skills, gifts, and discipline of a scientist with those of a literary artist. While she developed this ability throughout her life and career, it started with a

childhood steeped in both natural history and literature. Examining the confluence of these twin passions in Rachel Carson's early life illustrates what kinds of learning experiences undergirded Carson's celebrated environmentalism. It also serves as a reminder that literature and nature study remain valuable ends in themselves and that they are essential to children's learning as well as to contemporary environmentalism.

Rachel's First Teachers

> I can remember no time, even in earliest childhood, when I didn't assume I was going to be a writer. Also, I can remember no time when I wasn't interested in the out-of-doors and the whole world of nature. Those interests, I know, I inherited from my mother and have always shared with her. – Rachel Carson (1999, p. 106), from her 1954 speech, "The Real World Around Us"

Born in 1907 in Springdale, Pennsylvania, Rachel Carson's early childhood was guided by two of her most significant teachers, her mother Maria McLean Carson, and a 64 acre rural property that featured orchards and gardens, groves and fields, hills and hollows, and plenty of room to roam. Linda Lear (2009), Carson's principal biographer, offers this description of the famous naturalist's mother:

> Maria was an avid reader and believed in using her leisure time to improve the quality of her children's lives as well as her own. One of her keenest interests was natural history. She was not alone in this passion, for botanizing, bird-watching, and nature study were interests avidly pursued by amateur naturalists all over the country at the turn of the century, particularly among middle-class, educated women. (p. 13)

Maria McLean was highly educated for her time. The daughter of a Presbyterian minister, she attended the elite Washington Female Seminary, excelled in music, and was trained in a classical curriculum which included Latin. After taking advanced courses at Washington College, Maria taught school and gave music lessons until she married Robert Carson, as marriage was then taboo for female teachers. Robert was neither rich nor well-educated, and the family always struggled financially. But with their initial purchase of the property in Springdale, Robert and Maria were able to provide Rachel and her siblings with an expansive homeplace filled with daily wonders. Eventually, the young naturalist would learn to study her immediate environment systematically with her mother and discover that she had a passion for writing about it for herself as well as for other young readers (Lear, 2009, pp. 8–20).

The Nature Study Movement

Maria Carson and her daughter Rachel wandered the woods and fields around their home at a time when nature study had become one of the country's chief recreational and leisure activities for people of all ages. When considering the history of environmentalism and environmental education, the nature study movement in the

United States in the late nineteenth and early twentieth centuries stands out as an extraordinary phenomenon. It enjoyed enormous popularity among ordinary citizens, and it had deep impacts on children through the widespread adoption of nature study curricula in schools. The movement emerged and flourished during a time when naturalists – from Louis Agassiz to John Burroughs – were highly respected people and when the knowledge of the natural world, including a basic acquaintance with local flora and fauna, was considered fundamental to a proper education (Pyle, 2001). Historically, the popularity of the nature study movement owed much to nineteenth century Romanticism and the cult of nature that followed the American Renaissance. The difference was a departure from the mere idealization of nature by elites to firsthand experience of it for the masses, as a subject of both aesthetic appreciation and scientific inquiry (Armitage, 2009).

As a former schoolteacher herself and as a parent actively involved with the schooling of Rachel's older siblings, Maria would have been familiar with the many books then available to teachers to help guide their students in nature study. The most famous of these was Anna Botsford Comstock's, the *Handbook of Nature Study*, first published in 1911, 4 years after Rachel's birth. Like the larger movement and its advocates, such as Comstock's Cornell University colleague, Liberty Hyde Bailey, the *Handbook* encouraged not just curiosity for natural objects, but immersive experiences, as well as emotional and spiritual connections, which combined recreation, environmental learning, and an ethic of reverence toward the natural world. The subtitle of Liberty Hyde Bailey's 1909 book communicates the humanistic agenda for a nature study movement focused on school-aged children: *The Nature Study Idea: An Interpretation of the New School-Movement to Put the Young into Relation and Sympathy with Nature*. For Bailey and other advocates of nature study, the point was to connect the learning of the science of natural history to the experience of excitement, joy, and wonder. Later in her own life, as we will see shortly, Carson would restate this precise goal with its most memorable expression in her writings on "the sense of wonder." Well before she wrote about it as an adult, however, she experienced it as a child through the everyday contexts of family, home, and turn-of-the-century educational culture.

The nature study movement was the earliest example in the United States of widespread environmental education. By 1939, in its 24th edition, Comstock's *Handbook* had been adopted in schools throughout the country and had introduced two generations of children to natural history through the direct experience of their local environments. Before World War II, mainstream American culture included within it a strong affirmation of nature study as both a societal good and as a benefit to the education of the nation's children. Today's environmental movement is deeply indebted to the success of the earlier nature study movement. And some of the current movement's inadequacies, such as the diminishment of natural history within a broadly diffuse mission fractured by specialization, reflects the earlier movement's demise (Pyle, 2001). But in the second decade of the twentieth century, nature study flourished. Maria Carson devoted herself to mentoring the young Rachel in the wonders found in the family woods, hillsides, and orchards and made full use of the Comstock readers that her two elder children brought home from school. Rachel was surrounded from birth by birds, insects, fruit trees, vegetable gardens,

wildflowers, hedgerows, woodlots, and meadows. She was mentored from an early age to experience nature and her own backyard, as a vast laboratory for learning about life's miracles. While many rural children of Carson's era had open access to natural environments, few had the encouragement of committed college-educated parents like Maria Carson, whose persistent tutelage would help to fuse Rachel's experience with her developing senses of curiosity and wonder.

Maria Carson's guidance, like the nature study movement itself, went well beyond the taxonomical naming of the diverse creatures she and her daughter would regularly encounter on their property and the surrounding landscape. According to Lear (2009):

> Maria impressed her respect and love for wild creatures on all her children. When they returned home from their woodland adventures with treasures to show her, Maria instructed the children to return them to where they had been found. This kind of care for the natural world had a spiritual dimension that at least her youngest daughter [Rachel] embraced and would practice all her life. (p. 15)

However Rachel Carson experienced her own spirituality, her writings are alive with expressions of love, care, wonder, and awe – emotions that kindled her aesthetic imagination and enthusiasm. In her biography, Lear (2009, p. 8) describes how Springdale residents recount the story, "perhaps true, perhaps apocryphal," of Carson's early fascination with the ocean. As local lore has it, 1 day Rachel found a large fossilized shell in the rocky outcrops of the hillsides surrounding the Carson property. She wondered where it had come from, what kind of creature had made it and lived in it, and what finally happened to the animal and the sea in which it lived. Whether myth or fact, one can easily imagine these kinds of questions coming up regularly on Rachel and Maria's many rambles on their land and during Rachel's adventures with other Springdale children, who collected many fossilized shells on the Carson property. Later as an adult, Carson would write of her love of the sea: "Even as a child – long before I had ever seen it – I used to imagine what it would look like, and what the surf sounded like" (Carson, 1999, p. 54).

Her mother Maria, the family land, and the nature study movement helped to nurture in Carson an acute awareness of her imaginative powers, her sense perceptions, and her powers of expression. The nature study movement promoted reverence for nature's wonders *and* a reverence for nature's beauty. In his history of the nature study movement, Kevin Armitage (2009) emphasizes the importance of aesthetics to many of the movement's advocates:

> The nature study movement provided thinkers. . . with a working model for using education to inculcate the public with aesthetic sensibilities and a consciousness for conservation. One result of sympathetic contact with nature was to bring beauty into people's lives. Nature study advocates disavowed the idea that the experience of beauty should be a distinct and specialized component of a well-rounded education. They preferred to see beauty as continuously integrated into all parts of life. Sympathy with nature and the aesthetic pleasure derived from it affected every part of being. Rather than existing in things, aesthetic pleasure arose from human experience – especially experience with nature. (pp. 150–151)

So prevalent was the idea that the aesthetic experience in nature was a valued educational aim in itself that in 1902 the *Nation* magazine would opine that nature study and artistic seeing "have the same enemy – lazy and abbreviated habits of vision; both fight the same battle – to intensify the powers of observation" (cited in Armitage, 2009, p. 152).

The nature study movement had many advocates and practitioners. Dignitaries such as Harvard University President Charles Eliot promoted a new education for public happiness through the experience of the beautiful in nature (Armitage, 2009, p. 148). John Dewey's theories of learning and aesthetic experience provided theoretical support for new ventures into the field. Dewey's ideas of education and art were that they depended primarily on experience or forms of communication that were not reducible to subject or object. That is, experience, or art, is to be conceived as the continuous interplay between subject and object, between the viewer and the viewed, and between children and their environment (Dewey, 1997, 2005). It is this interplay that the nature study movement sought to enhance through direct contact with nonhuman phenomena and with opportunities for reflection and expression – key components of experience, according to Deweyan theory. Scientists, naturalists, writers, and photographers such as Liberty Hyde Bailey, Anna Comstock, and Gene Stratton-Porter inspired young people and their mentors to experience nature directly, out-of-doors, as a basic part of what it means to be alive in the world. All of these themes would become central to Carson's identity as a writer and environmentalist. Whatever Carson's innate gifts were as a child, it is hard to imagine the path she followed without the influence of the nature study movement and her opportunity to experience its credo daily, on the land, with her mother as her enthusiastic guide.

St. Nicholas Magazine

While art and writing were central to the nature study movement – Comstock's (1967) *Handbook of Nature Study* included correlations with drawing, story, and "language work" (p. xv) – Maria Carson also subscribed to several children's magazines to support her daughter's enthusiasm for reading and the art of writing. Rachel's favorite was *St. Nicholas*. Lear (2009) writes, "No other juvenile magazine of the period adopted the values of the nature study movement more completely than *St. Nicholas*" (p. 18). While *St. Nicholas* reflected the turn-of-the-century nature study movement, it also inspired other young writers who would eventually help shape American literature. William Faulkner, F. Scott Fitzgerald, Edward Estlin (e. e.) Cummings, Edna St. Vincent Millay, and E. B. White, among other notables, all contributed to *St. Nicholas* as child authors.

Like the bounty of resources produced for schools, teachers, and families during the nature study movement, *St. Nicholas* was geared toward children. First published in 1873, the magazine emphasized beautiful illustrations, high-quality writing, stories, poetry, and a section on letters from readers. The magazine was also designed

to motivate its young readers toward intellectual achievement and high ideals. In 1889 it began publishing work by children themselves and holding contests for the best poems, stories, essays, drawings, and puzzles. Each month, winners were awarded prizes and inducted into the St. Nicholas League; the highest achievements were for honor members who were awarded cash prizes. Before she was thirteen, Rachel submitted four stories to the magazine, all of which were published. This early literary success, which twice included actual payment from *St. Nicholas*, inspired Carson to think of herself as a writer of some ability, and it commenced what would later in her life become an assiduous business practice of identifying potential publishing opportunities and submitting work for review – usually with the expectation of remuneration (Lear, 2009, pp. 18–26).

Rachel Carson sent the magazine her first story contribution at age ten. It was immediately published and given a prize, as were several other articles, the last of which described her "favorite recreation" – which was a special section in the magazine devoted to the subject. Carson's story of going birds'-nesting (her favorite recreation) with her dog, Pal, is worth quoting here at length as it illustrates the convergence of her skills as a sensitive young naturalist and writer of some accomplishment:

> The call of the trail on that dewy May morning was too strong to withstand. The sun was barely an hour high when Pal and I set off for a day of our favorite sport with a lunch-box, a canteen, a notebook, and a camera. Your experienced woodsman will say that we were going birds'-nesting – in the most approved fashion.
>
> Soon our trail turned aside into deeper woodland. It wound up a gently sloping hill, carpeted with fragrant pine-needles. It was our own discovery, Pal's and mine, and the fact gave us a thrill of exultation. It was the sort of place that awes you by its majestic silence, interrupted only by the rustling breeze and the distant tinkle of water.
>
> Near at hand we heard the cheery "witchery, witchery," of the Maryland yellow-throat. For half an hour we trailed him, until we came out on a sunny slope. There in some low bushes we found the nest, containing four jewel-like eggs. To the little owner's consternation, we came close enough to snap a picture.
>
> Countless discoveries made the day memorable: the bob-white's nest, tightly packed with eggs, the oriole's aërial cradle, the frame-work of sticks which the cuckoo calls a nest, and the lichen covered home of the humming-bird.
>
> Late in the afternoon a penetrating "Teacher! *teacher!* TEACHER!" reached our ears. An oven-bird! A careful search revealed his nest, a little round ball of grass, securely hidden on the ground.
>
> The cool of approaching night settled. The wood-thrushes trilled their golden melody. The setting sun transformed the sky into a sea of blue and gold. A vesper-sparrow sang his evening lullaby. We turned slowly homeward, gloriously tired, gloriously happy! (Carson, 1999. p. 10)

In these few short paragraphs, we can witness several of Carson's attributes, so early embodied, that would develop throughout her life and work. The first sentence reflects the pull of the trail felt by so many nature lovers. This particular adventure

was not a special occasion, but a daily experience for Carson. She would embark alone or with her dog for an entire day prepared with food, water, and the tools of her nature study craft: a notebook and camera. Her language may seem somewhat cliché to today's readers, yet it is quite descriptive for a girl of thirteen. And while any decent young writer might pen the phrases "majestic silence," "rustling breeze," and "distant tinkle of water," Carson's prose is most evocative when she describes the birds' nests she finds in closer detail: the "four jewel-like eggs" of the yellowthroat, the oven birds' nest, "a little round ball of grass," and the extended list: "the bob-white's nest, tightly packed with eggs, the oriole's aërial cradle, the frame-work of sticks which the cuckoo calls a nest, and the lichen covered home of the humming-bird." That Carson even knew how to identify the nests and birdsongs of these local breeding birds reflects a process of learning the natural history of her homeplace, a process that had evolved over time to the point where she is clearly very confident and capable. That sense of confidence and ability is, likewise, reflected in the sure-footed phrasing and description of a talented writer. *St. Nicholas* was the perfect outlet for young Rachel. It was a public place where she could test and display her aptitude as both naturalist and writer.

Together, the nature study movement and the literary opportunities presented by *St. Nicholas* magazine created a rich milieu in which Carson's aesthetic sensibilities could be awakened. Nature's mysteries inspired Rachel on a daily basis, kindled her imagination, and led her to learn more about the plants, animals, and places of her home range. *St. Nicholas* offered a space where her voice could be seen and heard and where she could begin to identify herself as a serious writer with a publication record – all before entering high school. And perhaps most important to Carson's learning was the near constant presence of her mother, Maria McLean Carson. Maria recognized her daughter's gifts and made it her business to nurture them. The nature study movement and children's literary magazines provided them both with plenty of resources. Yet it was also more than that. These two pillars of Carson's childhood – nature study and literature – were highly visible and valued expressions of culture at the time; among the educated classes, reading, writing, and nature study were respected activities for everyone's self-development. Maria and Rachel Carson must have felt that support. They flourished under its influence.

The Sense of Wonder

If we were to examine Carson's major publications in reverse order, we would need to begin not in 1962 with *Silent Spring*, but in 1965 with her posthumously published, essay-length book, *The Sense of Wonder*. This may be her most timeless book: the one that, because of its brevity and broad appeal, may be the most widely read today and the one that will still be read for its freshness decades, perhaps centuries, into the future. Unlike her other books, which, though poetic, dramatic, and profound, depend largely on a science that may seem outdated, *The Sense of Wonder* captures a profound human experience that the environmental movement and all of its advocates consistently need to return to for sustenance.

As we have seen, Carson's professional success as nature writer was nurtured in childhood through intensive exposure to natural history and the craft of writing. Long before environmental educators would begin researching, writing, and discussing the impact of "significant life experiences" on environmental attitudes and behaviors (e.g., Tanner, 1980; Chawla, 1998), Rachel Carson wrote a powerful literary manifesto advocating childhood experience in nature. Just as the politics of *Silent Spring* sprang from an imaginative writer rather than a seasoned political activist, the pedagogical wisdom of Carson's book, *The Sense of Wonder*, arose not from formal research into childhood learning, but from the perceptive reflections of a naturalist and literary observer. Carson was, of course, well trained as a biological researcher, but her writing about childhood was biographical and imaginative. *The Sense of Wonder* describes her relationship with one child – her grandnephew, Roger. Today the phrase "the sense of wonder" is probably better known than "silent spring." Both phrases are iconic to the environmental movement; both emerged from a now historical figure whose primary identity was that of a writer. In a research handbook such as this, it is worth noting the value of imaginative writing as a legitimate form of knowledge production. The marginalization and exclusion of aesthetic expression from many academic conversations privileges one way of knowing over others and severely constricts the possibilities for human communication and understanding. The limits of space restrict elaboration on this point. Suffice it to say that an emphasis here on Carson's literary achievements, and their impact on environmental education and the entire environmental movement, points to the need to revalue literary and artistic contributions in every field of study.

The Sense of Wonder was first published in 1956 as a feature article in the popular magazine, *Women's Home Companion*, under the title, "Help Your Child to Wonder." Carson never had children, but she was very close to her grandnephew, Roger Christy, who she would eventually adopt when his mother, Rachel's niece, died. Carson's biographers and her own letters tell us of her struggles with her maternal role. Throughout her adult life, she had been the chief caretaker – and breadwinner – for her entire extended family, including Roger and his single mother. The burden, in terms of time and money, that this placed on so ambitious a writer as Carson was significant, and it forced her early in her career to develop strict work and business habits. Hard pressed to find space and time to write, she also always wrote with the aim of making as much cash as she could from her efforts. As mentioned earlier, Carson's blockbuster success with *The Sea Around Us* lessened the financial burden and also allowed her to build a cottage, a sort of writing retreat, on Southport Island on the coast of Maine. Even so, adopting 5-year-old Roger at age 50 added pressure to a host of family obligations she had begun to refer to as "the emergency" (Lear, 2009, p. 300). But even before she adopted him, Carson was very fond of her little nephew. Her relationship with Roger and their adventures near the sea at Southport are what inspired "Help Your Child to Wonder" and gave the public a closer look at the private, feeling life of the best-selling author.

This world of feeling, the intense world of sense perception and wonder at even the smallest parts of creation – this has always been the cornerstone of American environmentalism and its nature writers. Walt Whitman may have said it best in

Leaves of Grass when he exclaimed, "and a mouse is miracle enough to stagger sextillions of infidels" (Whitman, 1980, p. 73). English romantic poets like Wordsworth and Blake and American transcendentalists like Emerson and Thoreau all celebrated the mysterious forms, energies, and relationships between each part of the living earth and the entire cosmos, as did dozens of other writers Carson admired. From its earliest beginnings, American environmentalism was promoted and shaped by its nature writers. Intimacy between people and nature, however, and the meaning one makes of it, depends largely on place and time, on the conditions that either invite or inhibit the development of such a relationship. In their seaside adventures in Maine, Rachel witnessed Roger's bond with the world develop; her observations and reflections stand up today as a poignant plea on behalf of all of us to protect and reclaim our own sense of wonder.

The Sense of Wonder: A Brief Textual Analysis

This chapter views Rachel Carson – both her biography and her writings – as a necessary part of contemporary environmental education, especially with respect to aesthetics and children's learning. Examining the significance of Carson's own early learning experiences was the subject of earlier sections. This section aims to demonstrate, through close reading, how *The Sense of Wonder* (Carson, 1965) functions as a literary text imbued with particular pedagogical, ecological, and aesthetic insight – for children and adults.

The essay opens with the image of Carson wrapping up a small child to introduce him to the sea for the first time (citations are from the original 1956 version titled, "Help Your Child to Wonder" though both titles will be used):

> One stormy autumn night when my nephew Roger was about twenty months old I wrapped him in a blanket and carried him down to the beach in the rainy darkness. Out there, just at the edge of where-we-couldn't see, big waves were thundering in, dimly seen white shapes that boomed and shouted and threw great handfuls of froth at us. Together we laughed for pure joy – he a baby meeting for the first time the wild tumult of Oceanus, I with the salt of half a lifetime of sea love in me. But I think we felt the same spine-tingling response to the vast, roaring ocean and the wild night around us. (p. 25)

"Help Your Child to Wonder" was Carson's first magazine publication after the runaway success of *The Sea Around Us* (1951). Readers of the *Women's Home Companion* (1956) were excited to learn more about the private life of the famous author. Lear (2009, p. 280) reports in her biography that the original commission from the magazine was for Carson to write more of a personal profile of herself for admiring readers. But Carson gave readers something that even more women, as well as men, could relate to: the image of a motherly figure introducing a child to the all-encompassing embrace of Oceanus, Carson's mythopoetic name for the subject of her three previous books.

With the opening paragraph, Carson establishes several themes developed throughout the essay: the importance of sensory impressions, emotions, a sense of

mystery, and the shared experience of adventure. The night is stormy; the ocean is roaring; the waves are thundering: "I think we felt the same spine-tingling response," Carson writes. She describes an emotional scene of laughter and "pure joy," as she shares her "half a lifetime of sea love" with her nephew. But it is not just the sheer physicality of the sea throwing "great handfuls of froth" that produces the emotional response. This prelude paragraph is also steeped in a sense of mystery – the unknown. They go "down to the beach in the rainy darkness. Out there, just at the edge of the where-we-couldn't see," where "dimly seen white shapes. . .boomed and shouted." On this dark and "wild night," the child meets for the first time the "wild tumult of Oceanus." This is far from a tame nature walk. Carson introduces the child to creation itself and imaginatively invokes the gods. And suffusing the entire scene is the image of intimacy and togetherness. The adult guide is there with the child to share the joy, wonder, and awe of the experience.

Throughout "Help Your Child to Wonder," Carson describes diverse experiences in nature as enchanted "adventures" capable of producing deep feeling. She emphasizes the significance of the adult-child relationship in these adventures and insists that they are "based on having fun together rather than on teaching" (p. 26). She also points out that a natural outcome of such shared experience is a growing curiosity and knowledge of nature's parts and how they work together. Of Roger's developing ecological literacy and his ability to identify individual species, Carson remarks, "I am sure no amount of drill would have implanted the names so firmly as just going through the woods in the spirit of two friends on an expedition of exciting discovery" (p. 26). Such a reflection echoes Carson's own natural history exploits around Springdale with her mother and her dog Pal.

The heart of the essay communicates a profound sensitivity to the child as a person to be respected. In this, Carson shows herself to be a child-centered pedagogue in the tradition of Rudolf Steiner, Maria Montessori, or John Dewey. For Carson, this was not the result of formal educational training, but an extension of her sensitivity, as an artist and naturalist, to the experience of another being. Bridging the usual divide between the child and adult world, Carson (1956) writes:

> We have let Roger share our enjoyment of things people ordinarily deny children because they are inconvenient, interfering with bedtime, or involving wet clothing that has to be changed or mud that has to be cleaned off the rug. We have let him join us in the dark living room before the big picture window to watch the full moon riding lower and lower toward the far shore of the bay, setting all the water ablaze with silver flames and finding a thousand diamonds in the rocks on the shore as the light strikes the flakes of mica embedded in them. I think we have felt that the memory of such a scene, photographed year after year by his child's mind, would mean more to him in manhood than the sleep he was losing. He told me it would, in his own way, when we had a full moon the night after his arrival last summer. He sat quietly on my lap for some time, watching the moon and the water and all the night sky, and then he whispered, "I'm glad we comed" [*sic*]. (pp. 26, 46)

Not only does the prose here reflect a respectful attitude toward children, but it flickers with the aesthetic beauty of "silver flames." Just as she approached nature with amazement as a child and felt compelled to write about it, the mature writer makes the natural world shimmer with the imminent presence of some miracle.

After focusing on her relationship with Roger for the first half of the essay, in the second half, Carson begins to generalize about the nature of experience and learning. Although these general insights about learning are the most frequently quoted passages from *The Sense of Wonder*, it is worth remembering that they were nurtured in a relationship with Roger at Carson's cottage by the sea. In other words, her profound philosophy of environmental learning, which resonates with many diverse people today, originated in relationship with a specific place and a specific child. One of the lessons of the essay, therefore, is that environmental learning depends first of all on establishing and nurturing such relationships.

The following three paragraphs are the most famous passages from *The Sense of Wonder*. They are worth quoting at length because of their continued relevance and because of how they present a challenge to environmental learning programs for children that may not measure up to Carson's vision:

> A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. If I had influence with the good fairy who is supposed to preside over the christening of all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from the sources of our strength.
>
> If a child is to keep alive his inborn sense of wonder without any such gift from the fairies, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in. Parents often have a sense of inadequacy when confronted on the one hand with the eager, sensitive mind of a child and on the other with a world of complex physical nature, inhabited by a life so various and unfamiliar that it seems hopeless to reduce it to order and knowledge. In a mood of self-defeat, they exclaim, "How can I possibly teach my child about nature – why, I don't even know one bird from another."
>
> I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil. Once the emotions have been aroused – a sense of the beautiful, the excitement of the new and the unknown, a feeling of sympathy, pity, admiration or love – then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning. It is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate. (p. 46)

Preserving "one's instinct for what is beautiful and awe-inspiring" is Carson's primary pedagogical concern. The urgency of this concern is made more poignant in the first paragraph by her modernist acknowledgment of widespread adult boredom, disenchantment, and sterile preoccupation with what alienates us. She also claims that a dimmed adulthood can be avoided by keeping alive our sense of wonder. Carson's comments on adult life are instructive to educators whose curricula and programs focus only on children and youth and rarely recognize, at least publically, the reality of adult challenges and the impact that adult affect can have on young

learners. The sense of wonder, she claims, is something that must be kept alive in children. In order for that to happen, she implies, adults must also keep it alive in themselves as an "antidote" to what robs us of the sources of our strength. Carson's vision here is for lifelong learning though lifelong immersion in, and lifelong appreciation of, nature's wonders.

The second two paragraphs rephrase, highlight, and refine some of the themes illustrated earlier in her anecdotes about Roger. First, she reasserts the importance of adult guides: "If a child is to keep alive his inborn sense of wonder. . .he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in." Second, she stresses the primacy of the emotions over the intellect alone: "it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow." As a creative writer tuned to the aesthetics of experience, Carson reveals herself as an early champion of "affective experience" in environmental learning. Here it is helpful to remember that Carson's own education, steeped as it was in the nature study movement and in literature, was saturated with affect and creative expression. She knew from her own experience of learning that "it is more important to pave the way for the child to want to know than to put him on a diet of facts he is not ready to assimilate" (p. 46).

For Carson, facts, knowledge, and, most importantly, the desire to learn are nurtured through experiences of adventure, discovery, and curiosity, rather than from some predetermined educational curricula. The remainder of the essay, however, provides adults with specific guidance on how to help children wonder. Her message is simple: enliven the senses and focus on the living things found in one's home environment, whether that environment be rural or urban: "Exploring nature with your child is largely a matter of becoming receptive to what lies all around you. It is learning again to use your eyes, ears, nostrils and finger tips, opening up the disused channels of sensory impression" (p. 47). For her mostly female readers in mid-twentieth century America, Carson provides vivid, everyday examples for awakening sensory perception for both adults and children. Recreating the sense of wonder through her prose, she reflects on a multisensory experience stargazing with an adult friend:

> It was a clear night without a moon. With a friend, I went out on a flat headland that is almost a tiny island, being all but surrounded by the waters of the bay. There the horizons are remote and distant rims on the edge of space. We lay and looked up at the sky and the millions of stars that blazed in darkness. The night was so still that we could hear the buoy on the ledges out beyond the mouth of the bay. Once or twice a word spoken by someone on the far shore was carried across on the clear air. A few lights burned in cottages. Otherwise there was no reminder of other human life; my companion and I were alone with the stars. I have never seen them more beautiful: the misty river of the Milky Way flowing across the sky, the patterns of the constellations standing out bright and clear, a blazing planet low on the horizon. Once or twice a meteor burned its way into the earth's atmosphere. (p. 47)

Other examples include Roger honing his sense of smell for the wood smoke and sea air that surround their experience at Carson's cottage and listening with her nephew as "the sound of the insect orchestra swells and throbs night after night" (p. 47).

Near the end of her essay, she also shares for her readers her enjoyment, as a scientist and naturalist, of using simple technologies, such as binoculars or a magnifying glass, to enhance outdoor experience. Carson herself made frequent use of a microscope at her cottage, often carrying home specimens from her beach for closer examination. But again, her emphasis in this essay is not primarily taxonomical or even descriptive, but rather to use the simplest equipment of nature study to deepen the experience of wonder. In a passage evocative of the theme of mystery that opens the essay, she suggests sitting together with a child, binoculars trained on the moon to observe the wonder of night migration:

> Seat yourself comfortably and focus your glass on the moon. You must learn patience, for unless you are on a well-traveled highway of migration you may have to wait many minutes before you are rewarded. In the waiting periods you can study the topography of the moon, for even a glass of moderate power reveals enough detail to fascinate a space-conscious child. But sooner or later you should begin to see the birds, lonely travelers in space glimpsed as they pass from darkness into darkness. (p. 47)

Finally, after providing adults with a host of ideas for easily accessible and aesthetically rich nature excursions with children, Carson concludes *The Sense of Wonder* with a memory of her friend and mentor Otto Pettersson. When he knew that he had little time left on earth, the 93-year-old Swedish oceanographer revealed, "what will sustain me in my last moments is an infinite curiosity as to what is to follow" (p. 47). Carson's faith in a sense of wonder was bolstered throughout her life with fellow scientists who shared it. And as she herself faced an early death from cancer and related ailments, Carson never lost the ability to be amazed and enlivened by her perception of the natural world. As if prefiguring her own decline and the eventual passing of everyone, even children, Carson departs *The Sense of Wonder* with an abiding love for a mysterious world in constant flux:

> Those who dwell, as scientists or laymen, among the beauties and mysteries of the earth are never alone or weary of life. Whatever the vexations or concerns of their personal lives, their thoughts can find paths that lead to inner contentment and to renewed excitement in living. Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts. There is symbolic as well as actual beauty in the migration of the birds, the ebb and flow of the tides, the folded bud ready for the spring. There is something infinitely healing in the repeated refrains of nature – the assurance that dawn comes after nights, and spring after winter. (p. 47)

Always the poet scientist, Carson's ecological aesthetic embraces the power of nature to teach, to heal, and to transform.

Conclusion: Wonder in Life and Death

Rachel Carson's sense of wonder endured to the end of her too short life. Throughout the writing of *Silent Spring* and especially in the aftermath of the sensation it caused, Carson struggled with cancer, surgeries, and the debilitating effects of multiple

illnesses. The peak of her literary success in 1962 corresponded with suffering and physical decline that would lead to an early death in 1964 at the age of 56.

During her final 2 years, with her limited energy for work, she had more requests from publishers for writing projects than she could handle. But there was one project that she consistently voiced her commitment to complete. She called it "the Wonder book." Contracted with Harper and Row, this was to be an expansion of the 1956 essay, "Help Your Child to Wonder." When her illness worsened in 1963, she wrote in a letter to her close friend, Dorothy Freeman:

> Oh, I don't deny there are periods of depression and of dark thoughts. There is still so much I want to do, and it is hard to accept that in all probability, I must leave most of it undone. And just when I have attained the power to achieve so much I feel is important! Strange, isn't it? And there are times when I get so tired of the pain and especially the crippling that if it were not for those I love most, I'd want it to end soon. But I seldom feel that way.
>
> I want very much to do the Wonder book. That would be Heaven to achieve. (Freeman, 1995, p. 490)

In what she knew would be her final project, Carson made the very conscious decision to focus her energies on what she thought was most important: keeping alive the sense of wonder that had animated her passion for the natural world and her gift as a writer. At the very end of her life, with whatever power she had left, she wanted to return to this theme as a final act of service to all people, especially the children she knew would inherit a very uncertain environmental future.

The uncertainty of life, and the certainty of death, is part of what makes the sense of wonder such a universal experience. Wonder is the natural human response to the mysterious, the unknown, and the miraculous – the unfinished business of the universe. Unfortunately, Rachel Carson died before she was able to expand "Help Your Child to Wonder" into a longer book on the theme. But her wonder book – *The Sense of Wonder* – a reprint of the original essay with new photographs by Charles Pratt, was published in 1965. It was dedicated to her grandnephew, Roger Christy (Lear, 2009, p. 483).

The Sense of Wonder is among Carson's shorter works. Originally published in a popular magazine as a guide for women, it was not at first intended as the ecological manifesto it has become. But in this brief masterpiece, we can see the influence of Carson's own ecological education: the development of an "indestructible" sense of wonder. Like Carson, the nature study movement advocated not simply for a scientific stance toward children's learning, but for one steeped in the spirit of discovery, where the whole child – emotions, spirit, body, and mind – would be drawn into a relationship of intimacy with the natural world. The movement steered adults toward experiences, activities, and resources and encouraged mentors to become the kind of guide that Maria Carson was to Rachel and that Rachel would become with Roger. Rachel's early exposure to literature in magazines like *St. Nicholas* motivated the young creative writer to publish at an early age and to develop a lifelong identity as a writer. Over time Carson would hone her skills as a naturalist and her craft as a writer, eventually producing four best sellers. The last of these, *Silent Spring*, significantly changed the political environmental landscape. But

it was her sense of wonder, and her ability to express it with poetic prose, that positioned Carson to catalyze the new environmentalism.

At a time when children are often over-scheduled with educational activities and overloaded with media, Rachel Carson's early life, and her essay *The Sense of Wonder*, can serve educators as a touchstone for educative experiences in nature. The lessons for today are deceptively simple. One: children thrive when they can share the joy of discovery with adults who feel and express that joy and who do not rush to put children on a "diet of facts" they are not ready to assimilate. This precept presupposes something that cannot be assumed: that is, a joyful adult who gives children room to roam and who is eager to share the experience. Two: children whose emotional and aesthetic faculties have been sparked in relationship with nature should be given a chance to express that relationship in some creative form. Again, this is not so simple to achieve, especially in formal educational environments where individualized learning is often more rhetoric than reality. Maria Carson, however, regularly provided Rachel with opportunities to explore both of these powerful avenues of learning. All of us are their beneficiaries.

In the age of digital media, direct aesthetic experience with the natural world may seem like a simplistic, or even unrealistic, educational touchstone. Many educators today are encouraged to engage children with the wonders of technology rather than the wonders of nature. It is also true that the imagination and aesthetic sensibility even of today's preschool learners is often mediated by interactions with computers rather than oceans or forests. For many children, as well as adults, computerized attention is the dominant mode of experience in the development of their social and ecological awareness (whether this is an evolution or devolution is the subject of another essay). Gone is the day when a child waited impatiently for the new issue of *St. Nicholas* to appear in the mailbox. Steeped in the technological milieu and bounded by urban environments and regulated green spaces, children may seem to lack access to the everyday wonders of field, forest, and ocean that surrounded Maria, Rachel, and Roger.

In "Help Your Child to Wonder," Carson reminds parents and other adult mentors of some fundamental experiences still available to everyone: the sensory experience of sunrise, dusk, and dark; the revelations of the limitless night sky; the near or faraway voice of one particular bird waiting to be found and named; the power of a thunderstorm and other weather events as they move through and transform a place; the mystery of seasonal migration just overhead or in the distant horizon; the intricate beauty of a snowflake, or a grain of sand, or the wing of a housefly under a magnifying glass; the odors of the seasonal change as organic matter photosynthesizes or decomposes; and the music of insects on a summer night. Of the thrill of these everyday discoveries, Carson (1956) writes, "the game is to listen, not so much to the full orchestra, as to the separate instruments, and to try to locate the players" (p. 47).

Finally, whatever one's opportunities are for direct experience with flora, fauna, and the always changing physical environment, Carson reminds educators of our most potent resource with respect to the development of children's sense of wonder:

> If a child is to keep alive his inborn sense of wonder. . .he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in. . . .I sincerely believe that for the child, and for the [adult] seeking to guide him, it is not half so important to know as to feel. (p. 46)

However we imagine best guiding children, Carson insists that an indispensable part of the program is preserving and cultivating our own sense of wonder. This, the great naturalist and writer contends, is the most precious and educative gift we can offer those who will follow.

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Uncommon Worlds: Toward an Ecological Aesthetics of Childhood in the Anthropocene

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David Rousell and Amy Cutter-Mackenzie-Knowles

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Abstract

In addressing the need for a more robust engagement with aesthetics in post-humanist studies of childhood and nature, this chapter aims to make some tentative steps toward an ecological aesthetics of childhood that is grounded in Whitehead's speculative philosophy. In doing so, the chapter takes an alternative theoretical approach from much of the "common worlds" scholarship that has emerged in recent years while making the case for a new aesthetics of childhood that is responsive to the accelerating social, technological, and environmental

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changes of the Anthropocene epoch. Our approach foregrounds the singularity of children's aesthetic experiences as relational-qualitative "intensities" that alter the fabric of nature as an extensive continuum held in common. We therefore argue that every moment in the life of a child is an uncommon and unrepeatable occasion through which the common world of nature is felt, perceived, and experienced differently. In the second part of the chapter, we use this eco-aesthetic framework to analyze a series of photographs taken by children as part of the Climate Change and Me project, which has mapped children and young people's affective responses to climate change over a period of 3 years in New South Wales, Australia. Rather than working with images as representations or analogic signifiers for children's experience, we analyze how each photograph co-implicates children's bodies and environments through affective vectors of feeling or "prehensions." In doing so, we actively work to reframe aesthetic notions of image, sensibility, perception, and causality in relational terms while also acknowledging the individuation of childhood experiences as "creaturely becomings" that produce new potentials for environmental thought and behavior.

Keywords
Speculative philosophy · Whitehead · Ecological aesthetics · Posthumanism · Anthropocene · Climate change education

Introduction

> We must think of Nature without any residual anthropocentrism: that is to say, without exempting ourselves from it, and also without remaking it in or own image. (Shaviro, 2015, p. 216)

In addressing the need for a more robust engagement with aesthetics in posthumanist studies of childhood and nature, this chapter aims to make some tentative steps toward an ecological aesthetics of childhood that is grounded in Whitehead's (1978) speculative philosophy. By integrating Whitehead's philosophy with posthumanist approaches to the life sciences (Frost, 2016) and media studies (Hansen, 2015), we work to establish the contours of an ecological aesthetics that is both attuned and responsive to the rapidly changing material conditions of contemporary life. In doing so, the chapter takes an alternative theoretical approach from much of the "common worlds" scholarship that has emerged in recent studies of childhood and nature (see, for instance, Malone, 2015; Rautio, 2014; Taylor, 2013; Taylor & Pacini-Ketchabaw, 2015).

In the first part of the chapter, we begin by making the case for a new aesthetics of childhood that is responsive to the accelerating social, technological, and environmental changes of the Anthropocene epoch. We consider the recent turn toward "common worlds pedagogies" in environmental education and childhood studies while also highlighting the need for a more intensive and affirmative engagement with non-anthropocentric and nonrepresentational aesthetic theories within these

fields. Taking Whitehead's aesthetic order of nature as our starting point, we begin to develop an ecological aesthetics that is orientated toward the "uncommon" dimensions of children's experience in and of the Anthropocene epoch. This allows us to foreground the singularity of children's aesthetic experiences as relational-qualitative "intensities" that alter the fabric of nature as an extensive, vibratory continuum held in common. In doing so, we actively work to reframe aesthetic notions of image, sensibility, perception, and causality in relational terms while also acknowledging the individuation of childhood experiences as "creaturely becomings" that produce new potentials for environmental thought and behavior.

In the second part of the chapter, we develop this eco-aesthetic approach to childhoodnature scholarship further by analyzing a series of photographs taken by children as part of the Climate Change and Me project. This project has mapped children and young people's affective responses to climate change over a period of 3 years in Northern New South Wales, Australia. Elsewhere we have analyzed the political and ethical implications of children's embodied participation in the project (Cutter-Mackenzie & Rousell, in press-a), the emergence of speculative fiction as research method (Rousell, Cutter-Mackenzie, & Foster, 2017), as well as the project's methodological innovations and insights (Cutter-Mackenzie & Rousell, in press-b). Here we focus specifically on the speculative analysis of photographic images created by children over the course of the project. Drawing on Whitehead's (1978) theory of prehension in conversation with biocultural insights from the life sciences (Frost, 2016) and media studies (Hansen, 2015), we analyze the sensuous, causal, and virtual elements of children's photographs as occasions of felt relation and environmental encounter. Rather than working with images as representations or analogic signifiers for children's experience, we explore how each photograph co-implicates children's bodies and environments through affective vectors of feeling or what Whitehead (1978) calls "prehensions." This leads us to propose an ecological aesthetics of childhood that affirms both the "common world" of nature as an extensive continuum and the "uncommon worlds" through which children make aesthetic contact with other creatures, environments, and modes of existence. The chapter concludes by considering the pedagogical implications of children's photographic practices, focusing on Whitehead's (1967a) concept of the "art of life" as a guiding proposition for aesthetic cultivation and bodily engagement.

A New Aesthetics of Childhood

Recently there has been a turn toward more relational, collective, and distributed conceptions of children and childhood in the social sciences (Lee, 2013), the environmental humanities (Taylor, 2013), and environmental education (Malone, 2015). In many cases this turn has emerged in response to posthumanist concerns regarding the onset of the Anthropocene epoch, a time in which the very nature of childhood is being transformed by anthropogenic climate change, species extinction, resource contamination, ubiquitous computation, and biotechnological mechanisms

of social control (Lee and Motzkau, 2013). Scholars working the intersections between the fields of childhood studies and environmental education have proposed that the onset of the Anthropocene calls for new conceptualizations of children and childhood (Malone, 2016; Somerville, 2017), along with new research methodologies and techniques that are attuned to the complex dynamics of children's social and ecological worlds (Cutter-Mackenzie & Rousell, 2014). As the relentless acceleration of social, technological, and environmental change continues to erode the humanist foundations of dualistic Western thought, we are now witnessing a proliferation of biosocial (Lee, 2013; Youdell, 2017), posthumanist (Lenz-Taguchi, 2010; Malone, 2016; Rautio, 2014), Indigenous (Cajete & Pueblo, 2010), socioecological (Payne, 2010), and post-developmental (Blaise, 2014) framings of childhood. While these approaches tend to share a commitment to reconceptualizing childhood within more-than-human environments, assemblages, societies, and worlds, they have tended to focus predominantly on the ethical, political, and pedagogical implications of such radically inclusive ecologies of childhood. As such, the aesthetic, imaginative, and experiential qualities of children's environmental sensibilities have often been backgrounded by "ontological" shifts from individuals to collectives, binaries to hybrids, and constructivisms to materialisms. In many cases, this has involved a reinvigoration of the concept of the political collective or "commons" as an assemblage of human and nonhuman constituents that compose the messy and entangled worlds of children and childhood (Taylor, 2013). This backgrounding of aesthetics has been particularly evident in the recent flurry of scholarship under the rubric of "common worlds pedagogies," many of which have drawn extensively on the work of Latour (2004) and Haraway (2008) to account for the common worlds that children inhabit with myriad other agencies and forms of life (Taylor, 2013; Taylor & Pacini-Ketchabaw, 2015).

While we acknowledge the rigor and timely significance of the work currently being undertaken to reinvigorate a more-than-human commons, in this chapter we argue that such turns call for a new aesthetics of childhood as much as they require a new politics and ethics of relationality. It has been widely acknowledged that environmental education has not adequately engaged with the aesthetic dimensions of experience (Eernstman et al. 2012; Ingram, 2012; Inwood & Taylor, 2012; Stables, 2001), while an Internet search at the time of writing revealed no substantive treatment of aesthetics within published literature associated with "common worlds pedagogies" and related research. The reason for this eschewal of aesthetics is not entirely clear. One possible reason could be the distancing of posthumanist studies of childhood from Enlightenment and Romantic aesthetic traditions which have perpetuated purist, progressive, and sublime images of childhood and nature as idealized forms (Taylor, 2013, p. 13). We concur that such a distancing is both timely and necessary, as the humanizing influences of Romantic idealism are often the default philosophical touchstones for contemporary environmentalist movements (Morton, 2007), as well as the "child in nature" movements associated with forest schools and related environmental education initiatives (Malone, 2016). In resisting the dominant tropes of such humanistic ideals in environmental education and childhood studies, critical posthumanist studies have shown how representations of the "natural child" have been used to perpetuate political regimes of anthropocentrism and

human exceptionalism, effectively legitimizing the very social and environmental injustices which they seek to avoid (Malone, 2015; Taylor, 2013). The dominant cultural logic of Kantian aesthetics has also used ideal qualities (such as beauty) and capacities (such as art, language, and technology) as criteria for placing humans above other creatures, consequently positioning the external environment or "nature" as an objective correlate or backdrop for human progress, cognition, and knowledge (Morton, 2013; Shaviro, 2014).

As Morton's (2007) meticulous deconstruction of the lingering dominance of Romanticism has shown, the dismantling of such idealist aesthetic regimes has been a core project of the arts for over two centuries. While Kantian aesthetics continues to exert a stultifying influence on studies of childhood, education, and environment (Prout, 2005; Taylor, 2013), in the art world, these idealisms have long since been replaced by the austerities of social realism, the machinic abstractions of modernism, the anti-humanist deconstructions of postmodernism, and the relational assemblages and spatiotemporal mobilities of much contemporary art (Groys, 2008). Equivalently, contemporary works in art theory, cultural studies, and media studies have been largely influenced by Deleuzian, Whiteheadian, and new materialist aesthetics of immanence, sensation, relationality, affectivity, animality, and becoming (see, for instance, Hansen, 2015; Massumi, 2011; Shaviro, 2009). As Kennedy (2000, p. 30) notes, the materialist turn in aesthetics means that beauty is no longer "consilient with goodness, the romantic, or transcendent notions, but to a feeling of duration, movement, and continual process." Rather than a disavowal of outmoded idealist aesthetics, posthumanist childhood studies could benefit from a more affirmative engagement with the relational and materialist turns in aesthetics in art, media, design, architecture, technology, and film studies over the last three decades. Haraway's (2016) recent work could provide a catalyst in this regard, as she advocates the development of a "new new synthesis" between the environmental arts, humanities, and sciences which would tie "together human and nonhuman ecologies, evolution, development, history, affects, performances, technologies, and more" (p. 63).

Haraway's new synthesis of life sciences, environmental humanities, and relational arts shows the potential for a transdisciplinary ecological aesthetics to transform studies of childhood in ways that are responsive to the Anthropocene's most pressing challenges. By drawing on the vigorous development of posthumanist aesthetic theories in such diverse enterprises as philosophy, art, cultural studies, and the biological sciences, a new aesthetics of childhood becomes both possible and necessary in reconfiguring our understandings of children's learning experiences and environments. This is not to argue that posthumanist studies of childhoodnature need to become *more* aestheticized or artistic (though this may also be the case) but rather that the aesthetic dimension of such work is inseparable from the political and ethical issues that appear to necessitate an "ontological" reappraisal of childhood in relation to nature. We therefore argue that the posthumanist and post-anthropocentric turns toward relationality, collectivity, biosociality, affect, process, emergence, becoming, entanglement, and "common worlds" need to be understood as *aesthetic movements*, prior to their instantiation as movements in ethics, politics, or pedagogical practice.

What these posthumanist turns both instantiate and require, we suggest, is an ecological aesthetics that reconfigures how children's bodies, environments, spaces, places, times, and relations are composed, felt, sensed, and experienced. Such a new aesthetics could be located in the *creatureliness* of children's felt relations and bodily capacities while remaining attuned to incipient ethical and political ecologies as they emerge with/in environments that simultaneously surround, permeate, sustain, constrain, and animate children's everyday lives (Frost, 2016).

The Creatures That Become

In developing an alternative approach to posthumanist studies of childhood in this chapter, we negotiate a (re)turn to Alfred North Whitehead's speculative philosophy as an ecological aesthetics of becoming and felt relationality. Whitehead's philosophy has undergone a renewal in recent posthumanist scholarship, as the relational system of thought he developed nearly a century ago offers a visionary alternative to dualistic and anthropocentric philosophies that have dominated Western philosophy for millennia (Shaviro, 2014; Stengers, 2011). In Whitehead's (1978) speculative philosophy, every actual occasion of experience is understood as a "creature of becoming" that sustains its own existence through affective encounters with other creatures. "The actual occasions are the creatures which become," Whitehead (p. 35) writes, "and they constitute a continuously extensive world." In other words, everything that exists is a *creature* because all actual entities are, more or less, capable of *experience*. All things are creatures of experience. The differences between entities are therefore considered aesthetic differences of degrees, qualities, speeds, manners, and intensities of experience, rather than ontological differences in kind. A stone, for instance, may have a relatively dense, slow, and contracted quality of experience compared to the experience of a child. A child will likely have a more intense experience than the stone, with greater degrees and capacities for sensitivity, contrast, and transformation over a shorter duration. This means that the difference between the experience of a stone and the experience of a child is aesthetic, rather than ontological (Robinson, 2009). In other words, creaturely experiences are distinguished by differences in *becoming* (as the aesthetic mode or manner of existence) rather than differences in *being* (as the ontological essence or substance of existence).

For Whitehead, this differential quality of experience as becoming extends from the cosmological to the quantum, making his philosophy a form of "pan-experientialism" compatible with process thinkers such as Bergson and Deleuze. As Robinson (2009, p. 22) writes, each of these three thinkers foregrounds "the implicit aesthetic genesis, order and creative organisation of experience, with experience here understood as enlarged and not simply equivalent to human experience." We also note the compatibility of Whitehead's philosophy of organism with recent insights from the life sciences, which have revealed the extent to which genetic, cellular, and bodily activities are dynamically modulated by both immediate and transgenerational changes in social and ecological conditions (Frost, 2016). As

Protevi (2013) argues, contemporary advances in the biological, computational, and cognitive sciences provide empirical support for the process philosophies of Whitehead, Bergson, Simondon, and Deleuze while also demanding a posthumanist aesthetics that acknowledges the environmental porosity, plasticity, and permeability of sensing organisms and the environments they coinhabit with other creatures (see also Alaimo, 2010). We therefore take the lead from Frost (2016) in conceiving of children as "biocultural creatures" and the environments they populate as "biocultural habitats," to the extent that the term "biocultural" "encapsulates the mutual constitution of body and environment, of biology and habitat" (p. 4). Within this assemblage of biocultural creatures and habitats as the mutually conditioning elements of life, the element of "culture" is understood as a process of cultivation which provides a medium and milieu through which bodies and environments emerge, grow, develop, interact, and eventually perish.

We can now return to the example of the stone and the child in order to better understand what Whitehead means by the "creatures that become." The child picks up the stone on the riverbank, feeling its weight in the hand, the pock-marked texture of its surface, the way it catches the light as she turns it over. Both child and stone are *creatures*: they are accretions of all the relations they have experienced since they came into existence, including the auto-affective experiences of their own bodies, spaces, and times. They are distinct creaturely entities, each with their own "routes of inheritance" (Whitehead, 1978), and yet they inhabit, if only for a moment, a shared "biocultural habitat" (Frost, 2016). And in this imagined moment of encounter, as the child handles the stone and then skims it across the surface of the water, an event occurs that is not of the child or the stone but of the *aesthetic relation between child and stone*. This felt relation between creatures of becoming is what Whitehead refers to as "prehension." Prehension is the way that creatures sense, perceive, and incorporate the experiences of other creatures through the aesthetic *feeling* and *intensity* of relation. This also means that creatures become *what they are* by prehending other creatures, including themselves (Shaviro, 2009). We can attempt to encapsulate this in a rather simple formulation: *creatures are what they feel.*

Common and Uncommon Worlds

In order to make sense of Whitehead's "common world" pan-experientialism, we need to expand our understanding of aesthetic experience to encompass what he refers to as the "aesthetic order" (Whitehead, 1985). Indeed, we find within Whitehead's radically non-anthropocentric philosophy a system in which all orders of existence (including the biological, the social, the conceptual, the epistemic, the semiotic, the political, the ethical, the spiritual, the actual, and the virtual) are circumscribed within the aesthetic order of *nature.* As Jones (1998, p. 20) notes, this conception of aesthetic order is coextensive with the weight of causal complexity as it emerges through natural processes and accretes over time. For Whitehead (1967b, p. 53), the aesthetic order refers to a common world of nature as it is collectively experienced with each passing moment, along with all of the historical

data, virtual potentialities, and entangled sensibilities that each creature inherits from previous events. "The actual elements perceived by our senses are in themselves the elements of a common world," Whitehead (1967a, p. 88) writes. Every creature that exists is always already immersed "within a world of colours, sounds, and other sense-objects, related in space and time to enduring objects such as stones, trees, and human bodies. We seem to be ourselves elements of this world in the same sense as are the other things which we perceive" (p. 89).

The way that creatures become sensible elements of each other's worlds is crucial to understanding the distinction between common and uncommon worlds that we wish to unfold in this chapter. Whitehead's formulation of a common world is the vibratory continuum of nature that extends from subatomic to cosmological proportions and timescales. This common world is extensive, continuous, and objective to the extent that it includes every creature and occasion of experience that actually exists. This world is common because it includes all possible elements, actualities, and potentialities of experience. And yet these elements, actualities, and potentialities of experience are also changing, with every moment, in ways that are not reducible to anything common. These are what Whitehead calls the "actual worlds" of the creatures who become, what we might call, the biocultural habitats and intensive milieus of creatures and the societies they populate (Frost, 2016). While these uncommon worlds are not isolated from one another, we would not consider them "common" because they are always being felt differently by the particular creatures who actually experience them. Hence every creature (from a child, to a stick insect, to a mushroom, to an asteroid) feels its actual world differently. This gives every creature its own relational intensity as an individual, with its own *uncommon* world that is determined by *how* creatures prehend their interpenetrating worlds in different ways. Indeed, this privacy of subjective experience is what makes the assemblage of a heterogeneous society, ecology, or collective of creatures possible.

Based on this differentiation between common and uncommon worlds, we can tease out some initial propositions for reconceptualizing children and childhood. Firstly, as biocultural creatures, children never experience the same actual world twice because each experience constitutes a novel synthesis of relations from a series of disjunctive elements (molecules, bodies, societies, places, times, materials, concepts, feelings, perceptions, discourses). This fits with Taylor's (2013) assertion, drawn from her work with Arrernte peoples of Central Australia that "children *are* their worlds. It is the particularities and distinctive features of these worlds that makes children who they are." However, we suggest that the very distinctiveness of children's actual worlds is indicative of their *uncommonality* as individual creatures with their own private intensities of feeling and bodily capacities for aesthetic experience. Every moment in the life of a child is an uncommon and unrepeatable instance through which the common world of nature is felt, perceived, and experienced differently.

Second, and as Whitehead (1978, p. 35) makes clear, the common world of nature is not continuous in itself (or causa sui) but rather *becomes* continuous through the ongoing proliferation of uncommon worlds in all their teeming intensities and

entanglements of creaturely relations. In other words, the common world of nature relies on uncommon occasions of experience to continue its extension. This means that a child's process of becoming (or what Haraway calls "worlding") is fundamentally creative: the child feels the actual world in a way that is *qualitatively* different from any other occasion and, in doing so, adds her experience to the extensive continuum of nature. In this way, the extensive continuum of nature both *produces and is produced* by the intensive qualities of experience that constitute children as "creatures that become." Put another way, everything that a child experiences contributes to the continuity of nature while at the same time irrevocably changing what nature can be.

The Whir of Worldly Sensibility

In a common world in which everything both senses and is sensed through differential qualities of aesthetic experience, what comes to matter is the distribution and processing of aesthetic sensibility within more-than-human political ecologies and collectives. Whitehead describes how "we find ourselves in a buzzing world, amid a democracy of fellow creatures" (1978, p. 50). This buzzing world of creaturely activity "expresses the relation of causal interaction between entities and their actual worlds" (Jones, 1998, p. 20). As we described in the section above, the causal interactions between creatures and their habitats constitute the aesthetic order of nature as an extensive, vibratory continuum or common world. The idea that the very consistency, order, and causal infrastructure of nature is altered and redistributed by the aesthetic experiences of creatures (such as children) offers a basis for a new ecological aesthetics of childhood. It means that children literally reconfigure the virtual structures of nature through intensive processes of individuation, creating new potentials for life through the dynamic relations between "a milieu of interiority and a milieu of exteriority" (Simondon, 2017, p. 223). Whitehead (1978) describes this process of individuation as "constructive functioning," whereby the trafficking between intensive and extensive milieus, between bodies and environments, involves a creative synthesis of differential elements that produces the singular (uncommon) world of a living organism or creature (see also Deleuze, 1994; Protevi, 2013).

In taking this proposition a step further, we suggest that the molecular, metabolic, semiotic, perceptual, conceptual, and technological trafficking between children's bodies and their biocultural habitats is a function of what Hansen (2015, p. 3) calls "the distribution of worldly sensibility." For Hansen, worldly sensibility refers to the causal infrastructure of the vibratory continuum that operates above, around, and below the thresholds of human sense perception and consciousness (p. 2). The cells of our bodies, for instance, are constantly responding to the surrounding environment in ways that we are only vaguely aware of at the conscious level, if at all. These processes operate through what Whitehead (1978, 1929) calls the mode of "causal efficacy," which he contrasts with the perceptual mode of "presentational immediacy." Where the mode of presentational immediacy involves the sensuous perception

of vivid values as experienced through qualia such as colors, sounds, textures, tastes, and smells, causal efficacy is a function of the underlying causal infrastructure of nature as a vibratory continuum (Hansen, 2015). Presentational immediacy gives us access to the sensuous qualities of our external environments to reveal clearly recognizable objects of perception, but it lacks temporal duration, thickness, and subtlety. In this sense, presentational immediacy is only the province of sufficiently complex creatures, such as humans and other animals, who are capable of experiencing "the clear and distinct representation of sensations in the mind of a conscious, perceiving subject" (Shaviro, 2014, p. 23). Although Whitehead (1985, p. 23) describes such perception as "vivid, precise, and barren," it is through this representational mode of perception that "the world discloses itself to be a community of actual things, which are actual in the same sense as we are" (p. 21).

Causal efficacy, on the other hand, refers to the "vague (nonrepresentational) way that entities affect and are affected by one another through a process of vector transmission" (Shaviro, 2014, p. 23). It is thus more accurately described as a mode of *sensibility* than a mode of perception (Hansen, 2015). Causal efficacy opens the range and distribution of sensibility to the entire aesthetic order of nature and places all things that exist on the same ontological footing. For human creatures, causal efficacy means that even our most clear and distinct perceptions are mediated through complex causal processes that lie above, below, or beyond our consciousness, including those processes associated with our own bodily capacities. "We see the picture, and we see it with our eyes; we touch the wood, and we touch it with our hands; we smell the rose, and we smell it with our nose; we hear the bell, and we hear it with our ears; we taste the sugar, and we taste it with our palate" (Whitehead, 1985, p. 50). In these examples, causal efficacy is associated with what Whitehead (1978, p. 81) calls "the withness of the body," a position which implicates the body and its capacities within the elemental distribution of *worldly sensibility* across the whole of nature. In the mode of causal efficacy, "the inflow into ourselves of feelings from enveloping nature overwhelm us . . . the presentations of sense fade away, and we are left with the vague feeling of influences from vague things around us" (Whitehead, 1978, p. 176). As Hansen (2015, p. 49, italics in original) explains, the vague, haunting sensations of causal efficacy are indexed to "the *material causal linkages* that exist and have force outside of the realm of impressions, ideas, and ideas of impressions – outside the domain of sense perception proper." Underneath the incessant whirring of cicadas on a summer afternoon is the imperceptible whir of worldly sensibility, a whole buzzing world of nature seething just below the threshold of conscious, sensory perception.

In bringing the vibratory continuum of nature into contact with the perceptual impressions and affective intensities of individual creatures, Whitehead's theory of prehension effectively fuses aesthetic experience with the material causal infrastructure of nature's spatiotemporal dynamisms (see also Protevi, 2013). As Manning and Massumi (2014) further note, both presentational immediacy and causal efficacy are present to varying degrees in human experience, and it becomes a matter of how these modes of perception and sensibility achieve various fusions, syntheses, and vicarious interchanges. In the following sections, we focus more specifically on how

children's photographs can embody these kinds of bioaesthetic fusions and syntheses, which bring together the subjective experiences of children with the vibratory continuum of worldly sensibility.

Pieces of the Earth

Over the last 3 years, the *Climate Change and Me* project has mapped children and young people's affective, creative, and theoretical responses to climate change through participatory ethnography and socially engaged art practices. This has involved working with 135 children and young people (aged 9–14) from across Northern NSW, Australia, as co-researchers who were directly involved in all phases of the research. The artworks, essays, videos, photographs, poems, and fictional works created through this research were assembled into a public touring exhibition called Past Now Future, which was viewed by over 8000 members of the public over an 8-week period. This material also provided the resources for a transdisciplinary climate change curriculum, which is currently being implemented in regional primary and secondary schools across Northern NSW (see www.climatechangeandme.com.au). Over the course of the project, photography emerged as a creative research method that opened up spaces for children and young people to think and act differently in relation to climate change. This process was set in motion through the project's emergent research design and child-framed methodology, which allowed us to work collaboratively with children and young people within a "co-research playspace" (Cutter-Mackenzie & Rousell, 2014; see also Cutter-Mackenzie & Rousell, in press-b). Initially this involved hosting research training workshops in local schools, where students were introduced to the concept of the Anthropocene epoch and learned to conduct ethnographic interviews and observation, take field notes, and use creative practices such as drawing, photography, and video as educational research methods. We also developed a customized and secure social media interface that enabled the young researchers to post and comment on each other's photographs, as well as initiate their own small projects, discussions, and games within a blogspace we called the "CC + Me Hangout."

We found that many of the co-researchers tended to gravitate toward the medium of photography, as we witnessed an inundation of over 4000 images uploaded to the project website in the 1st year of the project alone. As we progressed through the analytic stages of the project, we hosted a series of creative ThinkTank workshops where the children worked through the data en masse. This included a process of collectively curating the photographs down to a series of 200 images that the children felt expressed their experiences of climate change and of life in the Anthropocene more broadly. The children also wrote messages on the backs of the photographs at this time, with a combined function of interpreting the affective qualities of the images while also translating those feelings for a public audience. At this point we worked closely with the children to design and assemble a collaborative artwork for the touring exhibition which involved transferring the photographs onto plywood tiles coated in beeswax. This process effectively archived the images

Fig. 1 A photograph submitted by Grace (age 11) with the subtitle "The little worlds that exist around us"

in an encaustic wax medium that would preserve them for millennia while also transforming the image from a reproducible digital file into a unique work of art. As shown in Fig. 1, the wax transfer process altered the color, texture, and form of the image to achieve a ghostly rendering encased in the surface of the wax. These rematerializations of the children's photographs were then fitted with magnetic strips, allowing them to be mounted on the surface of a whiteboard and iteratively rearranged in the manner of a fluid montage. This work was entitled "Pieces of the Earth" and formed one of the three major works in the Past Now Future exhibition, along with a series of video installations and a book of the children's poetry, photographs, critical essays, and speculative fiction (see Rousell & Cutter-Mackenzie (ed.), Handbook Companion) (Fig. 2).

Theorizing the Image as Surface

In this section we analyze how different images were materialized in the Climate Change and Me project through children's aesthetic engagements with their changing environments. Rather than interpreting the images as representations of what children think or know about climate change, we follow the intensive transformations of images as immersive surfaces within which children are implicated as biocultural creatures. We understand the surface of the image to be a composition of creaturely prehensions, or what Whitehead calls "vectors of feeling," as well as an

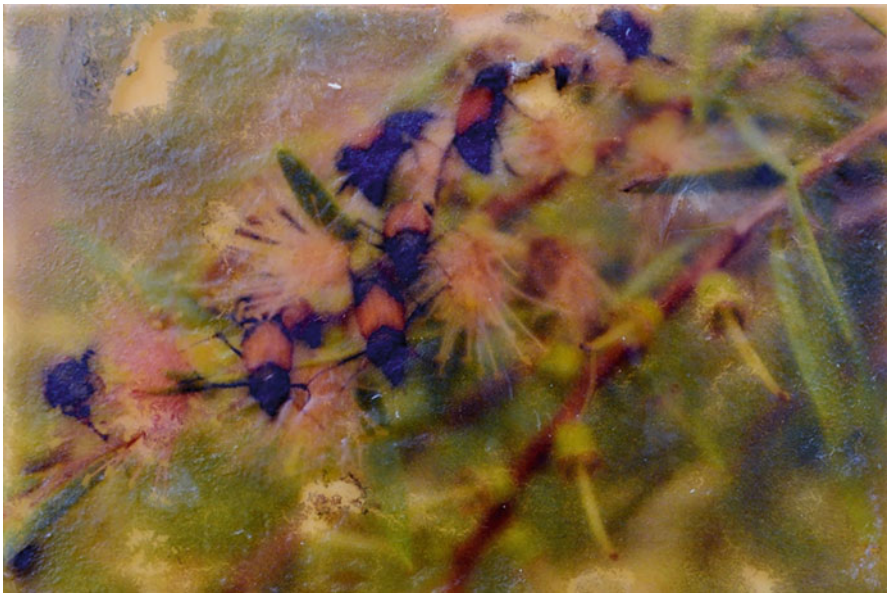

Fig. 2 Grace's wax transfer of the "little worlds" image using encaustic medium on plywood

interface that opens onto the vibratory continuum of nature. Our intention is to plumb the immersive depths of the image's surface, moving away from linguistic and optical frames of reference to embrace a tactile materiality that fuses the immediacy of aesthetic feeling with the vague penumbra of worldly sensibility. Through our focus on images as sites of aesthetic contact and felt relationality, our research essentially comes to involve "the production of surfaces, their multiplication and their consolidation" (Deleuze, 1990, p. 125). In this way, we see the surface of the image as a nexus between the uncommon worlds of children as biocultural creatures and the vibratory continuum of nature as a common world of material causality, relationality, sensibility, and extension.

Our analysis begins with a series of digital photographs taken by children, which we understand as prehensions of children's actual worlds as they exist (ed) in the places and times of the photographs. The first photograph was taken by an 11-year-old girl named Grace, who walked alone in the wet sclerophyll forest near her grandmother's house in a remote area of Northern NSW (Fig. 3). Moistened by a heavy rain that had fallen over previous weeks, the forest was teeming with fresh explosions of fungi, vegetation, and insect life as Grace collected a series of highly detailed and saturated images. The second photograph was taken by 12-year-old Kairo, who made her way to a remote coastal location in Northern NSW just before dawn (Fig. 4). Her images capture the Pacific Ocean's horizon in the liminal moments between night and day, such that the surfaces of water and sky become washed with color values too subtle and blended to name.

Fig. 3 Photograph taken by Grace (age 11) during a morning walk in wet sclerophyll forest

Each of these images emits a certain dark brilliance, a gradient of contrasts that results in a particular intensity of aesthetic feeling emanating from the surface of the photograph. In this first analytic pass over the images, we are aware of values of color, light, shadow, and texture resolving into recognizable forms on the surfaces of the photographs. The presentational immediacy of atmospheric qualities within a distributed environmental field resolves into clearly delineated spatial relationships: mushrooms growing on a branch and an ocean reflecting the sky. As Massumi and Manning (2014) note, there is a certain aesthetic enjoyment or "entertainment" that accompanies presentational immediacy prior to the resolution of the field's surface effects into forms and spatial relations. Entertaining the immediacy of the image also brings our attention to the contemporaneous nature of events that occur relationally, and yet independently, within the field of experience (Whitehead, 1927). There are interpenetrating values, such as color and moisture, which are shared between the ocean and the sky in Fig. 4, a resonance between surfaces. This is to entertain the surface effects of the relational field itself as an elemental *environment*, a mode of perception closer to the experiences of autistic people or of hallucinogenic states than to neurotypical consciousness.

Yet even before the surface resolves into recognizable forms and affordances (a mushroom you could pick, an ocean you could hear, smell, and dive into), our awareness of the image has been influenced by a more vague mode of sensibility associated with causal efficacy. The mode of causal efficacy reveals that there is much more occurring in these images, both perceptually and causally, than what can be seen within the frame of the photograph. In the first image, we can barely sense

Fig. 4 Photograph taken by Kairo (age 12) just before dawn at Angel Beach, NSW

Grace's damp foray into the rainforest and share in her increasing wonder as she photographs the wild variety of fungal constellations appearing at her feet. In the second image, we catch a vague, penumbral sense of Kairo knee-deep in the waters of Angel Beach at dawn, trying to steady the camera as she darkly contemplates rising sea levels and human failures. In each of these images, we see what the child sees and what the lens of her camera sees, at a particular moment in time and space that occurred 2 years ago at the time of writing. Attending to causal efficacy gives us a haunting sense of what lies beyond the perceptible objects within the frame of the image, the weight of multiple spaces and times that condition the image directly, aesthetically, materially, and causally.

The sensing body of the camera is crucial in this mediated configuration of child and environment, as it captures and renders the sensory data of the occasion in ways that no human can do. As Hansen (2015, p. 24) argues, such media technologies are able to "capture a wealth of data from worldly sensibility- including data about our own implication in it- and feed this data forward into a future or just-to-come moment of conscious perception." In other words, digital cameras give us access to nature itself in ways that conscious, human perception does not. We understand the extrahuman sensing capacity of the camera as a function of what Whitehead (1978) calls the "vector-character" of prehension. The camera renders the image as a conduit or channel for vectors of feeling that extend from one unique perspective on the universe to another: sunlight falling on the forest floor, the roiling ocean at dawn,

the wind-swept eyes of a child, and the ink-saturated pages of a book. All of these and more are events within an ecology of sensation that proliferates through an intricate meshwork of aesthetic prehensions. This sensory ecology is what makes it possible for you to the encounter these images and words as you flip the pages of this handbook. In this way, each image expresses a capacity to "channel the force of worldly sensibility" as the "pure potentiality" of the vibratory continuum of nature as the "total environment" (Hansen, 2015, p. 238). In prehending the image, we also grasp a vague sense of the whole of nature seething in the depths of its surface.

Through this speculative analysis of the image as a conduit for vectors of feeling and worldly sensibility, we find that it is no longer the human/nonhuman distinction that really matters, or maybe even that this distinction is no longer possible. The images themselves show nothing human, and yet the body of the child is *felt* as a living creature, invisible and yet implicated in the surface of the image. The sensible appearance of the image and the material conditions of its appearance are inseparable, such that the surface enables sensing bodies to make aesthetic contact with one another *at a distance* (Shaviro, 2014, p. 148). This fusion of presentational immediacy with causal efficacy opens the image beyond any representational or discursive function. What we are dealing with instead are the differential relations between the forces of aesthetic appearance and material causality, between the resolution of perceptual elements within a sensory ecology and the material conditions through which that whole sensory ecology operates. Child-environment prehensions contract the elemental qualities of worldly sensibility into an image, narrowing the field of potential experience to produce an intensity of contrast that is felt on the surface. This is what we mean when we say that the surface of the image has depth: it has depth of contrast, depth of feeling, depth of intensity, depth of sensibility, and depth of potential.

Rematerializing the Image as Surface

Having established the surface of the image as a site of aesthetic contact between sensing bodies and environments, we now consider the transductive potentials of the image through its capacities for material transformation. As described in the preceding section, the children selected 200 images for the exhibition which they transferred onto tablets covered with an encaustic medium (beeswax and damar resin). The digital images were printed out in high-resolution using a laser printer and then pressed into a molten layer of encaustic medium on the surface of the tablets.

After applying extensive pressure to the image with the back of a spoon, the paper from the original print could be removed by repeated rubbing with fingers (see Fig. 5). The tablet was then carefully reheated to a molten state in order to lift the underlying medium to the rippling surface, thus fixing the image within a translucent layer of wax and resin. What appears on the surface of the tablet is a ghostly monoprint of the digital image, as the printing ink is suspended within an archival medium that can, under certain conditions, preserve the image for thousands of years (see Fig. 6).

Fig. 5 Rubbing the paper off the surface of the wax transfer once the ink has been embedded

Fig. 6 An example of a wax transfer image that creates a fusion of body and environment

The wax transfer process demonstrates how the image can function not as a representation of childhood but as a surface that channels vectors of childhoodnature sensibility through material transduction and transformation. The image is seen to slide

Fig. 7 Children engaging with the collaborative artwork *Pieces of the Earth* as a fluid montage of surfaces

from one medium into another, as the transfer process effectively *resingularizes* a digital image through its deformation and reformation as an analogue image (see Guattari, 2008). In other words, the transfer process unleashes the virtual potentials of the image to become something else, something new, within a topological field of near-infinite possibilities. "Think of each image receding into its deformation, as into a vanishing point of its own twisted versioning," Massumi (2002, p. 133) writes. Paradoxically, we see the image become more singular by differentiating, by resingularizing back on itself as "matter in analogue mode" (p. 135). The wax transfer is a process of transduction from one medium to another, from a medium of digital code to a medium of analogue materials and bodily sensations. The precarious virtuality of the image is brought to the fore, as its rematerialization in analogue form is scarred by the process of deformation or sensible qualities that were lost in the process of transfer. "A feeling bears on itself the scars of its birth," Whitehead (1978, pp. 226–227) writes. "It retains the impress of what it might have been, but is not."

In becoming analogue, the image implicates the body of the child more thoroughly into the depths of its surface. The fusion of bodies and environments that we discussed in the previous section becomes even more palpable, more intricately embedded and folded together through a renewed tactility of the child-environment nexus. Perhaps the digital code of the photograph was only a temporary holding pattern between the child's environmental experience and the rematerialization of the analogue image on the wax tablet. As a medium for making aesthetic contact with children and their biocultural environments, the transfer process replaces the

representational ocularity of vision with a tactility that crosses temporal and spatial divides. We can touch the child's sense of the forest on the surface of the wax tablet, revealing what Hansen (2006, pp. 70–71) calls an "infratactility" or primordial tactility, operating at the very "heart of the sensible." The wax transfer process intensifies the tactility of the photograph and, in doing so, enables a more thorough melding of children and their environments on the surface of the image (see Fig. 6). While there is a loss in clarity and resolution, there is a gain in analogue sensation and worldly sensibility. The images become more permeable, taking on the biocultural tactility of skin, flesh, and membrane, as they come to embody the "sometimes fluid and sometimes disjunctive processes of responsive development, dissipation, intensification, and transformation" (Frost, 2016, p. 149). The images become, quite literally, *Pieces of the Earth* rendered from the biocultural interactions between children's bodies and their changing environments (Fig. 7).

Conclusion: Cultivating the Art of Life

In this chapter we have taken some steps toward the development of an ecological aesthetics of childhood that is responsive to the challenges of the Anthropocene epoch. We began by outlining the need for a more robust engagement with aesthetics in posthumanist studies of childhoodnature as part of the broader call for a "new synthesis" of the environmental arts, humanities, and sciences (Haraway, 2016). Drawing on Whitehead's speculative philosophy in conjunction with insights from the life sciences and media studies, we proposed a series of relationships between the common world of nature and the uncommon worlds of children as biocultural creatures. This led to a further series of distinctions between presentational immediacy and causal efficacy as modes of perception and worldly sensibility, with an emphasis on the fusion of children's perceptual experiences with the causal infrastructure of natural systems and dynamic spatiotemporal processes. We then extended this ecological-aesthetic framework through an analysis of children's environmental photographs as part of the Climate Change and Me project, including the analysis of digital photographs in relation to the analogue rematerialization of images through a wax transfer process. Using aesthetic concepts of intensity, contrast, sensibility, and surface, our analysis focused on developing the image as a site for making aesthetic contact with the embodied relationships between children and their changing environments.

This brings us to the perennial question of whether, and how, an image becomes a work of art. Does the child's photograph become art when it is curated and exhibited as such? Does the transductive process of the wax transfer qualify the image as art through its material transformation? While we do not offer a definitive answer to these questions here, we suggest that the transfer process intensifies both the elemental and aesthetic qualities of the image and, in doing so, pushes the image to the threshold at which image becomes art. To the extent that the image becomes more singular through an artful process and that this process introduces qualitative changes into biological, social, and material processes, then we would say that it

becomes art. Hence, it is not so much the image itself that we advance as art but the transformative processes that are both attributed to and unleashed by the image through forces of material production and the intensities of affective encounters. It is in this sense that we associate art with *artfulness*, as an aesthetic way or manner in which life is lived and experienced within an ecology of sensation (Manning, 2016).

We also recognize artfulness as the way in which the aesthetic becomes pedagogical, inasmuch as a work of art is able to redistribute worldly sensibility at the levels of the social, the ecological, and the planetary. We therefore conclude with a pedagogical perspective, as we position artfulness as the cultivation of aesthetic sensibilities and capacities for practicing what Whitehead (1929) calls "the art of life." We see the art of life as a pedagogy for cultivating environmental awareness through the aesthetic selection and recomposition of sensory elements in relation to bodily movement and perception. "For example," Whitehead (1929, p. 200) writes, "the mere disposing of the human body and the eyesight so as to get a good view of the sunset is a simple form of artistic selection. The habit of art is the habit of enjoying vivid values." Whitehead positions the body as the pivot point for the art of life, an aesthetic practice of enjoying the sensible intensities, values, and contrasts that emerge in the relations between interior and exterior milieus. "Each individual embodies an adventure of existence. The art of life is the guidance of this adventure" (Whitehead, 1967a, p. 39). The art of life is the art of the creature, the art of the organism, and the art of attuning one's biocultural body to an ecology of sensation through aesthetic techniques of existence. These are techniques that meld the aesthetics of beauty with environmental sensation, such that the beautiful is no longer associated with taste or judgment but with 'a felt "immediacy," "force," or "intensity" in process' (Kennedy, 2000, p. 31).

In this chapter we have proposed an ecological aesthetics of childhood drawing from speculative philosophies of nature, media, and the body. We have analyzed the sensory practices of children as embodied techniques for cultivating environmental attunement through aesthetic experience. Grace walking in the forest finding mushrooms at her feet or Kairo wading into the waters of Angel Beach to take photographs at dawn, these are moments in which creatures are guided by the art of life, such that body and environment become fused in the production of life itself as a work of art (Rousell & Fell, 2017). These are occasions of vivid experience never to be repeated; they are the uncommon worlds of children as biocultural creatures, each a unique perspective on the universe as it is felt differently and yet together, with each passing moment.

Cross-References

- ▶ Propositions for an Environmental Arts Pedagogy: A/r/tographic Experimentations with Movement and Materiality
- ▶ Section Introduction: Ecological Aesthetics: New Spaces, Directions, and Potentials
- ▶ The Mesh of Playing, Theorizing, and Researching in the Reality of Climate Change: Creating the Co-research Playspace

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Tin Shed Science: Girls, Aesthetics, and Permeable Learning

75

Lucinda McKnight

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Abstract

This chapter provides a partial account of an intimate case study of an after-school science club for young girls in a garden shed in suburban Melbourne, Australia. While hybrid learning spaces merging home and school have been described before (Moje, Ciechanowski, Kramer, Ellis, Carrillo, and Collazo, Reading Research Quarterly 39(1):38–70, 2004), particularly in relation to girls and science (Barton, Tan, & Rivet, American Educational Research Journal 45(1): 68–103, 2008), such descriptions are limited to the hybridity of discourses and do not acknowledge the aesthetic, material, or sensuous dimensions of scholarship. Instead, the study on which this chapter is based involves diffractive artworks

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taking place notionally some years "after" the science club, forming this chapter assemblage.

The chapter combines images of the science club shed with further assembled fragments of original pedagogical intent via planning documents and other arts-based interventions by the organizer/writer. Emerging with this work is the concept of permeable learning, based on understandings that design is multiple and human intentionality as curriculum is a thin-skinned and fragile fiction despite humanist insistence, particularly in neoliberal contexts, that it is otherwise. Permeable learning incorporates intra-action (Barad, Meeting the universe half-way: Quantum physics and the entanglement of matter and meaning. London: Duke University Press, 2007) as both human and nonhuman entities merge, thus calling each other into being. So students and the gases they create and breathe in their experiments become new entities of indiscernible boundaries, as do school and home, art and science, mud and hands, public and private pedagogies, teacher and student, memory and experience, girl and bird, and shed and garden.

Keywords
Curriculum · Pedagogy · Permeable learning · STEAM · Gender · Science · Arts-based

Introduction: Questioning Boundaries and Binaries in Childhoodnature

French poet Jacques Prévert dissolves the mathematics classroom in his famous poem *Page d'écriture* (1972), or *Page of writing*, in which a child at a desk imagines a lyrebird in the sky. The bird enters the classroom, and as if by magic:

> Les murs de la classe
> *S'ecroulent tranquillement*. (1972, p. 211)

The original French language retains the long vowel sounds of reverence, of wonder unfurling, as the walls (*les murs*) of the classroom fall away peacefully. The tiresome lesson of multiplication table chanting is transformed: windows are again sand, ink is water, desks are trees, and chalk reforms a cliff. In the last two lines of the poem, the *porte-plume*, the quilled pen, is once again a bird. The hard boundaries between what things are and what they have been melt away, meanings are playfully blurred, and the words of both poem and rote chant fly free.

The traditional classroom's discursive triumph over the material, its performance of humanist supremacy, is exposed as fiction. Prévert's surrealist intervention allows eco-aesthetics to bubble through the membranes that keep things apart that maintain boundaries of space, time, and sense. Things are more than tools for humans; here they flow back into their origins and form genealogies that reinstate them in the abject natural world. This release echoes the concept of childhoodnature and

the merging of human and other. The dry world of abstract mathematical sums, of dreary adult domination of the child, and of the illusion of mastery over nature no longer holds.

This chapter argues that while all learning spaces have their ecologies and materialities, as Prévert reminds us, some spaces are less devoted to suppression and oppression. They are less intent on the rigid maintenance of boundaries and binaries such as those between adult and child, teacher and student, school and home, mathematics and art, human and animal, and nature and culture. Some spaces are more open to the aesthetic dimensions of learning encounters, and these spaces, with their own particular affordances and constraints, can assist us in imagining what education might be in the Anthropocene. This is the period in which human activities are recognized as having a permanent impact on the Earth's strata, becoming "a geological force capable of affecting all life on the planet" (Braidotti, 2013, p. 6). By exploring what happens in these more fluid and permeable spaces, such as the garden shed as science club (Fig. 1) described in this chapter, we may reconnect with the ecological and aesthetic dimensions of learning, to more readily enact Prévert's literary dissolution and transformation. So childhood and nature become childhoodnature, and discourse and the material become discursive material as formally discrete concepts slide together.

The chapter considers the dissolution of binaries by describing part of an intimate case study of an after-school science club for young girls held in this shed in suburban Melbourne, Australia, in 2014. While hybrid learning spaces merging home and school have been described before (Moje et al., 2004), particularly in relation to girls and science (Barton et al. 2008), such descriptions are limited to the hybridity of discourses and neglect the aesthetic, material, or sensuous dimensions of scholarship. Instead, the study on which this chapter is based involves diffractive artistic provocations that work ecologically throughout this chapter text's words and images, forming myriad connections and echoes with discursive-material appeal.

Combining photographs of the science club architecture and detritus taken in 2017 with further assembled fragments of original pedagogical intent via planning

Fig. 1 Garden shed

Fig. 2 Science club table

documents, and other arts-based writerly interventions by the organizer/writer/researcher, the chapter takes an experimental approach. Emerging with this work is the concept of permeable learning, based on understandings that design is multiple and human intentionality as curriculum is a thin-skinned and fragile fiction despite humanist insistence, particularly in neoliberal contexts, that it is otherwise. Permeable learning incorporates intra-action (Barad, 2007) as both human and nonhuman entities merge, thus calling each other into being.

So students and the gases they create and breathe in their experiments become new entities of indiscernible boundaries, as do school and home, art and science, mud and hands, public and private pedagogies, teacher and student, memory and experience, girl and bird, and shed and garden. Permeable learning incorporates attention to the vibrancy of matter (Bennett, 2010) and the sensory aridity of learning spaces reliant on the Cartesian split. Permeable learning recognizes creatures as teachers, acknowledges discursive materially realized gender, and challenges persistent humanist preoccupations in both teaching and research. These anthropocentric notions include custodianship of nature and nature or art as tools serving the scientist (as in many manifestations of STEAM – Science, Technology, Engineering, Arts, and Mathematics as curricular orientation) and the lens as a way to conceive of research (McKnight & Whitburn, 2017). Both the study, and this chapter, form richly textured compositions (Fig. 2.) of what learning and research might be if children and nature are understood to be inseparable.

Forming the Chapter

The chapter therefore delays a linear humanist narrative account of the science club and seeks new ways to share concepts as practice. This *page d'écriture* is loosened from its positivist research output moorings of literature review, methodological framework, findings, and conclusions, moorings that create hierarchical thinking

(Braidotti, 2013, p. 86) imbued with human arrogance. Instead, imagination and critical intelligence are called into play (Braidotti, 2013, p. 82). Inspired by Prévert and the capacity for the lyric and aesthetic to mediate between concrete reality and abstract ideas (Bristow, 2015), a series of visual, textual, and theoretical vignettes leak into each other, and theory seeps through, concentrating here or there, where it is needed. The photographs are not merely illustrative of the text but do their own work foregrounding matter and insisting on the surprising agencies of insects and plants – the spider web strand or climbing geranium stem that participates in new assemblages in the making.

So the tidy story of a science club for girls run in a garden shed, relayed by a researcher voice and persona do not dominate this telling, although they become folded in. Instead this chapter remains alert to other voices, stories, unearthings, and blendings; the reader is invited to enter into the spirit of this reading and suppress impatience at the complications of collapsing concepts. The writing has not started, for example, with locating the researcher or theoretical resources (although these are important components of research assemblages) but with lines from a poem that embodies childhoodnature. Similarly, in a new materialist and posthumanist paradigm, the child is not foregrounded here, through a Rousseauian fantasy of virtue, but is part of childhoodnature's becoming. The category of "child" as in "child-centered learning" is, despite its employment in progressive education, exhausted. To focus on the child is to focus on the human, and the human custodian is a concept much depleted by planetary crisis, in relation to, for example, climate change, accelerating species extinction, and nuclear proliferation.

Instead of research questions that seek to establish what humans did, what the educational outcomes for them were and how, on reflection, things could be different; the questions raised here are those which do not revere a reflective practitioner already suspect in a relational ontology (McKnight, 2016). How can one look back at something fixed, when entities are created through intra-action (Barad, 2007) and call each other into being, rather than existing prior? In this instance, research takes the form of diffractive analysis (Barad, 2007), in which things are read through each other. This is not a mirror held up to science club and an account of what it was but an imagining of what it could be, if diffracted with theoretically informed arts-based inquiry. The study asks:

What dimensions of learning emerge through this project?

It also considers:

- How does an arts-based approach assist with understanding what learning is?
- How does the concept of diffraction provide alternatives to reflecting on learning/evaluating learning?
- How does this study assist in conceptualizing and critiquing STEAM (transdisciplinary Science, Technology, Engineering, Arts, and Mathematics) education?
- How does this study work to disrupt humanist and gendered notions of education?
- How can this study contribute to the development of new theory in relation to learning?

As the study is still in progress, this chapter shares the writing and assembly as inquiry and analysis that are currently in play, which attempt to respond to these questions and also flow beyond them, regarding them as permeable as well, as a discursive sieve of predetermined humanist constructs that are difficult (but not impossible) to think beyond and do research without (St Pierre, 2014). The *pages d'écriture* that are the project proposals and ethics applications compulsory for conducting empirical research are themselves of paper pulp, toner, traces of other studies, conventions, expectations, and fonts, if we imagine them as transparent, or permeable.

So rather than humanist rationales, whether for research or learning, we invoke the material (Alaimo & Hekman, 2008, p. 9) and become earth (Braidotti, 2013). Perhaps all experiments, all lessons, should begin with the question "how is the earth?", much as the common greeting in Mandarin asks "Have you eaten?" If we begin with a conceptualization of earth, and awareness of earth in the making within all assemblages, including that of childhoodnature, we may start to shift our understandings of what learning is.

Science Club as Earth

How does earth write? What is the voice of earth? What story would the earth tell about science club? How far can personification take us, as we "benevolently" (Braidotti, 2013, p. 79) incorporate others into the human category and reinforce presumed superiority? How can anthropomorphism always acknowledge its biases and limits, when humanism is inherent even in the grammar of our sentences and constructs of subject and object? It is even present in the portrait format of this page, which echoes the dimensions of the human body as convention. These are questions that feel urgent, in any project that seeks attention to nonhuman bodies.

The foundations of this study, of science club, of curriculum, and of my academic career are in earth. The structure of the shed forming part of science club's assemblage is impossible without earth, the earth of the Wurundjeri people: its contemporary local district name, "Boroondara," is drawn from the Woiwurrung language spoken by the Wurundjeri and means "shady place," although the trees in this area were cleared for colonial agriculture more than 100 years ago. I pay my respects to the elders of the Wurundjeri people, who are recognized as the traditional owners of these lands, despite this imported White, Western concept's inadequacy for describing the Indigenous melding of human and earth.

Humans are always in the making as human being earth or perhaps, preferably, human becoming earth, although I note critiques of children as "becoming" rather than "being" (Uprichard, 2008) as resigning them to an always inferior and incomplete status. Even rock is always forming, is always changing, and is far from a discrete entity. Water flows through rock. The slough of our skin cells is earth, as is the mud under our nails and ingrained in the whorls of our fingertips, as is the decomposition of our bodies in living soil (Williams & Brown, 2012), and the

inhalation of chalk dust. We have cliffs in our lungs. Our practices form the strata of the earth. We eat earth, on garden-sourced tubers, themselves made of nutrients taken up from soil. Where does one thing begin and another end?

If we understand that learning is always about the earth, and an awareness of the processual making of earth through intra-action and of temporary and permeable boundaries forming around coalescences of agencies, we enter new territory. Traditional curriculum theory requires educators to think of aims, objectives, and, more lately, outcomes, on a trajectory away from earth, from the lesser-than-human as designated by being other than White, able-bodied male (Gaztambide Fernandez, 2015). Education is designed to remove children from the abject, from soil, feces, and dirt, as exteriorities of the body that define subjectivity (Kristeva, 1982). Childhoodnature collapses the child into the soil and understands the child as soil. There are however risks here that those considered close to nature (children, women, people of color) are denigrated (Alaimo, 2008; Gaztambide Fernandez, 2015); a remedy for this is to emphasize that childhoodnature is part of personhood nature.

Templates for practical reports, curriculum planning, and research funding applications ask limited questions, with their focus on aims, materials, and methods. We are not best served by seeking ever Whiter, more ideal, more perfect, more educated humans. Instead we need to ask what is changed, decomposed, accumulated, preserved, eroded, and contaminated through our practices. These are the phenomena (Rotas, 2016, p. 180) of becoming earth happening and forming here, as soil "actively promotes life and is itself alive" (Williams & Brown, 2012, p. 43). Writing about science club is not about triumphantly performing set piece demonstrations of human mastery over matter with children, so that abstract concepts might be introduced and remembered. Science club could be a shivering, as worms turn us over in our graves-to-come, an awakening to the vibrancy of matter, rather than to our power over it. Science club could be a sensitivity to the material world, rather than relegating it as a backdrop to human actions.

The foundations of science club in becoming earth are made most obviously as we add our weight to the concrete slab of the shed floor, so that we are aware of the material beyond/below the neat list of apparatus and materials required for the first science club: nappies (diapers), water beads, water, Ziploc bags, and salt. Diffracted with new materialist and posthumanist theory, pushed through the narrows of becoming earth, this list, emulated in countless classrooms, might always begin with "earth." This would be an acknowledged materiality more fundamental than simply that required for an experiment as performance of human control.

The material turn in theory might also be described as the turn to dirt. This is not a turn as in an oscillation of a human figure but of the turning of dirt by multiple organisms, such as the plumules rearing from a seed or an ant collecting tiny particles of soil. This is how we might turn ideas and materials in science club, inspired by Braidotti, who draws on Gilles Deleuze, Jane Bennett's (2010) assemblages of vibrant gutter matter, Ladelle McWhorter's (1999) concept of dirt and flesh as cousins, Diana Coole's attractive and repulsive dirt (2015), Jussi Parikka's (2012) dirty media discourse, and the work of further feminist materialists such as Stacey

Alaimo (2008). These are the theorists informing this writing as diffractive practice (Barad, 2007) remaking science club, rather than reflecting on its outcomes.

This new science club does not begin with an experiment title for an activity, as the other science club did, with:

- Fizzy sherbet
- Elephant toothpaste
- Water beads
- Silly Putty
- Chromatography
- Birds' nests
- Christmas crystals

Such titles elide a bigger picture. Instead we flow into a kind of "*ca va*?" of the earth, a "how're we going," a return to recognition that we (human and non-human) are constantly making the earth and each other. Common sense informed the original science club that the happening that mattered was doing experiments in a pop-up shed lab and that the only materials that mattered were those of the equipment lists on the handouts. This demonstrates the extraordinary tunnel vision of conventional science. We were also, for example, simultaneously contributing to the compaction of topsoil under concrete, in a flesh-cement-soil assemblage.

To dare to write these words is not science happening as we allow it, but science as "knowledge making" – the etymological derivation of the word in another, more open way, based on another kind of heightened, multisensory "observation." The primacy of this looking word in science is another humanist trope that is difficult to avoid (McKnight & Whitburn, 2017). There is science beyond the predetermined demonstration of human management of natural phenomena that begins and ends with the donning and doffing of our disposable gloves; I have written about the notion of the "manager" elsewhere (McKnight, 2016). This is science as always already becoming, not what we are or know in a fixed sense, but what is in the making. This is science in which the researcher is always becoming the matter being investigated, rather than studying it at a distance.

Intra-action of various agencies, including children's bodyweight, reduces the pore spaces of the soil under the science club shed, so that microorganisms struggle to move through it; makes it hydrophobic, so that water moves away from it; and prevents the formation of leaf litter, with all its regenerative vibrancy. I refer to a children's book here: Rachel Tonkin's *Leaf Litter: Exploring the mysteries of a hidden world* (2006) illustrates this beautifully and interactively, with each page a fabulous assemblage of layered and living matter. The soil is already changing over time, with old cement dust from the laying of the concrete altering its pH. Standing on this concrete soil compaction makes our human bodies too, its hardness locking out our knee joints and testing the fluid-filled discs cushioning our vertebra, so that we ache.

Leaves blow in under the loose doors, slowly forming new drifts of soil in concrete corners. Our shoes break up these leaves and make dust that we breathe in windy gusts. This making cannot be disentangled from the cultural practices of further waves of migrants, who have removed Boroondara's vegetation in another cycle. Most of the mature canopy trees in the area, largely deciduous trees reminiscent of Britain and planted in the mid-twentieth century, have now been removed. Nor can the soil's composition be disentangled from the recent Australian drought, which killed many trees and has changed the nature of the soil. What we are becoming, breathing and breaking down into in the shed, is part of migration policy and global shifts in human traffic, nostalgia, climate, and more.

The chalk dust from drawings on the shed walls speaks of the educational play regimes of the middle-class mother; rust particles from disintegrating corrugated iron are endless products of the pickling liquor of galvanization and evidence of the contamination of other soil in the process. The ivy that penetrates the flimsy shed structure mocks the inside/outside, home/garden binaries, and its carapace of hairy stems diffracts the human intentionality of shelter design, growing to its own thick imperatives and necessities, blurring and remaking the shed, and allowing birds to build their nests there. The shed is also inseparable from its original purpose; it is a tiny garage for an early automobile. We are not so far away from a busy main road, and if we listen, we can hear, like George Eliot's roar of the universe that Braidotti reminds us of (2013), the cars' engines and taste the heavy metal particles we ingest.

None of the above is mentioned in the first science club.

This account describes the vitality of the shed, not as a container space for activity – this is problematic (Barad, 2007; Snaza et al., 2016) – but as a happening metaphor for learning and life as intra-action, of agencies calling each other into being, forming as they move through each other. Invisible, contingent membranes form too, like the skins on liquids, but these are always more or less permeable. Child and nature, child and car, and child and soil are only separated by conjunctions. Even childhoodnature is only separated by the kerning conventions of this font. Yet semiotics still insists on the binary; readers perceive two signs here. Perhaps we need a new combined word, a "chanterduil," perhaps, interweaving these signs to enact entanglement.

I thought none of this, running science club or, at least, imagining I was running a science club rather than participating in a teeming shed ecology, being made by it myself. Humanist teacher as mythmaker and proponent of impermeability, I was secure in the repeatability of routine and the shoring up of Cartesian logic. I had not even begun my new materialist and posthumanist reading or encountered any of the ideas that shape the diffractive narrows of this new version. As a writer, researcher, mother, and student, I too am always in the making, with ideas leaching into and out of me, with new thought and movement patterns flowing. Recognizing the human in posthuman, I turn now to the account of science club that well-trained readers might have been expecting, which serves to provide missing discursive elements that also form part of this assemblage. Yet it is read now, if the chapter has been followed sequentially, through the insights of the alternative, diffracted account above.

Science Club as Narrative

There is another story of science club, a neat narrative that puts dirt in its proper place, in the materials list of Experiment Seven: Birds' Nests. In 2014, my 9-year-old daughter's local state primary school obtained funding for specialist science training for two teachers and offered a lunchtime science club for students. This was so popular that attendance had to be carefully managed, and my daughter had to wait some months until the Grade Twos were allowed to go. During this time, her enthusiasm waned, and she told me she had realized that science club was just for boys. I did my best to persuade her otherwise, and by the time the form came home to be signed, she intended to participate. Alas, again the club was hugely oversubscribed, and by chance, all the female applicants in my daughter's class were not accepted.

As a PhD student in gender and education, who had just submitted a thesis on gendered bias in coeducational curriculum design, I had time and the inclination to create an alternative science club with my daughter. I had no intention to do research in relation to the club; this was an entirely domestic project to correct a perceived gender politics injustice and, as an aspirant middle-class mother, to ensure that my daughter did not miss out! The science club I refer to in this chapter from this point, providing the focus for this research, is this alternative club.

The school provided me with a list of topics their science club covered, and I used the Internet to find and design activities, supported by sites such as GEMS.org (Girls Excelling in Math and Science) and my own collection of child-rearing books. My previous studies had involved art, literature, biology, and physiology, so I was able to put this transdisciplinary aesthetic and scientific background to use. I wrote a lesson plan for each of 8 weeks, which also functioned as a handout for the children, and we invited all the five girls from my daughter's class who had missed out on selection for the school club. Parents paid a small sum to cover the cost of materials and refreshments: I made an after-school snack cake each week. The club took place after school, in our garden shed, an old tin structure four by six meters, in which we installed a central table for experiments. I wrote up each week's title on an old child's chalkboard (Fig. 3). I knew the experiments would be messy, and I wanted the girls to play and explore freely, so the shed seemed an ideal location. I did not want dirt in the house.

For reasons of insurance, this was construed as an informal, playgroup-type activity, located in the community and not in any way related to the school. It was not informed by mandated national curriculum, but by my own feminism and desire for girls to enjoy science. I designed and printed off posters of young female scientists, for example, Aynur Askin, who has developed a system for using the wings of butterflies in textiles (Celikkan, 2014), that played up the interrelationship of arts and science in a girl-friendly way.

As a poet and an artist, I was interested in the concept of STEAM, incorporating art into science, technology, engineering, arts, and mathematics, and had long encouraged the preservice teachers I lectured to design transdisciplinary curriculum,

Fig. 3 Chalkboard

Fig 4 Vases

for example, blurring physics and science fiction. I had a strong sense of enacting this through science club, of creating a sensorily delightful experience and an aesthetically pleasing space that blurred studio and laboratory (the space had been used by previous owners as a picture framing workshop) and also natural world, as the shed was sited in the garden and had windows and views on to greenery. I put a derelict antique cabinet along one wall and set up a collection of old glass vases (Fig. 4.) and flasks where they would catch the light.

I was wary of falling into the trap of making girls' science all about makeup and bath bombs but also wanted to complicate the masculinist precision of the lab, both physically and through the experiments; for example, we used our chromatography strips to make colorful butterflies (Fig. 5.) that we suspended from the shed frame. This was a science club initiated by a feminist artist, predicated on owning a suburban block big enough for a garden shed and only working part time.

Fig 5 Filter paper butterflies

Science club was a lot of fun, but sometimes I became concerned that my carefully planned procedures were not being followed. The girls were just as interested, if not more interested, in moving between the shed and the surrounding garden, picking and eating snow peas and checking on the baby birds in the nest made in the ivy surrounding the shed. As an experienced teacher, I felt the familiar impetus to keep my students on task. How much were they learning about scientific concepts? If I tested them, would they be able to remember the chemical equation of our citric acid/bicarbonate of soda fizz? Explain how polymers get bigger? Describe the properties of fluids? What knowledge would they be able to demonstrate to their parents? There were, of course, no tests. At the end of science club, I received some lovely thank you cards from the students – whatever they had learnt, they had certainly enjoyed and appreciated the opportunity.

What are the inadequacies of this account? What of the proliferation of "I"s, as the human and its intentions come to the fore? Despite my interest in the embodied experiences of the children (or, rather, my plans for these), this account situates us all in a discursive bubble, in which we are insulated from the materials surrounding us, unaware of and impervious to the myriad connectivities and complexities of existence. Science club performed the illusion that chemistry happens when we let it.

I received my doctorate just as science club ended. I was fortunate to have Bettie St Pierre as one of my thesis examiners, and she advised me to read in directions my own doctoral supervisor had been reluctant to take. Over the last few years, since the first science club, I have read until my eyes are sore as advised (St Pierre, Jackson, & Mazzei, 2016), absorbing new materialist and posthumanist theory. Science club has been constantly in the making with this reading, reforming through acts of both memory and imagination. Concurrently, the fields of childhood studies and curriculum studies have begun to move in similar ways (Snaza et al., 2016, p. xv), so that there is even more to read. In the following section, I turn to the theoretical resources that I draw on in creating the versions of writing as inquiry above.

Tin Shed Theory for Permeable Learning

This chapter is not a call for environmental education, for forest or bush schools, or for shed schools. This work is not related to the teacher practice of "porous learning" understood as enabling digital delivery of school curriculum at home (Jesson, 2016). This chapter does not simply describe the ecologies of a particular educational site but seeks to advance a theory of permeable learning that emerges from the accounts above (and following) and the particular materialities of the shed as happening. This is in stark contrast to an evaluation of science club, and an assessment of what learning its participants have retained so that its outcomes and impact may be determined (as if these things could in fact be known).

Instead the chapter shares a material and arts-based research and curriculum strategy that are conspicuously in the making in this writing, not something executed in the past that is being unproblematically reported on. The tissue-thin page membranes that separate the chapters and sections of this handbook are themselves permeable, so that what the collection has to say about, for example, "pedagogy," flows through and becomes concentrated here or there, as it is taken up into new assemblages shaped by digital search functions, white space, interests, time constraints, eyeballs, or ears.

The notion of pedagogy as place of purposefully creating particular kinds of learning environments with attention to their aesthetic dimensions has been a recurring theme in educational literature. This has been realized, during my teaching career, by theorists drawing on John Dewey and Maxine Greene's earlier work on experience and embodiment, still with a focus on the nurturance of the human. This work pays attention to "nonschool settings" (Schubert, 2004, p. ix) such as science club as backgrounds for learning but also gestures toward the material, if only through metaphor, to the need for "fertile educational ground" (p. xiii). This metaphor may, however, serve to reinforce a nature/culture binary through its oxymoronic tension between dirty agriculture and pristine school.

Julian Sefton-Green has recently undertaken a review of learning at nonschool, defined as "contexts where teaching and learning aren't usually understood to be the primary purposes of place" (2013, p. 20). He describes these kinds of learning spaces as traversing boundaries, where school and out-of-school intersect, and as underresearched, unless via project evaluations which ignore larger questions around learning. Sefton-Green does acknowledge other nonhuman participants in these spaces, such as tools and affect, but as context for human practices, not agentic intra-action.

I also acknowledge the work of Elizabeth Ellsworth. Her *Places of Learning* (2005) begins with William James' quotation about things not made, but "in the making" (p. 1). She is already moving toward a kind of permeable learning, with her desire for a "reciprocal opening" (2005, p. 9) between learning and the aesthetic and her call for investigations not models; this is the gist of Prévert's poetic critique of multiplication table rote memorization in *Page d'écriture* and of my writerly interrogation of the science club curriculum. Ellsworth describes encounters with artworks, and the material's capacity to know, as she draws on Winnicott's transitional

space and pedagogy as a "web of interrelational flows" (Kennedy in Ellsworth, 2005, p. 24). These concepts shift our sense of the boundaries and siloes of education, as bodies dissolve into and out of what we were and what we will be, with insides and outsides related not opposite, and receptivity to "encounters with the unthought" (2005, p. 37). This creates new possibilities for shed and garden, home and school, and gut and skin.

Her understanding of intent as agency distributed across multiple bodies is also helpful and reinforced by Barad (2007) who writes of intentionality as entangled human and nonhuman agencies. I aimed to stick to the school's sketched-out science club curriculum list, but the purchase volumes, volatility, and storage requirements of carbon dioxide meant that we had to skip the week on dry ice bubbles. What happens is not simply what I want to happen: matter really matters and has the capacity to blow the door off my refrigerator!

The diffracted science club's attention to matter, and to transversality, also flows from the work of material feminists over the last decade or so, and the realization of the ontological turn, in which things are understood to have the capacity to speak back (Lather, 2016). Concepts of intra-action and assemblage (Barad, 2007) and of vibrant matter (Bennett, 2010; Coole & Frost, 2010) are vitally important to this work.

Viscous Porosity and Permeable Learning as Related Concepts

Nancy Tuana's work is also closely linked, as she has developed the conceptual metaphor of viscous porosity (2008, p. 189), to understand how subjects are constituted through relationality and to explore the intersections between things, people, biology, and culture. Her planned feminist essay on embodiment shifts, via the forces of Hurricane Katrina, to an encounter with "levees, hurricanes and swamps" (2008, p. 189) in a manner similar to my emergent awareness of science club as more than a planned list of experiments. Instead of a discursive account, my accounts, even the more traditional one, become shot through with dirt, rust, birds, snow peas, and corn flour. Tuana prefers "porosity" to "fluidity," as she feels it indicates resistance and complicates interrelations. In contrast, I have chosen "permeability" as guiding metaphor, in part to distinguish this work from that of developing digital learning strategies as porous learning.

Permeability and porosity are related concepts. Permeability, in relation to earth and soil sciences, is a measure of how readily fluid passes through rock and, in chemistry, describes how things may pass through membranes. Porosity is a ratio, describing the fraction of void space (the space between particles) in a given material. Something that is porous has more space and less matter and is described by the mathematical relation of these comparable volumes. For my purposes in seeking a metaphor for learning that fits new materialist and posthuman sensibilities, "permeability," as capacity rather than state, has a stronger sense of movement across and through, and this encompasses the sense that things may be more or

less permeable. Borrowing from chemistry, the membranes that create ostensibly separate entities are themselves not fixed but better understood as a "fluid mosaic" (Nelson & Cox in Frost, 2016, p. 65), always shifting and in composition. Yet these membranes are enough to allow the perception of contingent and ephemeral entities and prevent the dissolution of all into universal soup.

In permeable learning, things are recognized as mutually co-constitutive, moving through each other, becoming anew as they intra-act. Membranes, both physical and discursive, form through coalescing forces of nature-culture, temporary boundaries that are never solid but are open to possibility and to continuous becoming. Curriculum or planning might be understood as membranous, textual assemblages of words, spaces, politics, and passions – I am reminded here of Ted Aoki, cutting holes in the curriculum (described by Pinar, 2011, p. 1) to open it to possibility. If curriculum is a perforated, gelatinous membrane, not a straightjacket or order, what might flow through it? This is curriculum as described in one of Yoko Ono's Instruction Paintings, in which she advises the reader to put a hand up to the light, "until it becomes transparent/and you see the sky and trees through it" (Ono, 2012, p. 36). What can we see through curriculum? Or if we can put aside this humanist preoccupation with vision as perception, what do we sense through curriculum? What can filter through this grid of intelligibility reimagined as fluid mosaic?

Curriculum and Childhoodnature

This different orientation immediately throws up radical transversalities; this is much more than the oft-described gap between planned and enacted curriculum. Suddenly curriculum does not just work one way. Things flow in all directions. Animals can teach. Children are nature. Science no longer starts and stops in the linear temporality of school but is always already forming as questions, as art and as matter. So we might ask of any curricular project:

- What are we pretending is discrete?
- What are the contingent boundaries, layers, or membranes we perceive forming? How have they formed (Barad, 2007, p. 23)? What is called into being through their formation? What do they attempt to prevent and enable? How readily do other things pass through them?
- What strategies can we use to disrupt the representational logic of curriculum documents, like the science club handouts?
- How is matter co-composing this learning phenomenon?
- How can we break down the boundaries between disciplines in this event?
- Who or what is participating in the choreography of the encounter (Coole & Frost, 2010, p. 36)?
- How are we performing binaries in planning, in particular that of nature/culture?
- How are we contributing to both bewilderment (Snaza, 2013) and wonder (Snaza & Weaver, 2015, p. 7)?

- How are we flattening the human and challenging humanism?
- What constitutes the materiality of places-as-happenings here? How can we think-act ecologically? What are the notional waste products of this learning act? What will happen to them?

Other educational theorists' ideas infuse these questions. In recent publications, there are calls for the borders between pedagogy and curriculum, nature and culture, and human and nonhuman to blur (Snaza et al., 2016; McKnight, Rousell, Charteris, Thomas, & Burke, 2017). There are demands for "a new politics of attention" (Snaza & Sonu, 2016, p. 30) echoing Bennett's "new regimes of perception" (2010, p. 108). If we turn this to science club, we perceive new phenomena, perhaps a colonial fantasy of subjugation of the land/Indigenous peoples? There was no acknowledgment of country at science club. The municipality of Boroondara, the shady place, no longer requires it at council meetings (Masanauskas, 2017), in a related performance of ignorance and forgetting. Do we perceive a performance of the "narrow governmentality of scientificity" (Lather, 2013, p. 645)? The reproduction of capitalism as "the engine of environmental degradation" (Miles, 2014, p. 8)? The excess materials I purchased for science club lie discarded in the shed. One week I put around 15 swollen disposable nappies (diapers) in our rubbish bin, after the girls had tested the superabsorbent polymers lining them by filling them with water.

Is science club the product of a struggling education system that channels scarce material resources toward boys? And/or is it a mechanism of exclusion reliant on middle-class cultural and economic capital, despite my feminist pretensions? Do we perceive a shoring up of the boundaries between child and nature, as children follow adult instructions to manipulate natural phenomena?

What would a science club be that "challenges assumptions towards cognitive and practical mastery over the world" (Frost, 2011, p. 78)? How could we resist the tyranny of the topic and honor the concept as creative agent (de Freitas & Sinclair, 2013, p. 466)? Through all these questions, further science clubs are forming, clubs that may follow Barad's advice that we should not take for granted what needs to be investigated (2007, p. 26) and that there are outcomes other than those defined by the "thrust called intent" (p. 32). In this way, science club can challenge what has been described as fascistic curriculum (Pinar, 2011; Helmsing, 2016).

This is therefore not a template for permeable learning but a call for tin shed thinking in curriculum planning that allows matter to take center stage that counters dull, disciplinary silo thought that eschews learnt ignorance and insensibility to actual places-as-happenings. Even students on the third floor of a brutalist school building can do tin shed thinking as permeable learning, alert to the fluorescent light co-composing their blood counts (Landesberg & Quatrale, 1996) and the xylene marker fumes in their airways, perceived through the teacher's tidy but permeable lesson-script.

Tin Shed Thinking: Reconvening Science Club as Poetry

In this chapter I have moved from a surprising material-discursive account of science club as earth, through a more traditional narrative account (although I acknowledge the leaky borders of these contrasting stories) and an overview of relevant theory informing new curricular orientations. I turn now, again as if burrowing through earth, to a reimagining of science club as:

- Becoming iron
- Becoming concrete
- Becoming polymer
- Becoming stem
- Becoming bird
- Becoming soil

In doing this, I take one of the science club experiment plans (acknowledging that these weekly experiments were permeable to each other) and diffract it with the writing of poetry, treating both these texts as permeable overlays of each other. I treat both my original science club plan, reproduced below, and also this further diffractive writing as sieves through which things pass and are made. This juxtaposition allows the reader to think about what these texts try to retain and what they allow through. In this way, we can read the science club plan through the poem, and vice versa, so neither serves as a fixed form of reference, and we perceive what and how differences are made (Barad, 2007, p. 30). We can also sense what moves through, and what is made in assemblage with the previous vignettes, of science club as earth, of researcher narrative and theoretical explication.

Science Club Week 7: Birds' Nests

Aim: to study how birds make their nests and make our own.

Materials: dirt, water, sticks, leaves, twigs and dried grass, and ice cream container to make mud in.

Method:

1. Collect your materials.
2. Mix some water into dirt in your ice cream container to make mud.
3. Experiment with making a nest, using the mud to stick things together. You can shred or tear the materials, twine, and bind them.
4. Practice using two fingers like a beak, so see how skilled birds are at nest building.
5. Leave your nest to dry before trying to move it.

Findings:

Science Club Week 7: Birds' Nests

Woiwurrung word, and still
the ground is thickly shaded
here where iron wave
casts ripples laid
over acrylic skin.
Bird flit from ivy dark,
Pre-Raphaelite, polycarbon-night.
Swift, lark, I do not know
your name.
Thermoplastic pants elastic
makes us pluck and weave.
The female builds
allometric-wise, the nest
thick-twig-sticks will
hold her mass.
Saliva binds, inside
the humans shriek.
[Sweetie, don't get your dress dirty!]

Checked cotton, all be-smock'n
limbs, claws, digits do
that women's work,
BlueScope branded, zinc strippin'
party trippin'.
Here is mud. Here is moss.
All these raw lovelies make
a pretty child at play
in rosy glass, paint,
and rust-sucked muck,
in foot-pestled powder
on dried bird-dribble
splashed cement.
[Honey, you don't want to mess with that!]

I must feed my young
bird's egg banana cake and,
for God's sake
polypropylene vanilla sludge
polyethylene dust and stuff
that clogs Bangladesh,
strangles seals.
The very same that makes
transvaginal mesh if
you mix it – quick girls–
with cows' or pigs'
tissue. So one fine day
we'll know our melt-flow rate, or
become degraded, oxidised,

crackled, brittle. . . *but,*
but – we're only little.
[Samantha, this project has gotten out of hand.]

Fifty five million
tons of us will feed
a global goblin market.
We will leach BPA,
we latex angels of the home,
when we go to landfill.
In one bird's nest
is a fine petroleum line, a
bread bag tie.
Give us this day
voracious fungi, larvae, pupae
plastic-munching, ladies lunching, hope.
In science we trust,
in chemistry's base mettle,
not in alchemy,
mystery, artistry.
[Careful! Why don't you hand that to your brother?]

Writing Poetry as Diffractive Research

Poetry is more porous than prose, with strikingly more void (white) space around the textual material on each line when compared to prose and a grammatical, syntactical looseness that leaves room for interpretation and imagination. Poetry created as and through associative, intuitive, sensuous, affective energy is ideal for challenging humanist and positivist reason. It also has particular affordances for exploring new materialist themes (McKnight, 2016; McKnight, Bullock, & Todd, 2016) and the Anthropocene (Bristow, 2015). This is to move beyond understandings of poetic research as attention to solely human experience as heightened state (Leavy, 2009) but to awareness of a more diverse universe. I've argued elsewhere that:

> this is poetry as experiment, not literature, poetry put to work empirically to engage the medium, the water or air in which we (both human and non-human) live, breathe, move, and learn. This is poetry as realization of some of the ambitions of new materialism, as a concrete example of what this more diffuse, fragmented, naturally attuned, and multiple thinking might look, sound, and feel like. I offer new ways to be with emerging theory in education. (McKnight 2016, p. 198)

As an intervention here, it serves to break down silo thinking that separates curriculum, literature, and the writing of an academic book chapter. If we squint through these textual layers, and blur their boundaries, we fall into a tumble of Indigenous memory, animal husbandry, and subversive wordplay, as girls and readers delight in vividly and aesthetically realized dirt play and then get pulled up

short by the square brackets of parental discourse. Words, images, ideas, and things can move between different spaces-as-happenings. The poem itself includes multiple intratextual references to sections of this chapter and intertextual references to sources such as Christina Rossetti's poem *Goblin Market* (1862/2017) and other Victorian literary and artistic texts setting up enduring relationships between women, children, nature, and domesticity; these emerge through the arts-based practice of writing poetry as research, as materially rich creative and cultural resonances that may elude other forms of inquiry.

References to Pre-Raphaelite paintings and poetry suggest an urge for the naturalism and close attention to detail of their lush gardens and also highlight the risks of their romanticism and sentimentality. Such works were produced in the context of rigidly sexist moral and professional mores, by an artistic "brotherhood." While new materialist theory and research practice have been critiqued for its absence of politics (Snaza et al., 2016, p. xviii), this poem brings gender politics to the fore, with a simmering resentment of the materially abject, dirt, and feces-smeared feminine work of the home that is ironically echoed by the girls' testing of nappies as polymer samples and the wearing of pseudoscientific latex gloves in the domestic setting of science club.

What further insights come into being when reading these texts diffractively to try to answer the open questions posed above of any curricular project and awake Bennett's "new regimes of perception" (2010, p. 108)? There is a greater sense of the complexity of the choreography of the encounter in the poem and of learning in the club. We become aware of affect, with a bulge of urgency rather than the flat complacency of the plan with its matter-of-factness. This dry tone of science as procedural text is immune to the unexpected entanglements of process, even though it gives a patronizing nod to the wisdom of creatures. The plan reads as insensible to the aesthetic dimensions of the project described or to the possibilities of humanbird or humanplastic assemblage that the creative affordances of the poem enable.

The poem does not pretend that the experiment is discrete from the material-discursive world of broader communications, whereas the plan forms an ostensibly less permeable bubble. For example, the poem gives reference to the media, via recent reports of scientific advances in the waste management of plastics via consumption by wax moth larvae (Sample, 2017). The lines in square brackets are quoted from telecommunication giant Verizon's (2014) advertisement promoting the participation of girls in science, *Inspire her mind*, that went viral online around the time science club launched. This advertisement shows a young girl interacting with (or, rather, intra-acting to co-create) the environment yet being thwarted by her parents' gendered concern and reminded to conform to being "a pretty girl" who does not play with yukky nature. In the final frames, the grown-up teenaged girl approaches a glass-covered noticeboard advertising a science fair; she does not read the notice but touches up her lipstick while admiring her reflection in the glass.

Steel industry multinational BlueScope owns Lysaght, the company which galvanized the iron of the shed; we work and play with ironic, feminine Lysaght logos (Fig. 6) on the wall that neither the girls, nor I, think to investigate until I come to take the photographs forming this research assemblage.

Fig. 6 Corrugated iron company logo

These logos represent the masculine-dominated professions that this STEAM-fired club imagines the girls may one day permeate. Surgery, another of these fields, contributes to the becoming machine (Braidotti, 2013) of posthumanism; one surgical procedure has resulted in multimillion dollar claims for compensation by women whose sexual and reproductive organs have been repaired with faulty plastic mesh, after damage sustained in childbirth (Campbell & Fishwick, 2017). What is the gender politics of this plastic manufactured by global corporations, the same plastic we mix mud in, absorbed from my daily media reading and filtering though into poetry? The poem collapses girl and woman, child and mother, and all into matter that complicates interiorities and exteriorities.

The Absence of Curiosity

The absence of curiosity about our surroundings is curious and might be offered as a key finding of this study, even at this early stage. Despite its romantic, feminized garden shed location and girl power posters, the original science club presents as a list of topics, not questions. It offers a single procedure to follow to reify human understanding of the world, despite the proclivities of science to disprove what has been believed before. The dirt writing, narrative, and poem of this chapter conspire to expose how our rote activities, like Prévert's multiplication tables in his *Page d'écriture* poem (1972), demote and conceal the matter in which we are immersed and part of, so that our connections to the wider world are lost. We focus on the human-arranged set piece demonstrations at hand.

I forget to write "plastic bags" on the materials list for the birds' nest experiment. I call the girls in when they are spending too much time looking at the birds in the ivy nest. I hurry them on when they are examining how the helices of snow pea tendrils secure the plants to their support. Science club learning, despite pretensions to breaking down binaries of home and school, girl and scientist, and child and nature, is predicated on a particular understanding of what matter matters. It is all too easy to elide my deployment of a dire global pollutant (plastic bags) as common-sense science club equipment and to steamroller the wonder of the materiality of existence in favor of my planned imperatives.

We know the shed floods when it rains, due to drainage issues with the new development at the rear, but do not think to experiment with engineering a solution together in science club, even when the girls' mud nests are at risk. We could be mixing cement ourselves, filling sandbags, running hoses, using spirit levels, and examining Google Earth to check building and permeable soil ratios on surrounding blocks, even as we talk about satellites, security, privacy, monopolies, and topographies, not to mention earth art and the agencies of water.

Instead of perpetrating learnt ignorance, we could be finding out what humans call the bird in the ivy shed nest and how these birds call to each other and how they build their nests. How do their lives compare with those of the birds whose yolks we have just ingested, in our banana cake, the nutrients from which will enter and become our cells? Would birds ever use a human-made nest? We could consider how these garden birds fit into broader biodiversity, especially considering the removal of the tree canopy due to recent migration patterns. Along with the sound of traffic, the roar of chippers provides a forgotten backdrop to science club; this is the roar of the universe Braidotti urges us to hear (2013). We could spend a whole club slot watching and listening to the bird, learning from the bird, and wondering what the bird learns from and about us.

What of my impervious and imperious attitude to the waste matter created through science club? What of the elephant in the shed, the pile of acrylic and latex paint tins (Fig. 7), that my partner and I are not sure how to dispose of? Science club completely ignores this matter. As an ever-ready consumer, I purchased new matter (water beads and nappies) to explain polymers, when the shed was already full of them. We could have explored the chemistry of paint, opened the tins, tested the paint, found out how to reuse and recycle it, and discussed the history and properties of lead (inevitably present on our house, given its age). The periodic table is not in a book or a chart. We are breathing it, at 0.1 micrograms per cubic liter of air, and storing it in our bones. This is science infusing, or permeating through everything, not presented as if by a magician, with a precise beginning and end to the show. What would a science club be, in which children designed the experiments? What would a science club be, led by birds, paint, water, and soil? What about a science club in which art proved the basis of each event, rather than demurring as handmaiden to the explication of superior scientific concepts or as an add-on to use up free time at the end?

Fig. 7 Paint tin collection

In the early 1990s, Joseph Dunne was already lamenting the instrumentalist turn in education and the backlash against progressive movements. He dreamt of an alternative derived from "the nature and texture of a practical engagement" (1993, p. 8) but before the bodily, new materialist and ontological turns in philosophy. Science club sought to provide such a practical engagement yet still falls short, in that it was conceptualized prior to my own engagement with these turns. It is discursive-material theory-diffracted science club, however, that acts as a kind of hinge (Ellsworth, 2005) for different thinking and acting, as explored in this chapter.

I have tried to avoid romanticizing or sentimentalizing nature, or children, here, and falling into the trap of positing nature as salve, or panacea for human ills, or as vehicle for presenting humans as saviors, as a well-known passage from E. Nesbit's classic *The Railway Children* (1906/2008), in which the children attempt to make mud nests, does:

> I've often thought people don't do nearly enough for dumb animals," said Peter with an air of virtue. "I do think people might have thought of making nests for poor little swallows before this.

The human as benign savior has little purchase in the Anthropocene, in which we have become aware that human influence on the planet has been anything but benign, or solicitous to the welfare of "dumb animals," species of which are becoming extinct at an ever-increasing rate.

Conclusion: Sliding into Permeable Learning

Along with ongoing poetry writing in relation to each experiment, the proposed next stage of this study is to reconvene science club, with all its myriad nonhuman and human bodies in attendance, for an arts-based workshop construed as science club as

art. This will be concurrent with ongoing poetry, narrative and exploratory writings as sampled here, enacting tin shed thinking and permeable learning, as the assemblage that is science club continues to form and dissolve, and I attempt to use aspects of it to address the research questions. This humanist overlay of researcher and researched persists and is part of any posthumanist project. Ethical approval for this next stage is currently being negotiated, although this writing highlights the absurdity of ethics being confined to research with/on humans and foreshadows future Faculty Planetary Ethics Research Committees (FPERCs), which would pull me up on my use of plastic bags in science club and demand that matter be made to matter.

Prévert chooses the verb *s'écrouler* to change the walls of the classroom in his poem, as they open to the imagination*: les murs s'écroulent.* This word means to collapse like a house of cards, to lose value, to relinquish resistance, and, in the vernacular, to become weak with laughter (Larousse, 2017). The membranes of walls and stationery weaken, and multiple flows of agency fashion them into other things. *Ecroulement* is a French geological term describing the *désolidarisation* of an edifice, such as a chalk cliff. This chapter has attempted a similarly dramatic shift of concepts, using the arts of literary and academic writing to slide them together like moraine, as childhoodnature, girl-bird, and art-science merge in ongoing becoming. The reference list of this chapter, too, although dense with academic theory, is shot through with newspaper articles, social media video, poetry, children's picture books, and other aesthetic literature. What is as solid as rock or curriculum or academic writing becomes understood as permeable. There is much further to go, however, in imagining an art-science learning event that is not human sanctioned and controlled and truly engages distributed agencies. This is learning that does not succumb to humanist hierarchies that place male above female, science above art, and culture above nature.

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Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective

76

A Conversation

Gregory A. Cajete and Dilafruz R. Williams

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Abstract

Discussions of Indigenous ecological knowledge and aesthetics are largely missing from mainstream education and environmental education. This chapter takes

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a unique approach to research and scholarship, one that is an emergent decolonizing methodology though it has long been used by Indigenous cultures: A conversation. In Indigenous cultures, oral language and storytelling are one of the oldest traditions. In keeping with the topic that is explored, Tewa scholar, educator, and artist Gregory Cajete and eco-educator Dilafruz Williams raised in India have come together to share through conversation the nature of eco-aesthetics, metaphor, story, and symbolism in Indigenous thought presented in Cajete's writings of three decades. Our conversation method aligns with Indigenous worldview and upholds its relational significance. We discuss aspects of the Indigenous mythopoetic tradition as part of the traditional education practices of Indigenous cultures. We draw upon our lived cultural experiences and professional practices to elaborate upon the rich use of metaphor, story, symbols, and art to convey notions of eco-aesthetics in the teaching and learning process and the education of children. Our goal is to produce new levels of insight as we engage in this dialogue. Exploring the environmental, mythic, visionary, artistic, affective, communal, and spiritual dimensions of Indigenous education, we conclude the chapter with a discussion of how Indigenous ecological thoughts may be eco-aesthetically symbolized through contemporary art forms to show possibilities for childhood and nature interconnected.

Keywords
Indigenous · Myth · Story · Metaphor · Learning · Eco-aesthetics

Introduction

> Who can tell stories, and, more particularly, who can tell stories that embody Indigenous knowledge and experiences? (Davis, 2004, p. 2)

In Indigenous cultures, oral language and storytelling are one of the oldest traditions (Archibald, 2008; Cajete, 2005; Denizen, Lincoln, & Smith, 2017; Kovach, 2017; Smith, 2013). In this chapter, we use a conversation format to discuss insights into eco-aesthetics from an Indigenous perspective, drawing upon three decades of writings, personal stories, and professional practices shared by co-author Gregory Cajete, a Tewa Indian from Santa Clara Pueblo, New Mexico. The stories are interlaced with co-author Dilafruz Williams' East Indian cultural lived experiences and practices related to ecological education and garden-based education. Since conversation and storytelling have traditionally been accepted as form of scholarly methodology for decolonizing research (Kovach, 2010a), we foreground the chapter with an explanation of this process. Next, we explore the use of the term *Indigenous*. We highlight the significance of *metaphor, myth, storytelling, and symbolism* as holistic and integral to life from an Indigenous perspective (Cajete 1993, 1994, 1999, 2001, 2005a, 2015, 2017). Although discrete sections are enlisted to discuss these concepts, there is much overlap among them. While we touch on critiques of modernity and modern decontextualized education (Williams & Brown,

2012), in this chapter, we share our aspirations for insights that can be gained from a relational ontology (Cajete, 1994; Feldman, 1999; Porsanger, 2004; Smith, 2013), to guide eco-aesthetic education. Although the academic trend is to accept the term "Anthropocene," we wish to move away from its colonial underpinnings and acknowledge that Indigenous Peoples of the world have had cosmologies that shaped alternative ways of being and living sustainably for millennia. The stance taken is one that elaborates upon and explains Cajete's depth of experience as an artist, writer, and educator, to show the interconnectedness of childhood and nature. (We have chosen to not heavily self-reference Cajete's work in the text and encourage the readers to review his original works listed in the References.)

In *Conversational Method in Indigenous Research*, Kovach (2010b) explains the use of conversation and story as legitimate forms of research that honors and upholds this process as a means of sharing Indigenous knowledge. She explains:

> Indigenous knowledges comprise a specific way of knowing based upon oral tradition of sharing knowledge. It is akin to what different Indigenous researchers, the world over, identify as storytelling, yarning, talk story, re-storying, re-membering (Thomas, 2005; Bishop, 1999; Absolon & Willett, 2004)... I refer to this same approach as the conversational method...[which] is a means of gathering knowledge found within Indigenous research. The conversational method is of significance to Indigenous methodologies because it is a method of gathering knowledge based on oral story telling tradition congruent with an Indigenous paradigm. It involves a dialogic participation that holds a deep purpose of sharing story as a means to assist others. It is relational at its core. (Kovach, p. 40)

Antoine (2017) furthers the cause for decolonizing research: "The complex, dynamic, and multifaceted aspects of research mean there are many opportunities to raise one's hand when research strays too far from including Indigenous voices and knowledges," she writes (p. 114). She calls for "an activism beyond a simple nudging to encourage our colleagues to put an Indigenous agenda front and centre when it comes to researching Indigenous peoples, nations, and communities," (Antoine, 2017, p. 118). Similarly, Denizen and Lincoln (2014), Kovach (2009, 2017), Kovach, Carriere, Montgomery, Barrett, and Gilles (2015), Smith (2013), and others have argued that conventional research and academic scholarship have ignored and discounted the customs, knowledge, and perspectives of Indigenous communities resulting not only in marginalization but also omission of Indigenous relational methodologies. Smith (2013) challenges the perceived observational neutrality of Western research that is the norm of the academy. In making a case for storytelling as legitimate research methodology, Kovach (2010a) counters the often inadmissible methods of oral histories and storytelling, and the ignoring of authentic voices of the Indigenous peoples. She reminds us that production of knowledge and academic inquiry are political. For Smith (2013), "stories are not entertainment, they are power," (p. 92). If research were undertaken through decolonizing eyes, then Indigenous cultures would be honored and Indigenous agenda and voices would be at the front and center of scholarship. To decolonize research, we need to "push the academy," urges Antoine (2017), by confronting the norms and conventional research practices:

> Researchers rely on epistemologies and ideologies that legitimize particular ways of understanding the world and what counts as knowledge. What is perceived to be legitimate knowledge is determined largely by a small and relatively homogenous group of people who form the academy. (p. 116)

However, Indigenous experience and knowledge, "emerge from centuries of survival strategies and cultural systems that have sustained Indigenous communities, whether in pre-contact societies negotiating survival with each other, with the land, and with ancestors," she claims (Antoine, 2017, p. 116). Our attempt in this chapter is to provide an Indigenous approach to sharing knowledge where the relational dynamic between the authors is central to the content that emerges. As Kovach (2009) writes, while "a decolonizing perspective may provide a critically analytical framework with which to identify the power dynamics of a research problem, an Indigenous perspective supports a relational conceptual model that moves beyond problem identification to action" (p. 16). The nuances of our own place-based lived experiences are deliberately interwoven into the text, since "without the grounding of place, knowledge becomes trivialized and fragmented into bits and pieces of memorizable waste," (Kincheloe & Pinar, 1991, p. 5). In taking an unusual approach for this *Handbook*, we are taking a risk. We agree with Kovach (2009) that "current scholarly writing on Indigenous Knowledges takes place with academic sites that are not yet free of colonial narrative" (p. 79). Having a conversation with each other, we hope to produce "new levels of insight" (Feldman, 1999). In exploring together and sharing stories, our intent is to come to an understanding of ecological aesthetics. However, following the proposition of Kincheloe and Steinberg (2008), we are engaging in dialogue, not seeing ourselves as saviors. We begin our conversation with situating what we mean by the Indigenous.

Situating the Indigenous

Dilafruz Williams: You have written extensively about Indigenous education and ecology for the past 30 years. As a Tewa Indian artist and educator from Santa Clara Pueblo, New Mexico, in your writings, you honor the foundations of Indigenous knowledge in education. You do so by speaking specifically to your lived experience. I particularly admire your acknowledgment upfront in your writings that your narratives do not presume to be an "objective" treatise, but rather, a culturally contexted and "subjective" perspective of Indigenous ecological relationship (Cajete, 1994, p. 17). As a Pueblo Indian, and specifically as an educator and an artist dedicated to environmental issues, could you first explain what you mean by "Indigenous?" Why do you capitalize the term in your writings, as do several Indigenous scholars including Margaret Kovach (2009, 2010a)? Also, could you elaborate on its relationship with various other terminologies such as Native, Native American, and Indian American and why you choose to use the term "Indigenous"?

Gregory Cajete: Here, it would help to situate myself. I am Tewa from Santa Clara Pueblo in New Mexico. My ancestors have lived in this region of the

Southwest for over 10,000 years, cultivating ways of life through interacting with this landscape. Relationship to land is predicated on history and interaction with place. By being rooted in this place, we developed a sense of being. We were immersed in growing food, collecting seeds, nurturing plants, all the while tied to the natural landscape. Growing up in that context, you are influenced by the soils, the elders, the communities. As a Tewa Indian, I grew up directly involved with and nurtured by my extended family and land that gave me a sense of generational, communal ties to place. I had authentic, intergenerational experiences and a sacred orientation to place (Cajete, 1994, 2000).

While these terms have been debated by Native scholars, I use the more inclusive, generic, and capitalized term *Indigenous* as an honorific terminology for the many traditional groups of peoples who have been identified with a specific place or region for millennia and whose cultural traditions continue to reflect an inherent environmental orientation and sense of sacred ecology derived from the long-term relationship with place (Cajete, 1994, p. 83). I use the general term *Indigenous education* to refer to the most inclusive description of culturally based forms of education that are not primarily rooted in modern Western educational philosophy and methodology (Cajete, 1994, p. 14). Another term such as *American Indian* is used when referring to the Native Indian people in the Americas with their specific histories and cultural traditions. The term *Native American* refers to the precolonial Indian inhabitants of the Americas. I use the term *Native* to refer to those who identify themselves with an Indigenous heritage. All the terms mentioned are capitalized to honor the peoples. The United Nations Declaration on the Right of Indigenous Peoples (United Nations, 2007) recognizes Indigenous peoples across the globe as inheritors and practitioners of unique cultures distinct from the dominant societies in which they live at present. For me, *Indigenous* is a preferred, more inclusive, term though I do refer to my own stories also as a Native American.

Dilafruz Williams: Exploring the interconnectedness of nature, culture, and aesthetics and initiation/education of children, from an Indigenous perspective, is our main task. First, let us discuss how being, reality, and knowing are conceived and interrelated? Using a decolonized framework, how do we know the world (Kovach, 2009)? As Caxaj (2015) reminds us, "The most familiar storied approaches to research in the academic world are based in a Western school of thought that may be at odds with, negate or minimize local Indigenous epistemologies and ontologies" (p. 1). Perhaps you could clarify what Western philosophers would call "epistemologies"?

Gregory Cajete: There is no word for *epistemology* in our language. As I have said elsewhere, there are bodies of understandings that can be said to include what this branch of Western philosophy would explore as the origins, nature, and methods of coming to know that give rise to a way of life (Cajete, 2000). Thus, for instance, there are as many Native epistemologies as there are Native Peoples. To understand how we come to know, it is useful to explore the realm of cultural ideals from which learning, teaching, and systems of education evolved (Cajete, 2000). I will use my own Native American context. Traditional Native education occurs in a holistic social milieu that upholds the importance of each individual as a contributing

member of the community; this form of education is a cultural and life-sustaining process. The learning unfolds through mutual, reciprocal relationships between oneself and one's community and the natural world. As learners participate in the life of the community, these relationships involve all dimensions of one's being. The mirroring between knowing and educating is a two-way process. Indigenous epistemologies are nature-centered and education is not separate from how one lives in community. Participating in all aspects of life is key to this education.

Dilafruz Williams: Related to this, we know that Indigenous vision for life and education is informed by *relational* ontology in contrast to modern atomistic and individualistic ontologies. For Wilson (2008), "It is not the realities in and of themselves that are important, it is the relationship I share with reality. It is not necessarily an object that is important, it is my relationship with that object that becomes important" (p. 177). These relationships are often expressed through metaphors, along with stories, myths, and symbolisms that personify this relational sensibility, as you have elaborated in your writings. In the next section, providing examples would help clarify their embodied connections.

Metaphor, Story and Symbolism

We devote this section to the themes of metaphor, story, and symbolism elaborated by Cajete in his writings. First, we examine the relationship between metaphor and symbolism and then the connections between myth and story. Indigenous storytelling engaged all levels of higher order creative thinking and imaging capacities, developing a fluency of metaphoric thinking and mythic sensibility which served Indigenous people in their understanding of their own inner psychology and maintenance of their spiritual ecology.

Metaphor and Symbolism

Consider the Southwestern Indian symbol of the humpbacked flute player, sometimes called "Kokopeli" or ant man, which is a mythological symbol that represents the bringer of seeds, fertility, sexuality, abundance, the spreading of art and culture. The Kokopeli is a natural process symbol which is "pregnant" with meaning. As such, the symbol of Kokopeli is surrounded by many myths; these myths in turn abound with metaphors representing various dimensions of the procreative processes of nature. Each of these processes is encircled by a body of psychological, aesthetic, and cultural expressions. These expressions in turn are tied to realities which are observable and which form a basis for Indigenous teaching through myth (Cajete, 2017, p. 121). Our conversation turns toward an inquiry into symbols and examples of metaphors that guide learning and living.

Gregory Cajete: The use of metaphor as a teaching tool is an ancient strategy that has been adopted by virtually all the great teachers of human history. That it is an integral part of storytelling and mythology reflects the great capacity of metaphor as

a means for conveying highly abstract concepts. Allegories, parables, riddles, visualizations, symbols, poems, rituals, and myths all provide specific expressions of metaphorical thinking. Metaphors are also highly flexible in their uses and can be adapted to virtually all cognitive levels, from child to adult. Our metaphors show the depth of relationships humans have with nature and how all beings participate in life. The most well-known phrase is: *Mitakuye Oyasin*, i.e., "all my relations" or "we are all related." I come back to this again and again as do many others. It is a Lakota phrase that captures the essence of Indigenous knowing and educating because it reflects the understanding that our lives are truly and profoundly connected to other people and the natural and physical world. Pueblo elders often remind young people to live their myths by saying, "These stories, this language, these ways, and this land are the only valuable we can give you—but life is in them for those who know how to ask and how to learn." The metaphor for this seeking is coded in the Tewa phrase: *Pin Peye Obe*, i.e., "look to the mountain!" Reconnecting contemporary Indigenous education to its mythic roots may metaphorically be viewed as looking to the cardinal mountains of thought from which our stories come and to which they return. This nature-centered understanding is reflected in how we educate. In traditional Indigenous education, knowledge is gained from first-hand experiences in the natural world and then transmitted and elaborated through ritual, ceremony, art, and appropriate technology. Education, in this sense, becomes education for "life's sake." Indigenous education is learning about life by participating and developing relationships with community – a community that includes not only people but also plants, animals, and the whole of nature (Cajete, 1994, pp. 116–119).

Hah oh is a Tewa word sometimes used to connote the process of learning. Its closest English translation is to "breathe in." *Hah oh* is a shared metaphor describing the perception of traditional Native teachings – process of breathing in – that was creatively and ingenuously applied by all tribes. While we do not have a word such as eco-aesthetics, as a whole, our traditional education revolved round experiential learning (learning by doing and seeing), storytelling (learning by listening and imagining), ritual/ceremony (learning through initiation), dreaming (learning through unconscious imagery), tutoring (learning through apprenticeship), and artistic creation (learning through creative synthesis). The legacy of traditional Native American education is significant because it embodies a quest for self, individual, and community survival and wholeness in the context of community and natural environment.

The understanding and application of the metaphoric thought process is invaluable both as a teaching strategy and as a thinking skill which can enable students to dramatically increase their creative thinking abilities. The intimate use of metaphor is especially evident in Native American mythologies. In these mythologies, metaphor provides the key vehicle for the presentation and elaboration of cultural truths, relationships, behavior, and personality traits deemed important in particular Native American contexts. This is especially the case in myths which relate concepts and ideal relationships to the forces of the natural environment and all the living things therein. Metaphoric thinking is closely involved with the process of imagining in creativity.

Dilafruz Williams: I can link your point about the importance of metaphors to my own writing about "living soil" as a metaphor to engage children on school grounds and in school gardens in meaningful ways for learning. This requires a shift from paving with asphalt and/or manicuring with grass the vast land mass surrounding school buildings. It is in the actual process of conversion of these lots by first exposing soil that its life-giving qualities can be appreciated and from which learning gardens grow (Williams, 2012). "In sight, in mind," living soil surfaces as the frontier where nature, culture, and biology are intertwined, where humus teaches gratitude, where knowledge of de-composition becomes as significant as learning composition. As you state, Indigenous learning unfolds through mutual, reciprocal relationships formed in community and with Nature. Soil is home to plant, animal, and microbial life and is vibrant life itself, thus making it an exquisite entry point into teaching about relationships by breaking down ontological barriers that divide nature from culture, humans from nonhumans, and food from soil (Williams & Brown, 2012). A dynamic food web, living soil, I believe, exposes the fallacy of mechanistic understandings of life and calls upon us to re-member ourselves as part of the biotic community (Williams, 2012, 2018). Human cultures have had historical, spiritual, and sensual relationships with soils (Kumar, 2002; Shiva, 2008). Thus, paving over soil alters the human experience and psyche in deep ways. Terms such as *earth* and *ground* – while some of the oldest in human language – are etymologically related to *soil*. In addition, words such as *humus, humility,* and *humanity* are associated linguistically. Soil is intimately connected with human culture and history (Hyams, 1976; Montgomery, 2007). Through soil, we learn about the sacredness of life, as taught by diverse revered texts such as the Gita or the Bible. As a living entity, soil invites us into kinship and serves as more than a mere growing medium. Soils are a web of relationships, heaving with life.

Gregory Cajete: Indigenous people, in every place they lived, found ways to address these questions of survival and sustainability in profoundly elegant ways. They thought of their environments "richly" and in each environment they thought of themselves as truly alive and related. As I mentioned earlier, "All My Relations" (*Mitakuye Oyasin*) is the metaphor used by the Lakota in their prayers. It is a metaphor whose meaning is shared by all other Indian people. Its shared meaning stems from the fact that it is a guiding principle of American Indian "spiritual ecology" reflected by every tribe in their perception of Nature. For it is at once a deeply spiritual, ecological, and epistemological principle of profound significance. Guided by this metaphysical principle, American Indian people understood all living and nonliving entities of Nature as having inherent meanings which were important to honor. Based on this understanding, they symbolized their relationship to plants, animals, stones, trees, mountains, rivers, lakes, streams, and a host of other living entities. And through the seeking, making, sharing, and celebrating of these natural relationships, they came to perceive themselves as living in "a sea of relationships." In each of the "places," they lived they learned the subtle, but all important, language of relationship. It was through such a mindset, tempered by intimate relationships with various environments over a thousand or more generations, that Indigenous people accumulated and applied their ecological knowledge (Cajete, 1994, pp. 74–77).

Dilafruz Williams: I am reminded here of the significance of the "metaphoric mind" in your work.

Gregory Cajete: The metaphoric mind is the facilitator of the creative process; it invents, integrates, and applies the deep levels of human perception and intuition to the task of living. Connected to the creative center of nature, the metaphoric mind has none of the limiting conditioning of the cultural order. Its processing is natural and instinctive. It perceives itself as part of the natural order, a part of the Earth mind. It is inclusive and expansive in its processing of experience and knowledge. It invented the rational mind, and the rational mind in turn invented language, the written word, abstraction, and eventually the disposition to control nature rather than to be of nature. But this propensity of the rational mind also leads to the development of anthropocentric philosophy and of a science that would legitimize the oppression of nature, its elder relative, the metaphoric mind.

Dilafruz Williams: Indigenous knowledge is couched in the intangible quality of being in relationships, as you explain. Indigenous scholars Caxaj (2015), Kovach (2009, 2010a, 2017), and Smith (2013) are particularly critical of research and narratives that are based in Western schools of thought whose assumptions about the nature of knowledge are often different and devoid of context that you, too, have pointed out. Caxaj (2015) states that when the assumptions about knowledge "originate in settler/colonial practices," that knowledge is incommensurable with several Indigenous standpoints" (p. 1). Similar to your viewpoint, she explains, "a focus on human agency on the world may construct a dichotomy of human and nature that is contrary to Indigenous knowledges that champion the interconnectedness and the relational aspect of the universe" (Caxaj 2015, p. 2). Congruent with your position and my own upbringing in India, Indigenous ontology of humans is manifested in a sacred relationship with the natural environment, one that is intimate and place-based, with knowledge and understandings passed from generation to generation. Taking this thought further in the next section, you can elaborate on your writings regarding the power of myth and story in the educational legacy of Indigenous peoples.

Story and Myth

Story is a primary structure through which humans think, relate, and communicate. We make stories, tell stories, and live stories because it is an integral part of the way of being human. Myths, legends, and folk tales have been a cornerstone of teaching in every culture. These forms of "story" teach us about the nature of human life in all its dimensions and manifestations. They teach us how to live fully through reflection on, or participation in, the uniquely human cultural expressions of community, art, religion, and adaptation to a natural environment. The stories we live by actively shape and integrate our life experience. They inform us, as well as form us, through our interaction with their symbols and images. Stories are "congruent with the relational dynamic of an Indigenous paradigm" (Kovach, 2010b, p. 43). In this section, we dialogue about this significant aspect of education and learning.

Dilafruz Williams: I was born and raised in India, where my parents and community practiced and lived the oral tradition. As children, my siblings and I were not read to at home; instead, we were told stories orally, often passed on intergenerationally. Stories had tremendous evocative power. This reliance on oral storytelling fascinates me as I look back, since I also had formal schooling influenced by the British colonial legacy with English as the medium of instruction and text books that were British adoptions. Yet, my fundamental beliefs and values were carved through the daily rituals of Indigenous myths that encouraged imagination. Sacred rituals, myths, and stories were at the core of how one form of learning took place, even as I was torn between two cultures: one sort of emergent with its "forward" Western pull, another deeply embedded in knowing the inner self through place and a sense of sanctity for all life. I was taught to seek meaning from nature as she was considered to be a wise teacher. We "operated" under a different cosmology in traditional culture, where spirit and materiality were inseparable; humility rather than human arrogance was the norm. There was clearly a different ontology guiding how we lived and learned even as we were ensnared by the modern monoculture of decontextualized and homogenized education that formal schooling offered. Analogous to my experience growing up, in much of your writing on Indigenous education, you discuss the role of ritual, mythology, and the art of storytelling as a means for cultivation of relationship to one's inner self. In what practical ways do these encourage children and youth to "trust their natural instincts, to listen, to look, to create, to reflect and see things deeply, to understand and apply their intuitive intelligence, and to recognize and honor the spirit within themselves and the natural world" which, as you state, are critical to Indigenous understandings?

Gregory Cajete: As an integral part of the teaching/learning process, serious consideration for myth and story is rarely given in most modern educational contexts. Yet children thrive on the mythical perspective, and there is evidence that the expression of childhood creativity is primarily facilitated by a mythological perspective. Myths mirror truths through a unique and creative play on untruths and imagination. Within traditional Native American contexts, myth and storytelling are regarded as tools toward true understanding. They are a primal way of presenting realities and truths. Models of behavior, the significance of ritual, the basic realities of human existence, and natural creative processes are presented in this form of coded communication. Storytelling and experience form the foundation for much traditional Native American learning and teaching. Stories give focus to and clarify those things which are deemed important. Experiencing through watching, listening, feeling, and doing gives reality and meaning to important Native American cultural knowledge. Combining story with experience, Native Americans are able to achieve a highly effective approach to education, basic to life (Cajete, 1994, pp. 116–118).

Myths perform four basic functions. The first is to kindle and represent a sense of awe combined with the realization of relatedness of human beings to the natural world and the universe. The second is to represent or relate a mythical history of creation, how things came to be, and how a pattern of relationship or a perspective of the natural world was first established. The third function lies in the structuring and

representation of symbolically coded cultural knowledge. The fourth function revolves around the development of imagination and representational thinking as it involves living a myth through its reenactment and application of its precepts (Eliade, 1963, pp. 18–19). Through the process of telling stories, skills in listening, thinking, and imaging are creatively molded. Through experiencing, the skills of knowledge application, observation, and experimentation are enhanced. Myths offer a great diversity of expression among different Native American groups. Myths that have survived the test of time are often those whose message is both immediate and timeless, eternal realities as true in the present as they were at the creation of the myth. Myths can express their meanings through a rich and creative use of language in an oral tradition through the art of a storyteller.

Because many Native American myths relate the learner to paradigms of proper relationship to plants, animals, and all of nature, as well as to the consequences of a poor relationship to nature, they provide a place to begin a greatly humanized discussion of the general areas and underlying assumptions of modern science. Myths are themselves a holistic form of communication. They appeal not only to the intellect and imagination but also, through their enactment in song, dance, theater, oral recitation or art, to the entire human capacity for experience. Through myth, the Native American cultural relationship to the natural world is made to live in both mind and heart. In addition, myths provide a vehicle for explaining metaphysical realities and mindsets encountered that are extremely difficult to discuss or explain through any other means.

The importance of the mythological perspective is multidimensional. For instance, at one level myth, through the oral traditions of Native Americans, provides a way of communicating about nature that has seldom been surpassed by other modes of communication. Myths are used to transmit generations of "understandings" concerning the natural environment. Myth provides a way to explain and think about natural phenomena which goes beyond the mere physical description of the phenomena, a way to describe nature that combines actual observable physical characteristics with affective, psychological, and cultural perceptions. Northwest Indian cultural myths relate how a mythological being first taught them how to fish, the nature of the first fishery, and the way the people must relate to fish in order that they might perpetuate themselves and the fish upon which they are so closely dependent. Inherent in all Native American myths concerning the natural environment is a philosophy and the ethics guiding Native American behavior toward nature. The understanding, respect, and conservation of natural resources, the land and all of life, is reflected throughout Native American myth (Hughes, 1984, p. 5). For instance, there are Native American myths relating to the Earth Mother concept: These myths are universal among Native American cultures and include "Changing Woman" (Navajo), "Spider Woman" (Hopi), "Thinking Woman" (Keresan), "Sedna" (Inuit), and a host of other representations. Myths also provide a way to compare, contrast, or integrate two ways of perceiving natural realities, and in doing so stimulate real appreciation of the aesthetics of life. In the telling of stories, the content of myth and everyday reality are integrated within the content of the learner (Cajete, 1994, p. 196).

Dilafruz Williams: Oral traditions, such as mine and yours, have used stories for millennia to evoke a sense of place and a deep understanding of interconnectedness of all life. This also means connecting past with the present and encouraging imagination. Writing about orality, Kovach (2010a) explains that the conversational method and storytelling are used as a means for transmitting knowledge by upholding the relational and collectivist Indigenous traditions (p. 42). In India, too, Indigenous communities similarly pass on rituals, myths, stories, songs, dances, and drama, from generation to generation, orally. Knowledge of sacred groves, mangroves, or medicinal plants that were endemic was shared with a view to preserve health of place and people. There really was no universal formula on how to live unlike the present consumerist messages for conformity that pervade our lives. Diverse contexts required diverse responses and attentiveness. Interestingly, as Luisa Maffi (2001, 2005, 2007) and others have argued and shown, biological diversity and cultural and linguistic diversity are interlinked. We need to recognize and value the importance of biocultural diversity, to life. The cries of ecosystem fragility also call for a recognition of the harm of homogenization to cultural resilience. The problems of loss of diversity in language and perpetuation of monoculture emanate from dominant Western stories influencing our personal mind-sets and lives. We need to bring life to the center of the educational enterprise at an early age.

Gregory Cajete: Yes, the homogenized and sanitized stories of western monoculture are becoming pervasive throughout the world. In contrast, Indigenous storytelling engaged all levels of higher-order creative thinking and imagining capacities. Stories helped with developing fluency of metaphoric thinking and mythic sensibilities. Stories kept listeners aware of the interrelatedness of all things, the nature of plants and animals, the earth, history, and people's responsibilities to each other and the world around them. Storytelling, like myth, always presented a holistic perspective, for the ultimate purpose is to show the connection between things. Through the cultivation of hearing, understanding and insight were enhanced by the stimulation of the imaging capacity of the mind. Storytellers fulfilled a vital role in the continuity of not only the tribal culture, but of the mindset concerning people's relationship to the natural world. In this respect, the storyteller was the philosopher-teacher of tribal America. That the storyteller earned widespread distinction in Native American cultures is no accident. Traditional Native American storytellers were masters of the art of making stories real through a variety of rhetorical techniques, creative dramatization, and the skillful use of metaphor. The use of artistic symbolization, song, and dance were commonly employed by traditional Native American storytellers to add flavor and emphasis to their stories (Cajete, 1994, pp. 138–141).

In many respects, the role played by the storyteller is the forerunner of the more formalized and eclectic role played by the modern teacher today. Whether teachers realize it or not, every time they teach they are echoing an aspect of the storyteller's art. Storytelling, whether about science, history, social science, language, literature, or art, is an essential dimension of the teaching process. Teachers must continue to learn about and express their innate potential in this area. All stories have multiple

levels of meaning ranging from the very basic and straight forward to the complex and the metaphoric. Stories, especially those of the mythic variety, present philosophical, psychological, and ecological truths simultaneously. Such stories provide opportunities to analyze, explore, and develop new perspectives about Native American cultural knowledge of the natural world. There is an art to both the telling of a story and the facilitation of an experience. Both take practice. *Dilafruz Williams:* Our challenge is to give legitimacy to traditional stories. Margaret Kovach explains: "The nuances and complexities of an Indigenous paradigm may not be fully understood (or viewed as legitimate) by all members of the academy, but few would openly contest, at least in public spaces, that an Indigenous paradigm exists" (Kovach, 2010a, p. 42). In the context of contemporary education, we have to ask what metaphors are being used as a basis to shape and reform policies and drive educational practices? Often, market place analogies and business models are favored for their greater efficiency; these models are themselves predicated upon lifeless *mechanistic* metaphors that guide schooling as complex machines. Modernist educational orientations are grounded in: de-contextualization of learning, loss of curiosity for nature and its wonders, acceptance of mechanical and industrial scale, homogenization of curriculum and learning, privileging of abstract ideas, stimulation of only certain senses such as eyes and ears, and perpetuation of individualism and autonomy; these are incongruent with living systems. Founded upon mechanistic metaphors, contemporary educational reforms imagine schools as no more than complex machines and overlook the value of life itself. What is sorely missing is an understanding of the power of life-enhancing guiding metaphors, myths, and stories, as you have shared. How might their significance for connecting with nature and life be acknowledged?

Gregory Cajete: Creating a classroom environment in which the Indigenous foundation of storytelling and story-making might once again flourish is a creative challenge whose potential benefit far outweighs the effort required to bring it into being. Storying is a natural part of all learning and what is required is learning how to facilitate and guide its development in students. Indigenous education has always been characterized by a process of "co-creation" between teachers and students. The enablement of storytelling within the classroom is indeed a "co-creation" in which teachers and students learn the discipline of storytelling through constantly finding, or making, stories and telling them. Empowering the creative process of storying in both teacher and students requires nothing more than once again becoming conditioned for it. Just as a distance runner conditions themselves for running by increasing their distance a bit each month and maintaining a proper diet and a balanced schedule of work and recreation, teachers and students can condition themselves for ever-greater capacities for storying. The following groups of activities are some of the possible ways to bring the creative conditioning for Indigenous storying back into being. First, creating opportunities to be in Nature and partake directly from the natural sources of life and creativity; gaining a perspective of past, present, and future through selected stories of one's tribe and place; and recognizing and honoring our "teachers" that are with ourselves, in our relationships with others and the natural world. This triad represents the development of orientations and mindsets

which facilitate the deeper and more creative exploration of story. Second, cleansing our vision through letting go of preconceived notions and other personal or social attitudes that we identify as being obstacles in our creative process of storying; exercising our creative imagination through creating and discussing all kinds of stories; and learning to envision a story from all sides to gain an understanding of it in all its dimensions and practice the skill of thinking "comprehensively." This triad represents the basic kind of preparations needed to enhance the ability to comprehend a story with greater levels of clarity. Third, learning how to apply the lessons and understandings which come from storying to other learning and life experiences; learning the techniques of Indigenous storying making, story giving, and story getting all of which are centered in the social and interpersonal realm of community; and learning the communicative art of performing story in a variety of forms and settings which is the foundation of the participatory and celebratory experience of story. This triad forms the foundation for applying stories in an integrated experience of learning and teaching which is inclusive of other forms of art and educational content (Cajete, 1994, pp. 140–141).

Dilafruz Williams: In India, too, myths are grounded in symbolic images that have profound meanings. The lotus flower, for instance, symbolizes purity. One can think of similar symbols in the west, the most common being a dove symbolizing peace. The concept of "performing story" you mentioned earlier is a culturally specific ritual that can be linked with teaching and learning about culture. Among the Hindus, there are devotional dances, for instance. The celebratory aspect of stories connects well with our topic on eco-aesthetics. We can elaborate on this further in the next section on rituals and especially highlight what you mean by mythopoetics.

Mythopoetics and Ritual

Thinking and communicating "poetically" through the structures of myth is a natural expression of human learning. The tremendous influence of mythopoetic traditions becomes apparent when one tracks the rich array of oral forms used by traditional societies to their ancient sources. These traditions depended upon the spoken word for communication. Indigenous peoples through their use of various mythopoetic forms of communication applied strategies and orientations to learning that are important to revive and nourish in today's education. Mythic poems were ritualized, performed, sung, or recited using a particular system of rhythmic structure which in turn required the application of creative and imaginative thinking processes and learning capacities. In this section, our conversation turns mythopoetics and rituals.

Dilafruz Williams: In the opening ceremony at the *Carleton University Institute on the Ethics of Research with Indigenous Peoples*, John Medicine Horse Kelly (2016) reminded all that "(f)or a long time society has asked us to learn their way. Now the time has come for you to learn our way." Rituals have been a significant aspect of my upbringing in India where we were raised to become conscious about the more-than-human world, in fact a cosmocentric world. Could you elaborate on rituals and symbolisms with some examples of how they encourage learning the

Indigenous way and developing a sense of eco-aesthetics? Given the disembedded and disembodied modern sensibility, we need to reconceptualize a new ontology, one where children and adults are seen as relationally constituted. Indigenous ontology provides insights here. The hierarchical and dominant role played by modern humans, as we have stated, arises from the fact that they are disconnected from nature. We need an alternative language, a different ontology. We need to understand the links among cultural diversity, linguistic diversity, and biological diversity as these are intricately intertwined. The challenge is that Indigenous perspective and knowledge systems cannot simply be imported into Western ontologies; they are highly contextual with integration of learning and living.

Gregory Cajete: The complex rituals associated with the growing of corn and the coming of rain in Southwestern Pueblo groups illustrate not only an ecological ethic, but also an understanding of the Pueblo relationship to the natural entities and the land itself. Every tribal group evolved their knowledge of nature around the central theme of humans as part of their environment, not its master. The so-called totems and spirits with which all Native Americans symbolized their relationship to their world have often been misunderstood. In reality the ecological relationships, the sacredness of nature, and the constant "seeking of life" are underlying mindsets focused upon in Native American ritual. Fetishes and other paraphernalia which are present in many Native American rituals were highly respected because they were symbols that represented the sacredness of the various forces of nature (Cajete, 1994, pp. 153–160). In general, Native American concepts of nature were not meant as explicit explanations of natural processes as are concepts in Western science. Rather, concepts such as animal or plant spirits, benevolent or malevolent forces of nature, and the mythological or ritualistic symbolic representations of nature were symbolic representations of essences and relationships which Native American groups have come to understand through generations of experiences within a given natural environment. These concepts and symbolic representations reflected a highly evolved resonance, a feeling for the natural environment which Native Americans shared so intimately that it was commonly accepted that it was possible for humans and other living and natural forces to communicate with and affect each other through their interdependencies and reciprocal relationships (Hughes, 1984, p. 28). As Hughes (1984) explains: "The Indian view of nature comes from deeper inside the human psyche than mere rational thought or intellectual curiosity, although Indians certainly have these too. But Indians regarded things in nature as spiritual beings, not because they were seeking some explanation for natural phenomena, but because human beings experience a spiritual resonance in nature" (p. 16).

Because of this resonant relationship with nature, Native American tribes developed ritualistic expressions around the recognition, celebration, and evocation of mutualism with the natural environment. Whether it was a Pueblo "Rain Dance," the hunting of game, the planting of corn, or the healing of the sick, Native American rituals sought to maintain the harmony of these relationships and through this "seeking of life" gained a glimpse of the sacred whole of which they were a part. Native American ethics concerning the natural environment were geared toward the preservation and perpetuation of all life. Everything in nature was imbued with a

spirit which was a part of the "Great Mystery" and, therefore, was also a part of oneself which had to be respected (Hughes, 1984, pp. 2–3). The "Great Mystery" breathed life into everything; therefore, all natural phenomena had the power to affect everything else. This was especially true for such elements as wind, water, fire, lightning, the sun, moon, stars, and certain birds, animals, and plants. In addition, everything in nature was viewed as having intrinsic value and therefore could not be exploited simply for the sake of exploitation without dire consequences. Traditionally, this understanding of mutual interrelationships was not merely a philosophical concept. Native Americans lived this interrelationship in their adaptation and interaction with the natural environment. In short, Native American cultural sciences were sciences based on experience and a high level of sensitivity and intuitive insight which is only now being explored in modern Western scientific philosophy.

Dilafruz Williams: In the context of eco-aesthetics, how do indigenous mythopoetic traditions provide guidance for our modern times?

Gregory Cajete: The tremendous influence of mythopoetic traditions on the development of global childhood education becomes apparent when one tracks the rich array of oral forms used by traditional societies to their ancient sources. These traditions depended upon the spoken word for communication rather than the visual word which dominates modern education today. Globally, Indigenous Peoples, through their use of various mythopoetic forms of communication, applied strategies and orientations to learning that are important to revive and nourish in today's global education (Rothenburg, 1985). Modern people, for the most part, have become "mythically blind" and suffer all the consequences stemming from such a "handicap" because their natural poetic sensibility has been "schooled" out of them.

Thinking and communicating "poetically" through the structures of myth is a natural expression of human learning which has been evolving for the last 40,000 years. Mythopoetic orientations are apparent in most children before they learn how to read. Indeed, children at this "illiterate" stage of their life show amazing metaphoric thinking and storying skills reflecting their natural poetic nature. In modern education's mad dash to make children (and for that matter Indigenous people) literate, it fails to recognize or honor a powerful dimension of a natural human way of knowing and understanding. The hidden message is "stop being children and stop being Indigenous." It is ironic that today so many modern people lament the loss of this primal human sensibility and strive in so many ways to recapture it through participation in some "thing" creative, Indigenous, or mythological (Cajete, 1994, p. 131).

Print, literacy, and the *written* story are very recent developments in human history – even in the history of Western societies. They, never-the-less, evolved from "illiterate" mythopoetic roots which cannot be denied in spite of the negative connotation that Western "civilized" cultures have promoted with regard to "illiteracy" as a sign of being uneducated, uncivilized, and primitive. The study and honoring of oral traditions and "orality" in children offers essential insights into the nature of natural learning. The human "oral" orientation to education offers techniques as well as windows into the world of Indigenous education. A better understanding of oral-based learning revitalizes old yet highly effective techniques

for learning while opening up new dimensions which have been forgotten or have become dormant with the development of the *printed* word, *literacy*, and modern education's focus on making everyone *literate* (Egan, 1987).

Dilafruz Williams: What then was the nature of the mythopoetic tradition and why must it again become an important element of childhood education?

Gregory Cajete: Mythic poems were performed, sung, or recited using a particular system of rhythmic structure which in turn required the application of a different set of thinking processes and developed a different kinds of learning capacities than today's modern schooling. The Aztec tradition of "flower and song" is one Indigenous example of a mythopoetic tradition of education in which teaching, learning, and reflection were founded upon chanted stories, poems, or prayers. The Aztec poet, philosopher/priest, would compose poetic storied chants or teach the divine songs, the mythic tales, and poetic verse which embodied the essential thoughts and content of Nahuatl religion and philosophy. He would then chant these stories and poems to students who would reflect on or internalize the essential messages which they contained. Later, as they became experienced in this oral system, students would compose poetic chants of their own to present to each other and their "tlamatinime," their poet-teacher. In essence, the "flower" was the thought, the feeling, the insight, the wisdom, and knowledge that was considered of importance as a teaching. The "song" was the vehicle which transported and transformed the "flower" of knowledge and made it live through the breath of the chanter and in the hearts of the listeners (Portilla, 1963, p. 140).

Indigenous mythopoetic traditions are essentially educational. Indigenous mythopoetic perspectives were founded upon an awe for the "*Great Mystery*" (that unknown spirit that permeates and animates everything, everywhere); the development of a strong, wise, and pure heart; an abiding respect for one's tribe, traditions, and law; and deep sense for the relationships and connections between all things. Tribal myths transferred these basic teachings through enlivened images and metaphors which embodied an expansive view of people in relationship with each other and a multiverse full of potential and possibility. Tribal myths encompassed every "thing" within a context which was spiritual yet irreverent, serious yet humorous, logical yet illogical. The messages conveyed through these stories had the power to heal and bring resolution to conflicts because, at its core, *poetry* illuminates, transforms, and mirrors the heart and soul of both the individual and the People. The presentation of these messages went beyond just words to include sounds, dance, music, games, gesture, symbol, and dream. In this way, thoughts, teachings, and emotions were amplified. Every word, every act, had meaning and energy. This allowed specific Tribal myth and poetry to become part of a larger context of situation and human expression, thereby making the presentation of myth and poetry a true expression of the "sacred" breath within humans and all living things. The mythopoetic realm of teaching and learning is not a relic of the past as might be construed from the designation of the arts and theater in the curricula of so many American schools. Rather, it is an educational necessity for enabling the kind of "new" imagination so desperately needed in today's sterilized and homogenized approach of modern education. Modern educators must admit to the fact that

non-European, traditional cultures around the world exhibit a level of complexity and sophistication of thought which equals and many times surpasses modern perceptions of what it means to educate. Many ingrained modern biases and preconceptions of the "primitive" which have been conveyed and conditioned through the hidden curriculum of modern education must be examined. This is especially true of the mythopoetic traditions of Indigenous America. The negative connotations associated with the word "primitive" must give way to a more enlightened understanding of the complexity and richness of "primal" traditions of myth, poetry, and storytelling.

In contrast to the usual conditioned modern perceptions of "*the primitive*," oral traditions and Tribal art forms are as individually oriented as they are collectively determined and contexted. It is a fallacy that traditional cultures and their oral traditions do not change, or that creative self- reflection is not a part of the traditional formula. I am not naive to think that orality alone defines Indigenous thinking. Indigenous oral traditions have always been integrated with drawing, arts, and practical education. It is the perpetuation of injustice to think that Indigenous people have not reflected equally as hard about the nature of language, myth, art, culture, aesthetics, ethics, and philosophy as Western scholars. If anything, the mythopoetic traditions of Indigenous people reflect that in reality there is no such thing as "primitive" in the way in which Western education has traditionally conditioned people to perceive it. The tendency of Western education to divide myth and poetry from music, dance, and relationship to nature, community, spirituality, history, and even politics reflects an illusion of Western thinking (Cajete, 1994, p. 133).

Dilafruz Williams: In the following section, we can highlight how art serves to advance creative expression.

Art and Expression

The human "need" to express through art has its roots in the deep reaches of hunter/gatherer origins. Art, as a human thinking and expressing process, is intimately connected to human consciousness. As a facet of such a "consciousness," Indigenous art presents a reality that is at once specifically unique, yet humanly universal. In addition, the process and product of Indigenous educational philosophy is intimately expressed through the various Indigenous art forms, a unique way of perceiving the world. Expression of Indigenous art presents what is inherently real about the Indigenous experience and understanding of the world – past, present, and future. Indigenous arts show the possibility, the many different "windows" from which to view the world, and each window, and the doorway which accompanies it, opens upon another possibility of human experience which has an equal level of validity. In this section, we explore these connections.

Dilafruz Williams: In your writings, you have shown how Native art is not done for mere individual expression. Rather, art such as pottery, sculpture, carving, clay painting must have context and are cultural expressions. For instance, sand-painting

is a ceremonial art tradition among many cultures, where meaning emanates from its ritualistic and performative context. In India, I grew up learning to make colorful patterns, known as "rangoli," on the earthen floor especially in courtyards. This art was not done alone; it was a collective undertaking mostly made by girls and women as a form of celebratory art, with motifs and patterns passed on from generation to generation. Rangoli is still a vibrant floor art (Tadvalkar, 2015, p. 173). If you were to visit India during certain festivals such as Diwali or Pongal, you would find the decorations widespread. It comprises often of geometric designs, floral and animal designs, agricultural motifs, or impressions of deities. Colored sand, red brick powder, vermillion, turmeric, and other natural colors and dyes are used along with the foundational white powder which is often pounded rice or wheat flour. Flower petals are also used. Usually rangoli as art captures the flora and fauna of the local region; thus, the artistic renditions are often place-specific. The art is impermanent. The materials used are compostable. But more importantly, the art of rangoli is ceremonial and ritualistic (Tadvalkar, 2015, p. 180). Art evokes deeper meanings, as you have eloquently captured over the years. Totem poles are packed with meaning. How does Native art emerge from and develop relational sensibility? In what ways does this art represent lived experiences along with "holistic view of life and cosmology through symbols that convey a deeper meaning of culture, honors traditions," as you write. And how does this relate to Indigenous peoples viewing themselves as part of nature, not apart from it?

Gregory Cajete: Traditionally, there was no specific word for "art" in Native American languages. Native American cultures viewed the creation of art as a natural way to communicate their perceptions of nature and their feelings and interrelationships with different natural entities within their environment. Familiar images within nature were incorporated into designs of Native American art. Nature provided the Native American artists with inexhaustible content for creative expression. All Native American art forms – from pottery, jewelry, and weaving, to stone sculpture and architecture – provided mediums for expressing their maker's perception of natural phenomena. Clouds, birds, animals, fish, wind, water, sun, moon, insects, plants, and spirits represented mutual relationships among all things. Each traditional art form required the learning and mastery of particular types of technology. For instance, certain forms of pottery such as that of the Rio Grande Pueblos of New Mexico require great skill and a substantial knowledge of the nature of various kinds of clays, slip and pigmentation characteristics, preparation and firing techniques. Weaving, basket-making, and architecture all required great skill and a high level of knowledge of the nature of the materials used. Expressions of "resonance" with the natural world required the application of material technology, creativity, and problem-solving skills, with the same kind of processes used to calculate, for instance, the movements of the sun and moon, the development of healing techniques, and successful hunting practices, all of which required the application of a basic understanding of natural entities.

Dilafruz Williams: We have been discussing Indigenous perspective in its own rights, not to champion it to fit into other ontologies. Given that we are addressing learning and eco-aesthetics what would you say to posthumanists? To those who

might want to indigenize the Anthropocene? How would your perspective/ontology fit with contemporary science, technologies, arts, theory?

Gregory Cajete: From my perspective, posthumanists can learn a great deal from Indigenous thought which focuses on the imperative of human relationship with and participation in the life processes of the natural world. Indigenous education must be seriously studied. Educating and enlivening the inner self in participation and resonance with the natural world is the primary imperative of Indigenous education embodied in the metaphor, "seeking life." Inherent in this metaphor is the realization that ritual, art, myth, vision, and learning the art of relationship in a particular environment is what ultimately facilitates the health and wellbeing of individual, families, and communities. Education for wholeness, by educating for a level of harmony between individuals and the natural world, is an ancient foundation of educational processes for all cultures (Cajete, 1994, p. 209).

Dilafruz Williams: You have developed a detailed foundational perspective of Indigenous education and learning, in *Look to the Mountain: An Ecology of Indigenous Education* (Cajete, 1994). Within the context of our discussions, it would be fitting next to elaborate on this perspective and how a sensibility for an interconnected view of childhood and nature might emerge.

Indigenous Education

In this section, we describe the cultural and life-sustaining process of Indigenous education as we develop insights into the community of shared metaphors and understandings specific to Indigenous cultures yet, reflective of the nature of human learning as a whole. In essence, an exploration of traditional Indigenous education is an exploration of nature-centered philosophy. Traditional Indigenous education is an expression of environmental education par excellence. It is an environmental education process which can have a profound meaning for the kind of modern education required to face the challenges of living in the world of the twenty-first century. It has the potential to create deeper understanding of the collective role as "caretakers" of a world which we as modern humans have been largely responsible for throwing out of balance.

Gregory Cajete: The legacy of the traditional forms of American Indian education, for instance, is significant because it embodies a "quest" for self, individual, and community survival and wholeness in the context of a community and natural environment. Indigenous education is really "endogenous" education, that is, it is an educating of the inner self through enlivenment and illumination from one's own being and the learning of key relationships. Therefore, the foundations for Indigenous education naturally rest upon increasing awareness and development of innate human potentials through time. Based on this orientation, American Indians and other Indigenous groups used ritual, myth, customs, and life experience to integrate both the process and content of learning into the very fabric of their social organizations thereby promoting wholeness in the individual, family, and community.

Dilafruz Williams: In your writings on traditional forms of Indigenous education, you have made a case for seven foundations of education that are intimately interrelated. You write that they relate to each other in such a way that exploration of any one foundation can guide you into the very heart of the Indigenous education experience.

Gregory Cajete: Extending the metaphor of environmental orientation and process inherent in the sacred directions to education, we may speak of seven elemental yet highly integrated kinds of thought that form the foundations on which the vehicles and contexts of Indigenous education rest (Cajete, 1994). These orienting foundations may include the Environmental, the Mythic, the Artistic, the Visionary, the Affective, the Communal, and the Spiritual. In traditional life, these foundations are so intimately interrelated that they act relativistically at all levels of their expression. In every sense, they contain each other in such a way that exploration of any one foundation can take you into the very heart of the tribal education experience. However, a complementary balance occurs in the interplay of these foundations. This balance can be illustrated by the interaction and interpretation of foundations that play within the environmental and spiritual fields of experience. An ebb and flow of interactive realities characterizes the play among these foundations of education. Dilafruz Williams: Providing an in-depth description of each of the seven elements will show how aesthetics also comes into play in Indigenous education. You have written that these elements are like the living stones, the *Inyan* (a Lakota term), that animate the expressions of Indigenous education. Here, you could highlight your observations about the sacred view of nature, and how, in your view, interrelatedness and reciprocity are essential to framing education.

Environmental Foundation

The Environmental foundation forms a context through which the tribe observed and integrated those understandings, bodies of knowledge, and practices resulting from direct interaction with the natural world. This foundation connects a tribe to its place, establishing the meaning of tribe members' relationships to their land and the earth in their minds and hearts (Cajete, 1994). To say that American Indians were America's first practical ecologists is a gross simplification of their deep sense of ecological awareness and state of being. The environmental foundation of tribal education reflects a deeper level of teaching and learning than simply making a living from the natural world. For American Indians, as with other nature-centered Indigenous cultures around the world, the natural environment was the essential reality, the place of being. Nature was taught about and understood in and on its own terms. Relationship and its expressions in all aspects of life formed the basis for a profound process of education. Based on the environmental foundation of tribal education, tribal people and their environment established and perpetuated a mutual and reciprocal relationship. Nature was used for sustenance; however, the use of material technology was elegant, sophisticated, and appropriate within the context of traditional society (Cajete, 1994).

Mythic Foundation

The Mythic foundation rests on the archetypal stories that describe the cosmology in the language and cultural metaphors of a tribe. This foundation explores the guiding thoughts, dreams, explanations, and orientations to the world. In short, this foundation represents the tribe's worldview and, through the process and structure of storytelling, presents the script for teaching, learning, and participating in the stories that guide a people. Ultimately, all education is the expression of some sort of storytelling, as we discussed earlier.

Visionary Foundation

The Visionary foundation rests on the deep psychological and spiritual experiences at the individual level that lead to or result from a tribe's practices, rituals, and ceremonies. Such practices and contexts provide a framework for individuals and groups to teach and learn through exploring their inner psychology and their collective unconscious. American Indians applied the visionary foundation to directly access knowledge and understanding from primary sources deep within themselves and in the natural world.

Artistic Foundation

The Artistic foundation contains the practices, mediums, and forms through which we usually express the meanings and understandings we have come to see. Art allows us to symbolize knowledge, understanding, and feelings through image, thus making it possible to transcend a finite time and cultural wrapping. Art itself becomes a primary source of teaching because it both integrates and documents a profound process of learning. Art was such an integral part of American Indian life that the various Indian languages have no words that translate exactly to mean Art. The closest direct translation to English refers to making or completing. The Artistic foundation also acts as a bridging and translating foundation for the Mythic and Visionary foundations. That is, the Artistic mediates the other two.

The Mythic, Visionary, and Artistic foundations form a natural triad of tools, practices, and ways of teaching and learning that, through their inter- action and play, form a fourth dimension for deep understanding of our inner being. Remembering the metaphor of the Sacred Twins, we may say that this triad of foundations springs forth from the twin that represents the teaching, learning, and innate knowledge of our inner self. It might be called the Winter Twin or the deeply inward aspect of Indigenous education.

Affective Foundation

The Affective foundation of tribal education forms a second context that contains the emotional response to learning, living, growing, and understanding in relationship to

the world, ourselves, and each other. This is the foundation in which we establish rapport with what we are learning and why we are learning it. It reflects the whole gamut of our emotion as it relates to the educational process. It is the seat of our primary motivation and the way we establish personal or group meaning for our learning. It is the foundation through which we cultivate our intention, choice, trust, responsibility, and heart for learning. And like the Artistic foundation, the Affective foundation acts as a bridge between the environmental and communal foundations. It mediates our feelings for our place and our community. For American Indians love for one's land and people have always been a primary motivation for learning and service to one's tribe.

Communal Foundation

The Communal foundation forms a third context containing the responses and experiences that reflect the social and communal dimension of tribal education. The life of the community, as well as the individuals of that community, is the primary focus of tribal education. The community is also the primary context – through the family, clan, or other tribal social structures – in which the first dimensions of education unfold for all human beings. All humans after all are social animals who depend on each other directly not only for their mutual survival but their identity. The Communal experience is the seat of human cultures; as such, there is not one thing in human life that it does not influence. The Communal experience and the inherent process for teaching and learning in tribal cultures are tied through history and tradition to some of the oldest and most instinctually human-contexted mediums of education. The structure, process, and content of teaching and learning resulting from traditional American Indian tribal and communal experience were and continue to be inherently human, highly contexted, situational, highly flexible, and informal. Learning and teaching are going on at all times, at all levels, and in a variety of situations. For American Indian tribal education, the community was and continues to be the schoolhouse.

Spiritual Foundation

The Spiritual orientation of tribal education may be considered as both a foundational process and field through which traditional American Indian education occurs. For Indigenous peoples, Nature and all that it contains formed the parameters of the school. Each of the other foundations of tribal education is exquisitely complex and dynamic contexts through which a kind of thought develops from a unique yet creative process of teaching and learning. The Affective, Communal, and Environmental foundations form the other triad of tools, practices, and way of teaching and learning that complements the understanding of the first triad. This might be called the Summer Twin or the highly interactive and external dimension of Indigenous education. In traditional American Indian life, the context in which these foundations interact is the Spiritual-Ecological, the seventh orienting foundation of knowledge

and process. It is the Spiritual that forms not only the foundation for religious expression but the ecological psychology that underpins the other foundations. A value many American Indian people share is that they must preserve their stories, languages, customs, songs, dances, and ways of thinking and learning because they sustain the life of the individual, family, and community. The stories in particular integrate the life experience and reflect the essence of the people's sense of spiritual being through time and space. For the mythic stories of a people form the script for cultural processes and experience. Culture is the face; myth is the heart; and traditional education is the foundation for Indigenous life. And all cultures have Indigenous roots that are bedded in the rich soil of myth from which the most elemental stories of human life spring.

Conclusion: Look to the Mountain

Dilafruz Williams: To conclude, our conversation leads me to my cultural reminder that myths, stories, performances, and the art are all about engaging relationally whereby we learn more about ourselves in the process. It would be appropriate to conclude this conversation with one of your art creations. Perhaps you could shed light on how this art weaves the concepts you have elaborated upon here. As well, do you have some final thoughts that can summarize the topic related to eco-aesthetics and learning?

Gregory Cajete: Environmental relationship, myth, visionary traditions, traditional arts, tribal community, and Nature-centered spirituality have traditionally formed the foundations of American Indian life. These elements formed a context for discovering one's true face (character, potential, identity), one's heart (soul, creative self, true passion), and one's foundation (true work, vocation), all of which lead to the expression of a complete life. A primary orientation of Indigenous education was that each person was in reality his or her own teacher and that learning was connected to each individual's life process. One looked for meaning in everything, especially in the workings of the natural world. All things of Nature were teachers of humankind; what was required was a cultivated and practiced openness to the lessons that the world had to teach. Ritual, mythology, and the art of storytelling combined with the cultivation of relationship to one's inner self; individuals used the family, the community, and the natural environment to help realize their potential for learning and a complete life. Individuals were enabled to reach completeness by being encouraged to learn how to trust their natural instincts, to listen, to look, to create, to reflect and see things deeply, to understand and apply their intuitive intelligence, and to recognize and honor the spirit within themselves and the natural world. This is the educational legacy of Indigenous peoples. It is imperative that we revitalize its message and its way of educating for life's sake at this time of ecological crisis (Fig. 1).

To bring a metaphoric kind of closure to our conversation, I would like to offer an image (Fig. 1) that I believe conveys the spirit of our dialogue about eco-aesthetics, learning, and the hopes for the education of all future children. As an artist, I like to

Fig. 1 *Asking*. (Painting by Gregory A. Cajete)

explore my concepts and ideas about Indigenous education through artistic images and constructions that convey the essence of an insight that I think is important. One such image is the painting that I used on the cover of my first book, *Look to the Mountain: An Ecology of Indigenous Education.* This acrylic painting is inspired by the tradition of Huichol Indian yarn painting and represents the first act in the journey toward understanding, that of *Asking*. Looking to the "inner" form of an archetypal mountain, the human form *asks for and receives understanding,* with the trickster, in the form of a spider monkey, and four *kokopeli* witnessing the vision of understanding. As the *flower and song* of the human touches the face of the Great Mystery, the human connects to a great *Rainbow of Thought and Relationship* which brings illumination and true understanding of *the ecology of relationship* and the inherent truth that *We Are All Related!*

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CineMusicking: Ecological Ethnographic Film as Critical Pedagogy

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Michael B. MacDonald

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Abstract

CineMusicking, a portmanteau of Cinéma vérité and *Musicking*, is an ecological approach to digital ethnographic filmmaking for music research and teaching in critical youth studies. The methods of CineMusicking were developed as a way of undertaking research about ecologically embedded lived personal experience. This method makes use of Gregory Bateson's work on ecology as it was developed in ethnomusicology by Christopher Small and, in a separate development, biosemiotics. The goal of this method is to explore the coupling and subsequent formation of individual consciousness and culture within a semiosphere-biosphere matrix, what I call *the matrix that embeds*.

I will show through discussion of the production of three of my original ethnographic films *Megamorphesis*, *Letters to Attawapiskat*, and *Pimachihowan*, that ecological ethnographic films made with youth can co-create an ecological aesthetic education with the potential to be deeply transformative for themselves, their schools, community, and environment.

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Introduction

CineMusicking, a portmanteau of Cinéma vérité and *Musicking* (Small, 1998), is an approach to ethnographic film production as a form of ecological critical pedagogy. Cinéma vérité was developed by ethnographic filmmaker Jean Rouch and made possible by portable sync-sound film cameras and by "deliberate intrusion" (Heider, 2006, p. 31) into a social world by filmmakers. Musicking was formulated by ethnomusicologist Christopher Small, building on Gregory Bateson's *Steps to an Ecology of Mind* (1972). Small recognized in Bateson a new way of thinking about the study of music, one that is based in an ecological orientation. Small argued that music is not a noun, but a verb – a system – and the notion that music is a noun has gotten in the way of a proper understanding of musicking as an ecological system *within* systems. This reorientation follows Bateson's definition of ecology as the study of an organism in its environment and provides a new way of studying the role of music in youth culture. For a relational ontology of consciousness, I turn to Jean-Paul Sartre's *existentialism*, for a relational ecological ontology of the body and community I turn to biosemiotics, and for community-based method that help make explicit these implicit processes, I use Paulo Freire's *critical pedagogy*. By doing this I am able to provide a systematic framework for the filmic study of music in ecology that does not exclude either the prepersonal or the biosphere. CineMusicking forwards an ecological existentialist ontology and ethic for the production of educational ethnographic film about music cultures, and "Rouch's technique of showing people reacting to their own images has rarely been followed up in any systematic way" (Heider 2006, p. 32).). CineMusicking utilizes biosemiotics as a way of getting above the culture/nature binary, where endo- and exosemiotics joins science and social science together in a joint program with the potential to contribute a rich interdisciplinary starting point for the study of *the matrix that embeds*.

CineMusicking

The methods of CineMusicking began when trying to communicate my hip-hop research with the inner-city youth with whom I was working. After 5 years of close contact at an inner-city drop-in program, the youth no longer wondered why a professor sat among them. But I was also aware that despite my explanations, I could not communicate the uniqueness occurring in this particular hip-hop cypher. In my book, *Remix and Life Hack in Hip Hop* (2016), I explored the production of an aesthetic system that produced hip hop as well as hiphoppas. I worked with youth to write histories, interview long-time hiphoppas, to document the operation of the hip-hop cypher, and finally to theorize the production of subjectivity within this

system. The youth, however, were not going to read my book, nor was it written for them. I decided to bring in a video camera and to make a film about the work I was doing with them so that I could show them what I saw, that the hip-hop cipher is an existential situation, and that it shared with Paulo Freire's culture circle, a pedagogical goal. On the first instance of filming, I set the camera and posed a question: "Who is more powerful, your civilian self or your hiphop self?" The youth required no further explanation; they had all developed a hip-hop self; Daniel was DNA, David was ViceVerser, Andre was Dre Pharoh, and Mike was Eflow. In each instance, they articulated the moment or moments where another self was brought into being. They did not require a master class on existentialism to know that "existence comes before essence" (Sartre, 2007) and that the existential situation is "self-making-in-a-situation" (Fackenheim, 1961, p. 37). Nor did they need to be told that "freedom is acquired by conquest, not by gift" (Freire, 2000, p. 47), nor that they are living in a time that treats youth as "disposable" (Giroux, 2011, pp. 89–107). They had already learned that "concrete thought must be borne from praxis" (Sartre, 1963, p. 22) and had been learning to live hip hop – learning to write and spit rhymes – in ways that would help them critically understand and play a role in shaping the ecology of the city in which they live. Hip-hop practice contributes a pedagogy of freedom located in the knowledge of the "unfinishedness of the human condition" (Freire, 2001, p. 66) and their capacity to self-create (Fig. 1).

On the second filming day, I arrived with two cameras and recorded the culture circle and cypher described in my article "Cipher5 As Method" (MacDonald, 2016b). With Diana Pearson operating the second camera on a tripod, I moved around the circle with a handheld camera (Fig. 2). I edited both of these days of filming into one film called *Megamorphesis*; the title comes from the song written by

Fig. 1 Megamorphesis. (Michael B MacDonald Films)

Fig. 2 Megamorphesis. (Michael B MacDonald Films)

the young hiphoppas during the filming. My co-facilitator Dre Pharoh (Andre Hamilton) rapped the chorus:

> From my mind to my mouth
> From the mic, to the mixer
> From the amp and the speaker
> It's in the air and it hits ya
> Ya, Megamorphesis gets ya
> Open your mind and let me paint a mental picture

Upon completing the film, I showed it first to only the young hiphoppas along with friends and family they invited. Given that they had previously showed little interest in my scholarly work, I was surprised that so many arrived at the university theater that night for the screening. The lights went down and the opening thump of the title song cut through the speakers. The youth began cheering, hollering back and forth, laughing and loving each other. There they were, larger than life on the screen. After the film ended and the lights came back on, we were all changed. They saw the point of my research for the first time and understood why we had created the circle. They also witnessed the power of ethnographic film as a pedagogical force. They were able to engage in a recursive conversation about themselves. They could see themselves both in the particular, the general, and in an ecology: as individuals telling their own stories, as hiphoppas who are members of the global hip-hop culture, and as bodies interacting in a space. Ethnographic film provided a way to create what Paulo Freire called *Situations* (Freire, 1974/2013, pp. 58–80). The Freirean method of critical pedagogy:

> Links together our existential situations in life with conditions of consciousness, and provides a possible explanation for how both become what they are. In other words, Freire helps

> think through that many of our existential situations are in part the result of a consciousness that has been shaped by a particular process – education. All three – existential situations, consciousness, and education – are inextricably bound. (Shudak & Avoseh, 2015, p. 464)

After this initial screening, I began to take the film to a wide variety of places including university classrooms, community centers, research centers, and film series. Each time I screened the film, the conversation that followed was rich and penetrating. Discussion always began with the feeling of proximity that the film created for the viewer, the feeling of being there. And then moved outward to think about the social situation of the youth, the environments in which they live, and the potency of their struggle. In the depths of each conversation, I saw more and more clearly how powerful, and ecological, the film situation can be.

A few months passed and in the news, alarming stories of youth suicide at the Attawapiskat First Nation in Northern Ontario, Canada, began to circulate. The members of Cipher5 decided to organize a letter writing initiative, to send personal letters to Attawapiskat youth. Dre reached out to me to return with my camera. This time the youth themselves decided what the film needed to be. Together we made *Letters to Attawapiskat*, a film that explores the ongoing hurt of colonization, intergenerational trauma, and the role of the hiphoppas and of hip hop in creating a new civilization (Fig. 3).

I began screening *Megamorphesis* and *Letters to Attawapiskat* together. The films feature inner-city youth speaking about their understandings of the world and the role of hip-hop music in their lives and in the lives of those they know, and they also speak about the ways that they see themselves nested in a complex and sometimes predatory ecology. This new civilization is not a small matter. In many ways Cipher5's new civilization is an ecological critique that locates aesthetics and

Fig. 3 Letters to Attawapiskat. (Michael B MacDonald Films)

healing, not reason and conscious purpose, at its center. While Bateson was among the first to talk about the transformative healing power of an ecologically embedded ethico-aesthetics, he did so as an antidote to the ecological degradation caused by conscious purpose, a consequence we are now calling Anthropocene.

Predatory Anthropocene

The negative consequences of conscious purpose can be seen in the emergence of the concept Anthropocene which has come to describe the Earth's current geological epoch (Steffen et al., 2015) (This has been dealt with in more detail in my 2016 book *Playing for Change: Music Festivals as Arts-based Community Learning and Development*.). And while it seems that what we thought we knew about the environment has all been thrown into doubt, I want to illustrate that the narrative that is emerging about the Anthropocene is problematic or at least not fully formed. If we undertake a political economy of the Anthropocene, it becomes evident that the so-called Great Acceleration that began in the late nineteenth century has introduced an epistemic-ecological illness that is ecologically predatory. It is essential to begin our discussion of environmental aesthetic education on this very shaky ground in order to first face up to the impact of conscious purpose, before we can introduce a biosemiotic aesthetic education capable of challenging the aesthetic subjectification that continues to contribute to predatory Anthropocene.

Anthropocene is defined by human action that is, for the first time in the history of the planet, having a direct impact on climate and the environment. This impact marks the conclusion of the geological epoch called Holocene that lasted 11,700 years and included the entire evolutionary history of human civilization. Particularly striking evidence was forwarded in Steffen et al.'s (2015) "The Trajectory of the Anthropocene: The Great Acceleration." They showed that rising rates of 12 human systems mapped directly onto 12 earth systems, and these increasing rates of impact began after the Second World War (Source: International Geosphere-Biosphere Programme http://www.igbp.net/globalchange/greatacceleration.4.1b8ae20512db692f2a680001630.html).

The Great Acceleration was the expansion of socioeconomic activity turbo charged by increasing resource use that created new technologies that further expanded rates of consumption. This was a celebrated new socioeconomic phase that was supposed to lead to full employment and a bright future for all. It was also the beginning of a next phase of the capitalist world-system accelerated by increasing urbanization. By 2008, humanity officially entered a new urban phase where 50% of the earth's population lives in urban spaces. John Bellamy Foster, York, and Clark (2011) argued that capitalism has produced an ecological rift caused by a core of the capitalist world-system out of step with ecological resources and its system thresholds (Particularly concerning is of course the carbon dioxide limits, and this is much discussed. But more concerning are some of the other earth systems like nitrous oxide, methane, ocean acidification, and coastal nitrogen. We are not having

a public discussion about the correlation of these systems nor the possible impacts that may arise from breaching their limits.).

The Great Acceleration produced a staggering amount of wealth that benefitted a very small percentage of people. In 2010, OECD countries had 18% of the earth's population but accounted for 74% of GDP. But it is reported that only 0.1% controlled this vast wealth. This is illustrated in the 2015 Oxfam-released Working for the Few (https://www.oxfam.org/en/research/working-few), a terrifying document that shows "almost half of the world's wealth is now owned by just one percent of the population," that "the bottom half of the world's population owns the same as the richest 85 people in the world," (2) and that this already extreme economic disparity is getting worse. So, while it is clear that everyone will be impacted by the implications of Anthropocene, its causes and the economic value that emerges from these impacts are not equally shared. A new form of ecological inequality has developed (As I have discussed elsewhere (MacDonald, 2016a, b), social scientists already know that human impacts on the earth are not equally disseminated across the globe and locations of resistance often located in capitalism's periphery are beginning to emerge. While environmental scientists study environment impacts, and environmental studies and environmental activists politicize governments and society to these impacts, social scientists from within a critical theory or cultural studies tradition have an opportunity to talk about what Niklas Luhmann calls "ecological communication" (1989). Social scientists in many disciplines are beginning to develop new approaches informed by this emerging data. Ecomusicology is one example.).

Predatory Anthropocene (PA) is the consequence of an epistemic illness. It is manifest as a crisis of the environment, the economy, and the human organization, occurring within communication. The source of predatory Anthropocene is the radical revolution in the semiosphere, the new languages, new discourses, new knowledges, and new politics of capitalism (Lazzarato, 2014, p. 16). Gregory Bateson provided a foundation for a way of studying these impacts on the semiosphere. His work has been expanded into biosemiotics and approach that I see as foundational to CineMusicking. This expanded notion of ecology that locates the semiosphere within the envelope of the biosphere, in an interactive way, helps explain the operation of predatory Anthropocene and its maintenance in popular culture. It also provides a way to explain how youth hiphoppas in Cipher5 are able to recognize that their self-work is able to build a new civilization. Moving out from *Megamorphesis* to *Letters to Attawapiskat* sketches out two levels of semiosphere. I followed these films with *Pimachihowan* that explores the role of Cree traditional ecological knowledge (TEK) and learned about the ecological aspects of *the matrix that embeds*. Previously, I had been sketching out a semiosphere without thinking very clearly about the recursive relationship between semiosphere and biosphere. I could see the impact of semiosphere on the biosphere, but I had not yet seen that the biosphere may also shape the semiosphere which would also be shaped by individual choices. The study of Cree traditional ecological knowledge taught me this, and trying to find a path that walks in parallel with Cree TEK brought me to biosemiotics.

Biosemiotics

Biosemiotics "is the name of an interdisciplinary scientific project that is based on the recognition that life is fundamentally grounded in semiotic processes" (Hoffmeyer, 2008, p. 3). Built upon the work of Charles Sanders Peirce, Jakob von Uexkull, and Gregory Bateson, it offers "path-breaking new ways of understanding both culture and nature" (Ibid.). Central to the biosemiotic approach is the position that "living nature is understood as essentially driven by, or actually consisting of, semiosis, that is to say, process of sign relations and their signification – or function – in the biological processes of life" (Hoffmeyer, 2008, p. 4). This provides a radically new platform for ecological aesthetic education (There is, however, a significant distance between music education and ecological music research on the one side and systems science, like biosemiotics, on the other. In Canada, praxialism is the dominant music education philosophy, and it denies a place for aesthetics. Ethnomusicologist Christopher Small brushed up against second-order cybernetics in *Musicking*. And while the concept has become widely used, its relationship to cybernetics is unknown. Ethnomusicologists have generally agreed that music "is a key resource for realizing personal and collective identities which, in turn, are crucial for social, political, and economic participation" (Turino 1999). While some ethnomusicologists utilize Peircean semiotics in their methods research in this orientation has tended toward identifying formation, and while this is undeniably important, it is only one part of communication. Ecological (ethno) musicology, in the form of the new subdiscipline ecomusicology, while the most likely candidate for systems science has utilized ecocriticism as its dominant framework. In this essay I seek to forward one response to these three threads. First, that music education might expand its practice beyond its rigid allegiance to studio practice and performance-based pedagogy. Second, that Peircean ethnomusicology might find resonance in biosemiotics and contribute ethnographic research to studies of human signification and, third, that ethnomusicology might benefit from rethinking "nature," by reorienting toward biosemiotics.). The goal is to get above the humanist binary of nature/culture in the recognition that semiotics is not exclusive to humans but is in the biological environment, a semiosphere, within which humans have evolved unique complex practices of symbolic learning in "cultural sign processes [that] must be regarded as special instances of a more general and extensive biosemiosis that continuously unfolds and acts in the biosphere" (Hoffmeyer, 2008, p. 4). Instead of thinking about "nature," biosemiotics allows us to inquire after the recursive impacts of semiotics phenomenology (art in this case) in the shaping of the semiosphere and how the semiosphere is functionally coupled (Luhmann, 1989, 1996, 2000, 2009) and embedded inside the envelope of the biosphere. The semiosphere is not undifferentiated; different semiospheres are produced recursively through the engagement of ways of acting within the biosphere. We call the collection of these thoughts, dreams, symbols, and actions *culture.*

The cybersemiotic perspective (Brier, 2008) builds upon biosemiotics by including Niklas Luhmann's *Social Systems Theory* (1996) which allows us to pose evolutionary questions about the role of art in the semiosphere without resorting to

reductive biological questions of evolution, i.e., sexual selection. Instead, a cybersemiotic question would ask about the recursive role of expressive practices in meaning creation about the environment; how it contributes to, and about the semiosphere, how changes in the semiosphere require the semiotic organism to respond as we attempt to shape the semiosphere to successfully integrate into the biosphere; and whether we are able to even tell what is successful. The evolutionary role of language signification and of its expansion across textual, aural, visual, and gestural modes, as we currently engage with them in popular culture, requires significant transdisciplinary research. One of the most pressing cybersemiotic questions regarding aesthetics is the impact of capitalism on signification and the semiosphere-biosphere matrix (It has been long acknowledged that aesthetics has been incorporated into integrated world capitalism (Adorno 1984, 1991; Adorno, Benjamin, Bloch, Brecht, & Lukacs, 1977; Benjamin 1968; Guattari & Rolnik, 2008). It has recently been argued that new forms of information workers, that some call the cognitive proletariat or the cognitariat (Lazzarato 2011, 2014, 2015; Marazzi 2008, 2011a, b), are being trapped in decentralized creative/semiotic factories working for capital accumulation, profit that benefits "creative" industries' executives. What began with the rise of neoliberalism has become the information economy, the gig economy, built upon precarious creative labor within a growing sector of the global economy extending into self-driving vehicles and expanding automation.).

Gregory Bateson (1972; Bateson, Jackson, Haley, & Weakland, 1978) has shown that the definition of the living organism is provided by the organism itself and that although the organism is self-aware, it does not follow that its actions and its environment are evident to the self. Further, because the organism is a self-reflexive (second-order) system, its environment can be known, and its history known, only through the resources available to it within its system (Von Foerster, 2003, 2014). Further, what the organism uses to know its environment (resources it has made for itself) contributes to autopoiesis (self-creation) (Maturana, & Varela, 1987). But as Bateson warns, self-awareness does not provide a privileged claim to ontology, and the community does not get access to its ecology. The maps are only what they think they know and are always in a virtual relationship to the territory.

Accepting Bateson's observations about the problems of self-awareness, it is necessary to clarify the capacity of critical theory, which provides the critical theorist a privileged critical vision that has remained largely unquestioned. Further, some strong forms of critical theory have turned everything into discourse. While it is necessary to talk about the construction of discourse, when taken to an extreme, it makes the mistaken claim that the biosphere, and all of the science dedicated to its clarification, is a construct of discourse. The result of this strong approach to discourse is the incorrect and dangerous belief that changing the discourse alone is enough.

Unreflective science that has claimed a monopoly on the real also has a strong form that does not see the place of human semiosis in knowledge production. As semiotics has shown, our biological engagement with the world is based upon humanly produced maps of territories that we can never have access to with our

analysis. All of our knowledge is a map of a territory. The tension between the strong humanities and strong science position is a continuation of C.P. Snow's *Two Cultures problem* (1998), where science believes that its analysis of nature and the universe is comprised of information and that there is no meaning. Social science and humanities believe alternatively that they are studying culture and society and that meaning systems are only located in discourse.

The problem of the two cultures is not a problem of personalities but is a problem with the entire framework of knowledge production. If ecological aesthetics is going to deal with both ecology and aesthetics, a framework that includes both science and semiosis is necessary. Cybernetics was developed as an interdisciplinary initiative to bridge the two-culture problem. The major theoretical contributions were cybernetics and systems theory which were expanded upon by second-order cybernetics, a system where self-aware observers of the system include themselves in the system, as with Maturana and Varela's (1987) theory of autopoiesis (self-creation). Niklas Luhmann (1989, 2000, 2009) built systems theory and autopoiesis into social systems theory. In a parallel development, biosemiotics was developed. Soren Brier brought Luhmann's work together with biosemiotics to develop cybersemiotics, a portmanteau of cybernetics and biosemiotics. This approach articulates levels of semiosis that joins science and social science and humanities together. Biological autopoiesis occurs through endosemiotics seen in DNA, for instance, psychological autopoiesis uses neurosemiosis, the communication of the nervous system and organs of the body. These endosemiotics are related to the exosemiotics of the social system and the relation of the social system made up of members of the same and different species (zoosemiotics and anthroposemiotics) and its semiotics coupling with the biosphere. Von Uexkull remarked that "Organisms are wrapped in semiotic networks in which specific circulating signs are accessible on to complementary systems of interpretation. The exosemiotic sign processes, which transform the objective environment into subjective universes, are intrinsically related to the endosemiotic sign processes in a continuous basis" (Barbieri, 2008, p. 366).

And if this was not complex enough, we are now facing a three-culture problem with the awareness that traditional ecological knowledge (TEK) has been maintained through songs, stories, foodways, and Indigenous epistemologies as a body of evolutionary ecological knowledge. This is knowledge about a biosphere in which Indigenous people are embedded and have been for as much as 15,000 years in Western Canada. The development of ecological aesthetic education within predatory Anthropocene needs to have the three-culture problem on its horizon. I propose cybersemiotic ethnographic film as a research methodology capable of addressing the three-culture problem. In the final part of this essay, I will discuss the journey of making my film Pimachihowan and the ways that ethnographic film (In an interest to finally get to the main subject of the paper, I will spare the reader a survey and discussion of the work written about ethnographic film though important is a methodological discussion that will have to await a follow-up paper.) can provide a valuable method for researching as well as practicing cybersemiotics.

Pimachihowan and the Matrix that Embeds

Pimachihowan began as an ethnographic film contribution to a web-based petroleum education learning tool (PELT). PELT was a federally funded research project headed by business ethics professor Dr. David Lertzman and partnered with Cree elder Conroy Sewepagaham, to explain to business students, destined to work in the Alberta energy sector, the complex sociocultural-economic environment they are about to enter. David, Conroy, and I began working through potential ideas for the film, but after a few failed attempts, it became clear that the traditional documentary approach was not going to work. A central complexity was that the film's goal was to explain Cree traditional ecological knowledge to people who do not have the framework for understanding it. Canadian energy sector professionals come to Indigenous communities understanding that they have a responsibility for consultation and accommodation. But these two words are not translatable in the Cree language. So, these students came to learn expectations that are often difficult to meet in the field. Over the process of David and Conroy's work, it was agreed that Cree words would have to form the center of the film. We began to work toward developing a film method that would have the capacity of being ecological in the same way that the hip-hop films would be. In the process of developing the method, I began to see that once again it was necessary to utilize the CineMusicking method. That I was not exploring music explicitly was made unnecessary by Conroy's observation that in Cree TEK, all education is ecological aesthetic education, not of nature but of our relationship with *the matrix that embeds* (Fig. 4).

In the short educational film *The Matrix that Embeds*, Humberto Maturana and Heinz von Foerster explain that the form of the described universe is shaped by the tools used to do the describing ("The Matrix that Embeds" Humberto Maturana and

Fig. 4 Pimachihowan. (Michael B MacDonald Films)

Heinz von Foerster, American Society for Cybernetics and Change Management Systems. Directed by Pile Bunnell 1998. https://www.youtube.com/watch?v=acx-GiTyoNk (accessed March 19, 2017)). In other words the method taken to describe the universe is therefore not just one method among many that will lead to the same end, but is a choice, made often with little foreknowledge of the consequences the method will have for the model. In particular, von Foerster explained that the root word of science (skei) means to take things apart as in schism and schizophrenia. While taking apart in the act of naming produces a universe of parts useful to its itemization, this method does not necessarily lead to understanding of the ecological productiveness. There is sometimes a confusion between mechanical science and living science. For instance, if you take a car apart in your driveway and take very close notes, you can reassemble it based on your very close notes, and it will restart. Attempting this on your cat will not produce the same result. Another method is necessary.

The opposite of skei is the root syn, to unify, to put together, as in the root of system. In *Steps to an Ecology of Mind* (1972) and *Mind in Nature* (1979), Gregory Bateson presented systems of interconnected "minds" established upon *the pattern that connects*. In his later work *Where Angels Fear* (1987), he and his anthropologist daughter Mary Catherine Bateson explore aesthetics and sacredness as the experience of being embedded in human-animal-planet matrix (Charlton, 2008). Bateson's ecological view was of the whole and had to "accommodate aesthetics to the question of consciousness" (Harries-Jones, 1995, p. 212). He argued aesthetics and consciousness were two parts of a necessary triad with the sacred. Harries-Jones, summing up Bateson, wrote: "The sacred (whatever that means) is surely related (somehow) to the beautiful (whatever that means) in that the sacred is a sort of surface, or topology, on which both terms, beauty and consciousness could be mapped" (212). Following Bateson, it is possible to inquire after questions of aesthetics through the sacred, as the pattern that connects.

The pattern that connects allows for a view of parts and wholes; it is the study of the connections between things. Heinz von Foerster, however, did not feel that the paternal association of pattern, from the root *pater* meaning father, was the correct metaphor. Pattern presupposes a master form, a maker (Platonic forms?) capable of cutting out parts. Instead of father (pater/pattern), Foerster suggested mother, mater or matris, from which a system emerges as wholes, built of relations-of-difference that embed. Instead of a pattern (pater), von Foerster suggests matrix (mater) and substitutes *the pattern that connects* for *the matrix that embeds*. The change of metaphor from father science to mother matrix introduces a new approach to ecological aesthetics that works in parallel with traditional ecological knowledge of Indigenous peoples in Canada and maybe more broadly (Because of the colonial history of Western rationality, in both science and the humanities, meta-questions for researchers in post-Truth and Reconciliation Canada are of great ethical, epistemological, and methodological importance. Indigenous writers have long recognized the negative impacts of skei, the tearing apart of "things" in Western rationality. In "Custer Died for your Sins" Vine Deloria Jr. (1969) critiqued colonial scholarship when he wrote: "Into each life, it is said, some rain must fall, some people have bad horoscopes, others take tips on the stock market, but Indians have been

cursed above all other people in history. Indians have anthropologists" (78). Although Treaties 6 and 8 were signed between Indigenous peoples and the Canadian government as an agreement to share the land and to provide Western education, these treaties were systematically ignored. The promised education was delivered in the form of a system of residential schools dedicated to "kill the Indian in the child;" European aesthetic education was used as an epistemological weapon. The federal government apologized in 2008. Soon after, the Truth and Reconciliation Commission of Canada traveled across the country to hear and record testimony of the impact of residential schools. Concluding in 2015, it is now public record that Indigenous people were physically, psychologically, and sexually abused in a government-supported system of cultural genocide. However, while the government says "we are sorry," treaty obligations as of 2017 are still rarely lived up to. What's more, the epistemological operation of colonization remains opaque. It is this field that I am seeking to theorize aesthetic education not in the hopes of explaining traditional ecological knowledge but instead of contributing to an allied ecological aesthetic education.). For instance, when Sewepagaham talks about *Kimaamanow* (This is not a Cree word but instead is *Michif*, a complex language comprised of Cree and French. It is not a patois that mixes and reduces the complexity of two languages into one hybrid but is instead a language that was built by expert speakers of both Cree and French and therefore has very complex grammar structures.), there is some hesitancy with the often-used translation *mother earth*. I believe the hesitancy comes from the fact that the English words do not quite capture what is being expressed. Matrix with its root in *matris* brings us closer than the English word mother. The process of engaging with the *matrix that embeds* is part of the practice of life called *Pimachihowan*, experienced as sacredness.

I began to realize during the making of Pimachihowan that it was *the matrix that embeds* that I described in the film *Megamorphesis*, and it was the larger context of the hip-hop semiosphere that *Letters to Attawapiskat* attempts to describe. *Pimachihowan* attempts to describe Cree traditional ecological knowledge, which needs to be understood in order to more fully understand the semiosphere of Cree youth in Edmonton. It is worth noting as well that many youth involved in hip hop in Edmonton are Indigenous (Fig. 5). The role that Cree TEK plays in the lives of young hiphoppas, or youth in Edmonton more generally, is not well understood. But as Cree elder Sewepagaham explained, predatory Anthropocene is impacting TEK:

> With our teachings, it is subtle. If it's walking down through a boreal forest or tracking down a game animal it's soothing. It's totally opposite to what youth are now being engaged on. It's not 'bam' right in your face, here's a frag grenade, 'boom' you have instant reaction. With our teachings it's calm, it's soothing, it's *pah'pe'ya'ht'ik*, slow, it's like steeping your tea. You don't rush it because it doesn't taste good. It's like that, our teaching needs to steep nice and slow. It takes time. So when you ask how can we teach that to non-indigenous folks or even with our people who are not able to be granted that kind of teaching, how do we do that, at the end of the day we have to teach them patience. You don't get an instant reaction, you're not going to get instant gratification. When you go out and walk on the land and say 'here it is', you're not going to go out there and say 'wow I'm changed'. You have to do it repetitively, you have to do it over the years. It's slow healing and without the slow healing it's not true healing.

Fig. 5 Pimachihowan. (Michael B MacDonald Films)

Showing this distinction in the film was complex and relied upon the Cinéma vérité method. In one scene, we followed Conroy walking through the deep snowy woods of the northern boreal forest, breaking large branches as we moved. Eventually, and without warning, Conroy stopped and began making a fire. He made a space in the snow and started to stack pieces of wood; he added some cotton synthetic fur from his gloves and lit it with a lighter. David asks, "can you tell us about *Pimachihowan?*", and Conroy responds: "We're doing it right now" (Fig. 6).

Conroy explained that nothing starts on its own, that we are all just like the fire, and that we are all in relation to each other. He goes on to explain that a key teaching of Pimachihowan is that if we respect the environment then we learn to respect ourselves, and if we respect ourselves we learn to respect the environment. We realized that Conroy is teaching us Cree TEK. As a filmmaker, I realized at that moment what Conroy had decided to do; he had chosen to "perform" TEK for the camera. In the process of filming and editing the film, we learned that slowness provides an opportunity to interpret your ecology using all of your capacities. Your senses, feelings, dreams, memories, and knowledge. I edited the rest of the film with this in mind. Everything was edited for slowness, to allow time for new ideas, observations, and feelings to emerge. I learned in the process that slowness was not just tempo, but a space of productivity. Long takes were utilized throughout. It is with great satisfaction that the feedback I regularly receive from audiences is focused on the tempo of the film, the feeling of being there, of sitting next to Conroy. In the second half of the film, titled *Kawitapmatoa* (sitting down with people), the approach to the film direction explicated the central notion. David and Conroy were joined by Willard Tallcree, and they sat down together at Conroy's family's hunting cabin deep in the boreal forest. We learn more about the continuity between

Fig. 6 Pimachihowan. (Michael B MacDonald Films)

how we live and the wellness of the environment. That colonization and the impacts of Indian Residential Schools have emotional as well as ecological ramifications for all people and that the impacts of colonization are not over until we are both healed, settler and Indigenous alike. These observations map on completely with the observations made by the hip-hop youth in both *Megamorphesis* and *Letters to Attawapiskat* (Fig. 7).

When I screen *Megamorphesis* with *Pimachihowan*, questions emerge about youth migration, rural to urban, and youth living in Indigenous community and then moving to metropolitan multicultural community. Youth tend to respond in either two ways. Non-Indigenous youth tend to be amazed that there is a hip-hop culture that is influenced by Cree TEK. For youth who understand hip hop exclusively as a product of American popular culture industries, it is quite a surprise to recognize that hip hop is formed by the ecology within which it is embedded. They are surprised because they are used to not thinking about the environment, because they do not yet have the capacity of thinking about semiosphere-biosphere coupling. Indigenous youth are often very happy to see this connection made and often explain authoritatively to non-Indigenous members of the audience details about their lived experience. In such a way, at-risk youth who are often the least empowered find a central place in a public educational environment. Following Paulo Freire's methods, the oppressed are able to find voice in their lived realities and in doing so dissolved the bonds that holds oppressor and oppressed in their places. The films help Indigenous inner-city hiphoppas talk back to power, to help make explicit the implicit epistemologies of hip-hop culture and traditional ecological knowledge. And we are able to do this together because we have set out to make ethnographic films together. To understand ourselves more deeply as we put ourselves on screen and then share our journeys with audiences.

Fig. 7 Pimachihowan. (Michael B MacDonald Films)

Conclusion

I began making ethnographic films during my graduate work as a way of doing aesthetic research that could communicate outcomes that print publications, no matter how literary, could not communicate as effectively or as ecologically. When I began incorporating my ethnographic films into my teaching, it was with great effect. My students not only began to see what I was researching but began to report that they "felt" as if they were entering into someone else's lifeworld. I have found that the affective impact of film can be molded through editing into a variety of phenomenological forms that are sometime intersubjective and sometimes ecological. I am increasingly convinced that CineMusicking is not only an excellent vehicle for communicating cultural research in aesthetics, but it provides a two-sided opportunity for aesthetic education. First, because of the immediacy and multimodality of film, it is an excellent technology for ecological and intersubjective aesthetic education. The second side is that through ecological ethnographic filmmaking, young people can gain an aesthetic education that has the potential of being deeply transformative for schools, young people, their community, and environment. CineMusicking is an inherently interdisciplinary practice for aesthetic education. It draws together all of the traditional forms of aesthetic education: visual art, theater, theater production, music, composition (screenwriting), and new forms of aesthetic education like audio recording, video editing, coding, design, and communications. Through CineMusicking young people can produce films about their environments and communities, and by doing so, they engage in the research of the semiosphere that may help their communities and themselves understand their world in ways not currently accessible.

Finally, we live in a time when digital film production equipment costs much less than even maintaining a traditional music program (and dissemination by Vimeo is almost free), but most schools do not make film production a priority. Perhaps it is because Hollywood so controls the stories we tell ourselves about ourselves that we are unable to imagine what aesthetic education could look like after we take control of our own narratives. Perhaps it is a lack of ecological aesthetic education philosophy. This chapter takes one small step toward this emerging film-based ecological education.

Cross-References

► Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective
► In Place(s): Dwelling on Culture, Materiality, and Affect

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Patterning in Childhoodnature

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Abstract

This chapter explores patterning as a transdisciplinary approach to conceptualize childhoodnature through the ways patterns of self and environment interconnect, relate, and resonate. In doing so, we aim to critique the compartmentalization of education through discipline foci, space and time limitations, and separations from nature. We argue that despite trends toward integrated and holistic approaches in education, such as STEAM (science, technology, engineering, arts, and mathematics), and inquiry-based learning, a deeper, more aesthetic and ecological approach that encompasses childhoodnature is needed. Analyzing research on patterning in the early years of education and development, it has

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been noted that patterning is mostly conceptualized and understood through discipline-focused lenses, such as in mathematics, science, and the arts. Putting forward the argument that innate knowledge of patterning has been eroded from our everyday lifeworlds, a holistic concept of childhoodnature is required. We contend that knowledge and learning about patterning could enable children to make complex connections with their selves and environment, as ecological and aesthetically engaged learners. Based on eco-critical perspectives and incorporating Indigenous cultural arts, this chapter reconsiders and reconceptualizes ways pedagogies and curricula in education to encompass a more transdisciplinary approach with a biophilic focus.

Keywords
Patterning · Ecocriticism · Childhoodnature · Children · Education · Pedagogy · Biophilia · STEAM

Introduction

The three authors of this chapter are teacher educators who work in different discipline areas – art education, early childhood education, and STEM (science, technology, engineering, and mathematics) education. In our attempt to challenge the anthropocentric view and paradigm, we consider humans' connections with other living organisms and the natural environment as an integral part of a conceptual framework for understanding the foundations of childhoodnature. These connections enable us to focus on natural, embodied, and holistic approaches to education, some of which are shared in this chapter. In particular, we discuss the notion of patterning, defined as identifying and creating regularities and/or repetitions in space, time, and behavior. The chapter focuses on the usefulness of this notion of patterns and patterning in thinking eco-critically about childhoodnature and taking into consideration ecological aesthetics and the learning environment.

Drawing on Crutzen and Stoermer (2000) and others, our definition of the anthropocene is "[the] earth's most recent geologic time period as being human-influenced, or anthropogenic, based on overwhelming global evidence that atmospheric, geologic, hydrologic, biospheric and other earth system processes [that have been] altered by humans" (Encyclopedia of Earth, 2017). We share a concern about the compartmentalization of disciplines in education and research within an anthropocentric era, a compartmentalization that has limited space and time for children to be creative, to be able to explore, contemplate, experiment, experience, and deeply connect with nature. Along with discipline knowledge traditionally being compartmentalized, education has been affected by accountability and performativity discourses and the culture of efficiency (Kilderry, 2015; Wilkins, 2011). Moreover, Rolling (2013) explains how the dominant contemporary education system stemmed from American inventor and engineer Frederick Winslow Taylor's ideas about being efficient in the workplace:

> . . ..the stopwatch became emblematic of Taylor's system, often likened to "management by measurement". As Taylor's approach was applied in schools, the completion of homework assignments, sequenced workbooks, and timed tests became the order of the school day. (p. 30)

Typically patterning in early childhood education and in the early years of school has been taught in traditional discipline areas, such as mathematics, science, the arts, and music (see Fig. 1).

There are many reasons for the compartmentalization of discipline areas and for predictable systems with defined and categorized information and knowledge. For example, critiquing the traditional structure of schools and how it lingers today, Rolling (2013, p. 42) observes that:

> Schools do what they are intended to do – schools underdevelop creativity in favour of the development of citizens who are easy to categorise, easy to sort into cubicles or assembly lines, and easy to manage. Twentieth century behavioural psychology and the principles of 'scientific management' converge across the nation to shape a system of education that penalizes unpredictability and a lack of adherence to prescribed metrics.

While we do agree with the importance of students gaining in-depth disciplinary knowledge in mathematics, science, or design, we argue that disciplinary knowledge could be taught in more holistic and integrated ways. For example, patterns and patterning could be explored in sensory and embodied ways along with a focus on transdisciplinary learning experiences in and through nature across the arts, sciences, and mathematics. Over the past few years, we have been exploring patterning as part of children's learning and investigating how children are exposed to patterns in educational contexts, local communities, and homes. In particular, we are interested

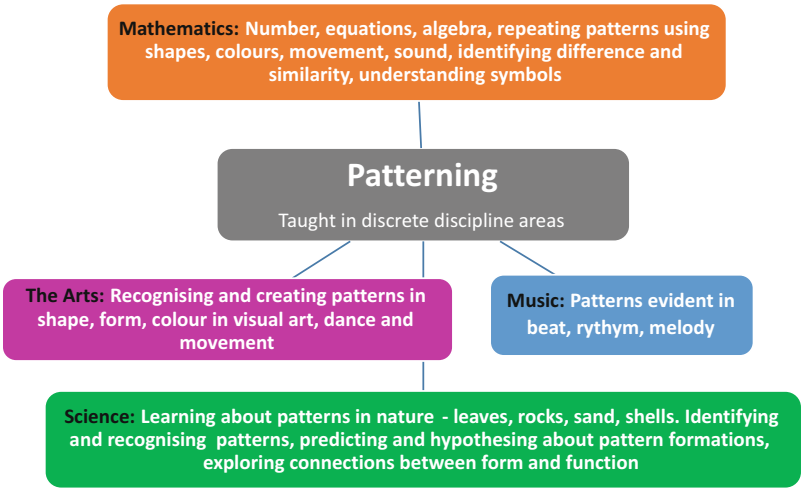

Fig. 1 Patterning: taught in traditional discipline areas

in how different contexts enable children to learn about patterns and patterning through their own sensory and embodied experiences with the natural and built environments and how their engagement with these spaces can be fostered in ecological and aesthetical ways.

In this chapter, we draw on research literature and practical applications to suggest some potential roles that patterning might play in nurturing children's curiosity and interest in nature and how patterning can enable an understanding of childhoodnature in a holistic and integrated way. The first section of the chapter theorizes the *ontology of patterns* and includes an overview of the central place of patterning in art, education, Indigenous cultural arts, ancient knowledge, and lived experiences (Warren & Miller, 2010). In this section we explore what constitutes a pattern and how we might distinguish between patterns of difference. We maintain that patterns of difference can open up new potentials for experience, rather than patterns of sameness that simply reinforce habituated thought and behavior (Barad, 2003; Deleuze, 1994; Shostak, 1999). Drawing on eco-aesthetics, we discuss ways of learning from contemporary art movements embracing an interconnection of self and place. Drawing on reflections on our own experiences of learning concepts in silos and space/time limitations within education, we discuss pedagogical and curricula possibilities for childhoodnature education. This is where pattern and patterning can be both an integrating and engaging platform for environmental and eco-aesthetic learning.

Theorizing the Ontology of Patterns

The growing interest in STEAM (science, technology, engineering, art, and mathematics) indicates a need for more interdisciplinary and transdisciplinary approaches in education (Ghanbari, 2015; Henriksen, 2014). Researching in a transdisciplinary space illuminates the limitations of thinking, teaching, and learning within one single discipline and a myriad of shared conceptual interconnections and possibilities. Gregory Bateson's work (1972, 2017, np) provokes us to question "things, labels, categories, diagnoses." He urges us to "think about living and relationships, communication and set ourselves free (or at least be aware) of what these lenses are that we see through" (Bateson, 2017, np). Likewise, Bowers (2001) advises us to be aware of the metaphoric meaning that a categorized subject like science or art might conjure up as we engage in teaching or learning within a particular discipline. He urges us to disrupt such conditioned ways of categorizing and labeling at the deep metaphorical level. Wheeler (2016) notes the metaphorical similarities between how organisms change and how art and poetry are structured. She explains that, "nature is made of the stuff – the patterns, repetitions, figures and movements – that make song and poetry in humans" (p. 40). Furthermore, she argues that change for organisms "is neither mechanical nor law-like; it is metaphor driven and subject to chance and the making of meanings. In this sense, organic life bears the structure of art rather than the machine" (p. 39). It is these more relational aspects including metaphors of animals, nature, and environment that we explore through a focus on patterning in education in this chapter.

The Ontology of Patterns

Our definition of pattern includes regularities and repetitions of actions, units, or shapes in space, time, and/or behavior. Pattern can be understood in many ways within and across school curricula. For example, patterning can be viewed in mathematical terms (Bjorklund & Pramling, 2014; Papic, 2007), perceived as fundamental to the arts (Geist, Geist & Kuznik, 2012), and regarded as an important concept in science (Ampartzaki & Kalogiannakis, 2015; Murray & Winteringham, 2015). We recognize patterns as useful and important ways to explore disciplinary concepts such as number sequences in math, patterns in art, and biological patterns in animals and plants but propose that patterns can be understood as a transdisciplinary concept for disciplinary integration.

Patterns are the most basic and pervasive building blocks of organisms and environment. Patterns can be found in relation to the biologic and genetic makeups of living organisms (including humans) and identified in both natural and sociocultural environments that we live in. One example of such pervasive patterns is the *Fibonacci sequence,* which was first written down in 1202 by the Italian mathematician Leonardo of Pisa, known as Fibonacci. The Fibonacci pattern of numbers is where each number is based on the sum of the two numbers before but also equals the difference of every two numbers that follow it (e.g., $34-21 = 13$). An example of a Fibonacci sequence of numbers is 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, and so on. Fibonacci patterns can be identified in the arrangement of the leaves around the stem of a plant, the arrangement of flower petals, or the patterning of an artichoke or spiral shell (Ball, 2016). The ratio of two successive Fibonacci numbers approximates the golden ratio Phi 1.618 (where the ratio of two numbers is the same as the ratio of their sum to the larger number). The golden ratio can be found in the structure and form of plants, animals, and planetary systems. The golden ratio is also used in the arts and architecture in many cultures. The impressionist painter Seurat was one of the many artists who have used Fibonacci patterning to develop his compositions (Meisner, 2014).

Patterns and patterning can be explored in sensory and embodied ways across the arts, sciences, and mathematics and can be translated across different senses such as sound, touch, and vision. Visual patterns in art, design, architecture, and mathematics are often repeated shapes, lines, motifs, symbols, numbers, or images. In science, patterns are often represented visually, for example, in the form of cell structures, DNA, atomic, and subatomic arrangements. Patterns are understood both structurally and through audiovisual and spatial awareness in mathematics, science, and music. Furthermore, patterns can be internalized, conceptual, imaginative, invisible, and thus non-sensuous. Patterns and spaces need not necessarily be seen visually (Wertheim, 2015). Christine Wertheim reminds us that pattern and space in art, such as poetry, may be imagined. She refers to this kind of inner structure (invisible in the optic sense) as "inner sight" rather than "external sight" (np). Such internalized pattern occurs in music, writing, and theatre, where a linear structure enables rhythms and repetition of elements across time to be imagined, whereas writing or arranging music sequencing on computer screens or music manuscripts is arguably "visible" musical patterning.

Murray and Winteringham (2015) reveal how humans design, create, and live with patterns. Just as spiders weave their webs or bees create honeycomb, so do humans create patterned things that are both functional and important for survival. Examples of the way people live with patterns can be seen in the design of cultural artefacts, utensils, homes, and clothing. Indigenous cultures have meaningful patterns illustrated in clothing, mats, artwork, and ceremonial artefacts. Australian aboriginal and Torres Strait Islander "rarrk" patterning is a particular kind of cross-hatched patterning found in the Northern Territory or central desert paintings. Other Indigenous patterns include Scottish and Irish tartans, woven tapa cloth from the Pacific Islands, and Islamic patterns found in ceramics, artwork, and tiles. These patterns have emerged over place and time, representing particular cultures, spiritual beliefs, ancestral story and heritage.

Patterns can be found in thinking and behavior, such as rituals that are repeatedly practiced by particular groups of people or habits and movements that we engage in everyday life. Examples of patterns in thinking and behavior include breathing, walking to and from work each day, the action of jogging, dancing, slicing bread, or work activities such as hammering a nail or folding a napkin. Patterns can also be found in the way we think and communicate, for instance, the way we are taught to learn to say words, learning by rote, poetry, times tables, mantras, and prayers – even the format of debating. Patterns require a unit (speech, action, image, shape, sound) to be repeated or arranged in a sequence or structure. When such units are randomly placed or do not exist (are plain), then it is not a pattern. This leads us onto the topic of patterns of sameness and patterns of difference.

Patterns of Sameness and Patterns of Difference

Patterning is an integral part of who we are and our environments. The architects Alexander, Ishikawa, and Silverstein (1977) suggested that "every single part of the environment is governed by some portion of a pattern language" (p. 88). When considering patterning as an integrating and holistic approach to educating in childhoodnature, we need to be aware of the difference between patterns of sameness and patterns of difference. Patterns of sameness potentially reinforce habituated thought and behavior (whether these are good or bad), and patterns of difference offer possibilities of opening up new potentials for educational experiences. These concepts are explained in some more detail in the next sections.

Patterns of Sameness

Patterns found in Indigenous cultural artefacts are an example of how integrated people are to their place, culture, and identity. For example, Scottish clan tartans depict ancestry, region, and clan. The Australian Indigenous desert painters create dreamtime stories through patterns of dots that are important records of place, identity, and ancestral knowledge. The process of being in one's place and nurturing one's identity in that place can be habitual and developed out of a need to survive as a

species over time. Epigenetic research suggests that these patterns are imprinted on markers that affect the expression of genetic code for generations (Barros & Offenbacher, 2009; Kanherkar, Bhatia-Dey, & Csoka, 2014).

Patterns found in artefacts or clothing of some cultures represent information about food sources and harvesting. In Maori culture in New Zealand, for instance:

> Men involved in the ceremonial planting of kūmara plots on the East Coast were required to be clothed in garments such as the aronui, māhiti, paepaeroa, puhoro or pātea – all finely woven garments of dressed flax, differing from one another in their ornamentation. This was part of creating the most auspicious conditions to ensure a successful harvest. (Tamarapa & Wallace, 2013, p. 1)

Haddon (1914) reports that in what was British New Guinea, artefacts of the Orang Belnda people feature patterns that are symbolic of survival processes, such as farming and building shelters. As an example, the decoration of a bamboo stick "is a formula to enable a man (sic) who wishes to build a house to easily find the necessary materials" (p. 246). The stick is decorated with various patterns, which represent aspects of house building, including cross-hatching, symbolic of trellis for a wall of a house, and "diagrammatic representations of burnt trees which have remained after the firing of the jungle" (p. 247). Haddon reports:

> The rest of the bamboo is divided into longitudinal bands, most of which look like attempts at decorative patterns, but they really signify a liana with many leaves, the frame-work of the roof of the house, a ladder, split leaves interlaced for thatching rattans, while a zigzag line means the long path which goes from side to side, and thus indicates the obstacles which befall the leaves for the thatch whilst they are being carried through the jungle. (p. 91)

While these patterns on the bamboo are decorative, they are also forms that record and communicate ways of building ideal habitat. They offer patterns of sameness that are useful records of how to successfully build these shelters again. More recently, Alexander, Ishikawa, and Silverstein (1977) delineated patterns of habitable environments so as to assist people in the design of their ideal habitats. They call this a pattern language as it provides a model to understand and apply the complexities of the habits of creativity, such as building shelter and tools for survival, to create functional communities. This pattern language is, like the bamboo designs described above, a "practical" language, distilled from Alexander et al. (1977) own building and planning practice of 8 years. This model emphasizes the importance of patterns in human-made environments. They explain:

> The elements of this language are entities called patterns. Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice. (1977, p. x)

This notion of doing then recording a patterned way of creating, doing or being, or aesthetic design, is reinforced by Wheeler (2016) who explains the human

creative need and habit to tinker and create things. She notes that when we create things, we tend to "look for a solution which will repeat the success of (our) earlier triumph by making use of similar structures" (p. 32).

In addition to doing and recording things, living beings have developed patterned ways of living for survival around seasons, food, hunting, and work. Finkel (2017) tells the story of the 20-year-old man, Christopher Knight, who was drawn to live in the forests around Maine, USA, as a recluse for 25 years. In order to survive, he learnt to observe the habits of people who lived at the edge of the forest. He noticed their daily habits and patterns of activities around seasonal breaks, when he could take the opportunity to break into their homes or gardens to steal food and resources. From his own survival habits across so many years, Knight observed that everyone has predictable patterns.

Furman and Gallo (2000) posit that pattern information links the environment that is a person (e.g., cells, DNA, nutrients, waste) to the environment that is his/her place. They state that:

> As a subterranean cave is dynamically shaped by the passage of water, the human brain and its resulting mind and behaviours are shaped by the passage and presence of information, the universal measure of order within a system. In a sense, the human being becomes a living fossil, a dynamic informational bioarchitecture formed from the interaction of information within the agglomeration of matter and energy. (Furman & Gallo, 2000, p. 123)

This eco-critical perspective acknowledges the interconnection of things, and it recognizes the potential for sameness and difference. Barad (2003) observes that "'we' are not outside observers of the world. Nor are we simply located at particular places in the world; rather, we are part of the world in its ongoing intra-activity" (p. 28). This view suggests that even if we do engage in repetitive behaviors like getting a certain type of coffee from the same café each morning, there is such constant variability within structures (i.e., changing cafe staff, changing customers, changing weather, and so on). It has been argued that repetition will produce difference through the reconfiguration of these variables (Deleuze, 1994).

The focus on pattern and patterning acknowledges the importance of interconnections between self, place, and dimensions of environment that could be of sameness or difference. Through patterns and patterning in early childhood education, we propose that educational experiences can offer holistic perspectives that link our biological selves, actions, and lived experience with an appreciation for the patterns of our environment. At the same time, this focus on patterns and patterning along with taking into consideration the learning within natural environments can teach students about how selves and places are dynamically interconnected (Malpas, 1999), rather than separate limited spaces that we enter and exit.

We maintain that education should provide positive experiences to assist young people to develop positive patterns of life and healthy habits that benefit both themselves and the environment. This could be done early in life through childhoodnature pedagogy, as knowledge about patterns commences from a very young age such as in the form of schemas.

Repeated Actions or Schemas

Children learn and make sense of their surroundings through repeated behaviors and actions, and this begins their patterning learning journey. Repeated actions, or "schemas" (Arnold, 2010; Athey, 1990; Meade, 1999; Whalley, 2007), are concepts used in early childhood education drawing on Jean Piaget's work. Schemas are considered as crucial information required in order for people to make sense of the world. *In his analysis of culture and cognition,* DiMaggio (1997) explains how a schema is a basic unit of analysis for studying culture and for "focus[ing] on social patterns of schema acquisition, diffusion, and modification" (p. 269). Schemas in early childhood comprise patterns of behavior and include actions such as "transporting" where children repeatedly carry objects from one place to another, "enveloping" where children wrap themselves up in a blanket or cover themselves with sand, and "enclosing" where children fill up empty containers and put objects down plug holes (Athey, 1990, Meade, 1999, Whalley, 2007). It has been argued that these schemas later develop into concepts (Athey, 1990) and mark the beginning of a child's patterning journey of sameness and difference. Routines, such as feeding, bath, sleep, and waking times, set babies up into patterned behaviors. Childhood-specific patterning emerges through repeating behaviors and actions based on what they are taught, what they observe others do, and/or their own experiential and experimental play.

Development in cognitive science in the last two decades suggests the everyday embodied experience gained in the early years is the foundation for later abstract and high-level thinking (Lakoff & Johnson, 2008). An important concept in cognitive linguistic studies is "image schemes" (Hampe & Grady, 2005; Johnson, 2013; Lakoff, 2008). Image schemas describe recurring patterns of our sensory-motor experience by which we can make sense of that experience and reason about abstract concepts and make inferences about abstract domains of thought. According to Johnson (2005), image schemas arising from recurring patterns of organism-environment sensory-motor interactions in conjunction with the capacity for conceptual metaphor. This process provides the basis for abstract human reasoning. For example, an image scheme *collection*, involving the pattern of adding or taking away objects from a group, can be mapped conceptually to arithmetic through the concept metaphor *arithmetic is object collection*. As a result, image schemas operating within conceptual metaphors make it possible for us to use the logic of our sensory-motor experience to perform high-level reasoning with abstract entities.

Patterns of sameness are regular, seen, experienced, known patterns that we associate with things and processes. Habitual behaviors can be considered as patterns including sleep patterns, eating patterns, and exercise patterns, for example, eating cereal with a sliced banana each morning, an evening walk, or a morning meditation sitting on a cushion, facing the same way in the same room. Children might prefer to eat out of their preferred bowl and go to sleep with their comfort toy snuggled up in the same way each evening. Behavioral patterns of sameness can be observed in many situations.

Patterns of Difference

Recurring patterns are usually associated with habitual ways of thinking and behaving, which are reinforced through day-to-day living experience of the child. Patterns of difference, however, are as important as patterns of sameness because they are key mechanisms for learning (Marton, 2016; Marton & Booth, 1997). Marton and Booth (1997) discuss the structure of human awareness and indicate that to experience something as "something," we must differentiate it from other aspects and relate it to a context and be able to discern parts and relate them to the whole. According to Pang and Marton (2013), new meanings are acquired from "experiencing differences against a background of sameness, rather than experiencing sameness against a background of difference" (p. 1066). The pattern of difference inherent in a learning situation is fundamental to the development of certain capabilities and for experiencing a certain aspect of a phenomenon (Marton, 2016; Marton & Tsui, 2003).

Conventional education taught in disciplines focuses on patterns within mathematics, science, art, and music, and the pedagogical approach can isolate and disconnect patterns from our innate and ecological understandings. The Irish artist Dominic Fee explores patterns and subverting patterns in his artistic practice, influenced by patterns from human-made, urban environments, and geometry. Fee has spent time living in the United Arab Emirates where he has become influenced by Islamic patterning. Fee (2013) also puts his interest in pattern art down to his fascination "with the early modernists, especially Kazimir Malevich's Suprematist works" (np). However, when creating his artworks, Fee repeats motifs to create and play with pattern and then creates possibilities to change the pattern formations by asking others to construct the works or even creating possibilities for the work to fall over. With reference to Fig. 2, Fee explains:

> When you set up the expectation of regularity in a work, it becomes interesting to subvert that expectation to see what effect it has. For example, the physical structure of a work might

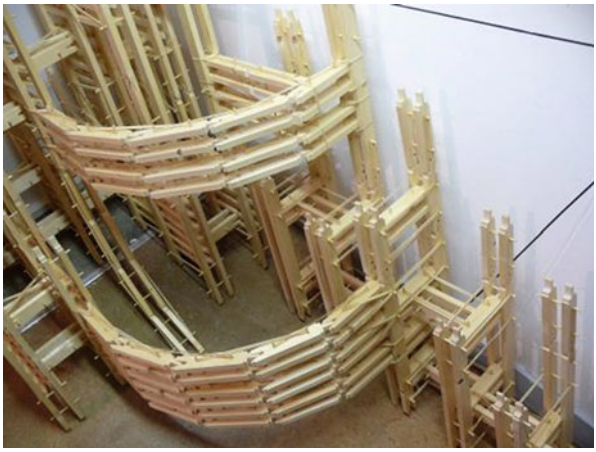

Fig. 2 Dominic Fee's *dimensions, location variable (DLV)*. Medium: wood, elastic bands. Dimensions: variable

> be very regular, but there may be some sort of organic or random element in the surface texture, or in the environment in which it's installed, for that to kick against. It's also fun to introduce elements of messiness into say, a regular, modular artwork, by getting someone else to assemble it, or maybe pushing the construction of it to the point where it falls over. (Fee, 2013)

Fee's artistic practice offers an insight into how we might value patterns that are "correct," but sometimes we might need to play with disrupting patterns to see things differently and to understand balance or just because it feels interesting and is fun.

A childhoodnature perspective enables us to look beyond the disciplinary patterns of the classroom with the aim to understand, "know," and make connections with nature in embodied ways, so that links can be made between music, art, nature, visual images, texture, imagination, memory, and so on. Learning patterns and patterning as part of disciplinary content is still important, but we argue that the conceptualization of patterning can be broadened to include a deeper, holistic, and more aesthetic, ecological, and playful approach to pedagogies. We suggest this allows for possibilities to alter people's habits, patterned ways of thinking, moving (dance), creating, and understanding how we and our environments are connected and patterned in different and exciting ways.

Art, Aesthetics, Nature, and Patterning

Our discussion of patterning in childhoodnature considers young people's potential to be ecologically and aesthetically engaged learners. We therefore consider ecologies across the arts and environments of self and place and the role of patterning in this process. Nora Bateson (2015) is one of many who have noted the similarities between art and nature because they both are layered and complex. When we walk in nature, we are among infinite patterns such as birds flying, swarms, patterns in leaves, petals, and seeds. We may notice how patterns form on rivers, lakes, and oceans or footprints in the sand.

Crafts are important as they offer young people ways to learn technical skills to create useful or aesthetic artefacts. In so doing they exercise their brains, engage in creative processes, use their hands, and engage in sensory experiences of touching, feeling, imagining, and making visual aesthetic judgments. Knitting and crocheting offer young people ways of learning how the repetition of creating a series of knots can create a plane form (square, one side of a mitten, and so on.). Haraway (2016) picks up on this importance as she notes the ancient patterning habits when creating string figures in different cultures and territorial mappings of pigeons' flight paths. Her work examines deep meaning and reasoning, stating ". . .it matters what knots knot knots, what thoughts think thoughts, what stories make worlds. . ." (p. 12). She writes about these string figure/flight path lines as both literal and metaphorical ways of communicating and connecting across in and with places, environments, and cultures and devises a "fictional equation" called Terrapolis which is "at once a story, a speculative fabulation, and a string figure for multispecies worlding" (p. 10).

With a similar embodied and transdisciplinary sensibility to Haraway, Margaret Wertheim explains the process of crocheting hyperbolic geometric structures with her artist sister Christine Wertheim. Margaret Wertheim (2009) recalls how, as a scientist, she was adhering to the "rules" of how to create such structures, but her sister began experimenting and creating irregular hyperbolic structures using different colored and textured yarns. They realized from this aesthetic experience that their crochet forms started to resemble coral reefs, which in turn made them realize how irregular coral reef hyperbolic structures are. This experience led to their international collaborative arts projects where up to 10,000 people contributed to crocheting coral reef structures for exhibitions in many countries including Germany, Australia, and the USA (Wertheim, 2009). This is an example of the creative process of creating through the repetition of making knots as crochet, which then became an interdisciplinary project that considers deeply, environmental and art aesthetics in representing and appreciating the interconnections between selves and nature through patterning processes of crocheting.

Knitting with plastic bags and providing knitted garments for trees (yarn bombing) are alternatives to traditional wool knitting. The alternatives that artisans and crafts people offer today provide students with opportunities to think creatively about other possibilities such as patterns of difference. A recent trend has been to knit with your arms instead of knitting needles, and such alternatives offer students embodied and bodily felt ways to learn about how knots create other forms and, after Haraway, what knots have knotted these knots.

Artists such as John Wolseley challenge conventional ways of painting and creating art by allowing nature into the process. For example, he lays paper at the edge of a lake so that the muddy Australian water, sediment, and live creatures imprint the work. He takes a dead bird, inks it, and presses this onto paper as an unconventional way of printing. Wolseley (2017) provides further insight about his work:

> My work over the last thirty years has been a search to discover how we dwell and move within landscape. I have lived and worked all over the continent [Australia] from the mountains of Tasmania to the floodplains of Arnhem Land. I see myself as a hybrid mix of artist and scientist; one who tries to relate the minutiae of the natural world – leaf, feather and beetle wing – to the abstract dimensions of the earth's dynamic systems.

Taking another perspective, Carmel Wallace, an Australian artist, has a different relationship to her patterns in her environment. She lives near Portland in Victoria, where large amounts of plastic debris wash up on a local beach. Wallace collects this debris then arranges it into art installations based on her particular ways of binding, weaving, and arranging this material (see Wallace, 2011). The artist and coauthor of this paper, Hannigan, knows the painting process as a constant problem-solving endeavor: "As soon as you put a mark on a canvas you have a problem to solve." Hannigan deliberately includes patterns into her paintings to complicate the "problem-solving" dynamic of her painting process and also always paints to music because the embodied patterning of music and the way music is mood-altering and informs her work (Fig. 3).

Fig. 3 Shelley Hannigan's *Dress at Bundanon*

The Japanese artist Mako Sasaki photographs the regularly lit nighttime scenes of cities such as Singapore, Shanghai, or Tokyo. His photographic technique is to use long exposure to capture the movement of lit elevators and other city lights, so that their patterns are caught and exaggerated in motion. See Figs. 4 and 5.

The patterns of lit shapes and colors become blurred in Sasaki's photographs as a way of capturing the movement of place and capturing our knowledge of this movement and both his and our interaction with this movement. Within the frame of the photograph, we see a snapshot of a patterned place made up of city lights, but it is deliberately blurred to emphasize the movement of patterns. Sasaki (2015) loses some of the detail and original shapes of his patterned subject matter (night lights of the city) because of the way the photographs are stretched and blurred during the process of capturing movement with still photography.

These alternative ways of engaging with, viewing, imagining, and creating patterns of environments are ideal ways to show people how they are interconnected with their environments. In addition to arts and crafts, music is an aesthetic and holistic approach to teaching and learning childhoodnature through patterns and patterning. Music is a patterned language that plays with our feelings – thereby potentially changing moods, inspiring the body to move, and activating the brain and imagination or even memory. Music can conjure up images of places or remind the listener of places where they may have heard similar music. Therefore, music can be an interesting way to connect people to sound-scape art.

The musician John Luther Adams (2012) describes how fundamental concepts of ecology are important to his practice, describing his music as "not the specific patterns of harmony, melody, rhythm and timbre" but "the totality of the sound" (n.p.) – that is, the way all these different patterns come together to create the complex and layered patterning of the piece of music. It is this holistic notion of patterns that we think should be explored in nature. Educators need to consider how children learn and identify pattern information for growth, development, and well-being through and across all the disciplines taught at school. Therefore, our pattern-

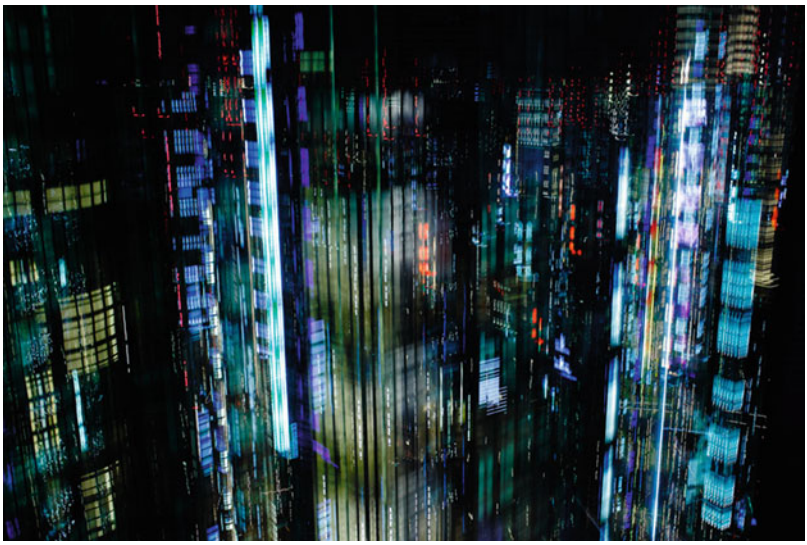

Fig. 4 Mako Sasaki's *Tokyo Layers*

Fig. 5 Mako Sasaki's *Shanghai Layers*

inspired pedagogy and curricula for childhoodnature foregrounds the arts and aesthetics as a transdisciplinary focus for children to learn in sensory and embodied ways. As Graham (2014) suggests, "when extended to the beholding of Nature's patterns, the 'artist' is Nature itself" (n.p.).

Being Ecologically and Aesthetically Engaged Learners

Having explained our theoretical stance, which is transdisciplinary, and introduced theories that support our view of childhoodnature with a focus on patterns and patterning, this section discusses the development of environmental aesthetics toward ecological aesthetics. In a similar way that discipline foci are remnants of the past, such as the factory model for education, remnants of modernism exist where art was that created by "the" genius, to be appreciated from afar. That is, portrait paintings, still life, sculpture, and other traditions in western art have tended to focus on the object d'art as an object that we admire from a distance. One way of aesthetically knowing and appreciating environments has been through the art of landscape painting – where people captured a view of landscape as something "out there." This compartmentalisation and hierarchical view of art, people, and environments shares the tradition of discipline foci and limited time, scope, and space in schooling – where everything is defined, contained, and bordered with a place and/or space.

This traditional kind of people/place relationship views nature as landscape places which are separate from us (Carlson, 2012). In contrast, ecological aesthetics challenge an anthropocentric view of humans to nature where, particularly through the tradition of landscape painting, landscapes were selected, bordered, and viewed – often depicting control or ownership. Both eco-aesthetic and eco-critical approaches to art and nature have critiqued this human-centered depiction of nature (Banerjee, 2016). These approaches have inspired art that enables the viewer to engage in and with landscapes or places through community art, site-specific art such as those exemplified by Wolesley (2017) and Wallace above, or socially engaged art projects.

Aesthetics is not limited to art and Carlson (2012) explains that an ecological aesthetics can engage people in more embodied connected ways than traditional object-based aesthetics. One model is the *natural environmental model.* This aesthetic suits our proposition of patterning in childhoodnature as it "bases aesthetic appreciation on a scientific view of nature and its qualities. It thereby endows the aesthetic appreciation of nature with a degree of objectivity that helps to dispel environmental and moral criticisms, such as that of anthropocentricism" (Carlson, 2012, p. 12).

Another model that Carlson (2012) proposes is called *aesthetics of engagement.* This model considers the way artists have in the past few decades engaged more with nature, communities, and environments. It is a model for appreciating art and nature that encompasses aesthetic dimensions of natural and human-made environments as well as the social aesthetics of human relationships. This fits with our understanding of childhoodnature explored through patterns and patterning as teacher educators as we teach conceptual knowledge about nature and environments. In addition, we support and encourage embodied experiences of being in and with and how we interact with others as part of the environmental-self/environmental-place happenings.

The aesthetics of engagement is a relational way of learning and teaching about patterns in and with place. This may include finding patterns (in context), noticing

patterns, understanding how and why patterns are organized from scientific or mathematic perspectives, creating patterns, and discussing and experiencing patterns in various spaces and places. Thus, one can start to gain understanding about how and why patterns exist in holistic ways. This approach requires teaching young children to see and understand patterns within themselves such as their skin and within their environments such as insects, leaves, shells, sand, and waterways and not only to appreciate the artistic possibilities of patterns but also to appreciate the science of how and why they emerged and the mathematics of their forms. This holistic and transdisciplinary approach enables people to see and understand things, beings, and their place and their interconnections with each other.

Gregory Bateson's daughter, Mary Katherine Bateson, reminds us of the importance of understanding and perceiving these kinds of ecological interconnections. She states, "what is there about our way of perceiving that makes us not see the delicate interdependencies in ecological systems that give them integrity. We don't see them therefore we break them" (Bateson, 2015). It is through learning to see, by noticing, feeling, and focusing on things such as pattern that are all around us and interconnect us as natural beings to our environment, that we can foster children's connections to their environment in complex ways, as ecologically and aesthetically engaged beings.

Patterning and the Possibility of Biophilic Pedagogies

In this chapter, we take the perspective that humankind's connection to nature is innate. Wilson (1984, p. 1) describes this process as *biophilia* or the "the innate tendency to focus on life and lifelike processes." He argues that as part of our humanity, we are deeply embedded within our biology to "explore and affiliate with life" and that "it is a deep and complicated process in mental development" (p. 1). Considering humankind's biophillic tendencies, we maintain that compartmentalized understandings about complex concepts such as patterns and patterning are limited when viewed from stand-alone disciplines, whether from mathematics, music, or science perspectives. New ways of thinking about how we can connect children to complex knowledge and insights through biophilic explorations and engagement with nature are needed.

Of utmost importance to our survival within the anthropocene is the situation where children, as part of childhoodnature, are not only encouraged to become environmentally aware but are able to recognize and maintain their innate connections to nature. In recent years there has been a surge in interest in eco-aesthetic and nature pedagogies in early childhood education. Nature pedagogies are effective ways to foster children's learning and curiosity in nature and to support them to be environmentally aware and comfortable as ecological beings (International Association of Nature Pedagogy, 2017). For example, the forest school movement, originating in Denmark after the Second World War, is now popular across Scandinavia, the UK and Europe, and in other countries (Knight, 2013; Williams-Siegfredsen, 2012). In Australia the "bush kinder" approach, where children learn in, through, and

about nature is gathering momentum (Campbell & Cutter-Mackenzie, 2015). Other examples of connecting children's learning to and within nature are from the artist and educator Peter London (2003) who invited his students to lie down on a forest floor to learn about nature in a sensory way. Tim Ingold (2013), an anthropologist and educator, encourages his architecture students to develop their awareness of designing in and with place by spending time on a beach to learn in embodied and sensory ways with nature.

Integrating Patterns of Sameness and Difference into Children's Learning

Children's biophilic engagement with nature along with environmental play and aesthetic engagement is often missing from discipline-centered teaching of patterning. Thus, the question that needs asking is what would eco-aesthetic pattern-based education for children look like?

First, for children to have opportunities to engage in activities, teachers need to understand the big picture of the difference between discipline foci presented in Fig. 1 and more fluid and holistic ways of exploring patterns and patterning across different cultures and disciplines (see Fig. 6, *A pedagogy for patterning in childhoodnature*). In Fig. 6, we have conceptualized a complex pedagogy that shows the different elements of our pedagogy in black circles, all interconnected with the blue lines and with opportunities for play and experimentation across all areas.

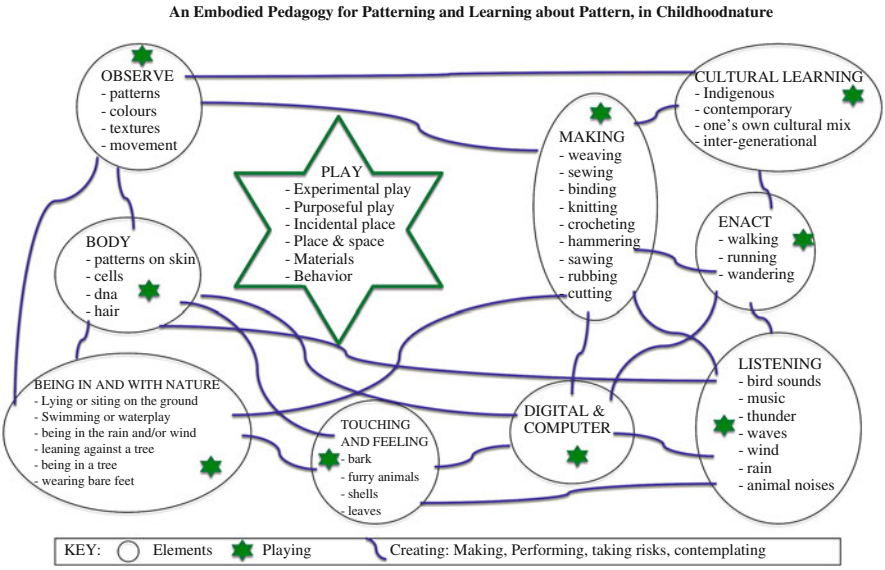

Fig. 6 The authors' diagram of *a pedagogy for patterning in childhoodnature*

There are many patterning experiences children can have in and with nature, such as building shelters with driftwood, lying down in a forest, and allowing nature to leave imprints and marks on paper as part of developing artworks. However, a way that students could take responsibility for "connecting the dots" of their learning is to record drawings of science experiments, nature observations, street scenes, samples, notes, writing, photographs, and so on, in their own handmade journal that they take with them to document their different experiences. A "patterning journey" journal could look different for different individuals and contexts. For younger children, for example, educators might scaffold children's learning experiences through asking questions and pointing out different patterning features along with documenting the process and initiating group reflection.

As an extension of Haraway's thinking about string figures, teachers could more consciously include children's string games in the teaching and learning process to explore the following: where string games originated from, different cultural approaches and materials used, and learning about pattern, line, complex structures, symmetry, and knots. Similarly, the "jumping elastics" children's game has different names and derivatives in Germany, France, and China. As part of their patterning learning, children could explore the variations to the game and learn about the materials used in the past and where this game might have originated. Jumping elastics to a rhyme in itself provides children opportunities to learn patterning through repetitive jumping, musical understanding with riddles, and mathematics learning as they achieve the different heights, jumping combinations, and levels of competence. It offers visual, spatial, and embodied ways of learning patterning with others through the engagement of the properties of the elastic.

Weaving with natural fibers, including dried grasses, reeds, hand-spun paper (shifu), felted fibers, or handmade rope, provide children with opportunities to understand how different string fibers are made then how they are woven. Weaving provides links to cultural practices of patterning across the world and links back to ancient times. Author one, Hannigan, recently worked with an Indigenous elder and an art class to create dried grass animals. The students used straw for convenience, but she noted how this activity involved patterning through binding with wool while shoving dried grass into an animal form. Once children have engaged this activity themselves, they are able to then appreciate the material, technological, and cultural information one generates when creating toys with binding more traditional materials such as dried grasses among Indigenous artists.

As Fig. 6 shows, to think differently we believe patterning learning should cross boundaries. Rather than preschool children learning about patterning in mathematics by rearranging colored blocks, playing with dress-ups as part of dramatic play, and then on another day learning about beehives as part of science, we suggest combining the patterning learning across disciplines. An example of a transdisciplinary approach to patterning learning might be where children construct a beehive, with hexagonal units made with cardboard or cut plastic milk containers, with opportunities to understand the patterning. Next, children could design and dress-up in homemade bee costumes, with opportunities for children to study the different patterns on the bee's abdomen and, like bees, inhabit the beehive wearing their

homemade costumes learning about insect behavior. They could enact the process of bees making honey and fanning the hive when temperatures rise. This transdisciplinary learning experience would provide knowledge and insights about architecture, art, textiles, biology, insect behavior, nature, and culture.

One common way of learning patterning in preschool is where children line up their shoes to learn beginning mathematical concepts such as identifying attributes, matching, sorting, and patterning. Our childhoodnature pedagogy could expand this to provide children with opportunities to explore cultural practices of storing shoes outside in patterned and ordered rows (e.g., as practiced in Japan). This could extend to histories of making shoes out of natural materials and fibers and how this links to nature. To extend the patterning learning further, other cultural practices about shoes could be explored, such as shoe shops with shoes in size order across the store expanding to different size footprints and animal footprints on different surfaces, i.e., sand mud, snow, and so on.

Patterns and exploring the process of patterning are ways of overcoming discipline boundaries and connecting children's biophilic engagement with learning. For example, children observing patterns in water ripples in a river or a creek, or tracking snail trails on a path, or watching ducks fly in a "V" formation, exposes them to nature's patterns and in turn supports children's ecological learning. Further engagement with the ways patterns begin, end, and take a different turn allows children to explore with patterns of sameness and difference within nature. Environmental play is crucial for children to be able to become ecologically and aesthetically engaged learners, in order to inquire about the 'why,' 'why not,' and 'how' of patterning. This in turn fosters interest and insights and helps to develop biophilic dispositions. Through reconceptualizing teaching of patterning in education and by crossing the discipline divides as Fig. 6 illustrates, embracing biophilic pedagogies allows for information and phenomena to be learnt about within all its complexity. We know that young children learn through play, but as argued by Cutter-Mackenzie, Edwards, Moore, and Boyd (2014), children's environmental education needs to be supported by adults because play alone "does not help children to develop pro-environmental dispositions and understandings" (p. 34). Furthermore, adults who have biophilic attitudes can support children to access learning and knowledge about nature, extending their understanding about the environment (Cutter-Mackenzie et al., 2014). Thus, we argue that to teach, learn, and know patterns and patterning require a rethink about what constitutes discipline and non-discipline content, pedagogy, innate knowledge, and connections to nature. Engaging with biophilic pedagogies might just be one way to do this.

Conclusion

This chapter has explored patterning as a transdisciplinary approach to (re)conceptualize childhoodnature. By transgressing established barriers and boundaries found in mainstream education, we have highlighted the potential of patterns and patterning for reconsidering and reconceptualizing pedagogies and curricula. This reconceptualization offers a way of teaching that engages children through finding,

noticing, understanding, and creating patterns. Our reconceptualization of childhoodnature education has maintained that knowledge about patterns and patterning can bring children closer to understanding themselves as ecological beings connected to the natural environment. It provides opportunities for alternative inquiries that allow for deep understanding of the self and its connections to nature.

As the introduction to Section 9 of this handbook states, our patterning and patterned proposition offers a way to attend "to the sensuous and affective qualities of childhoodnature encounters" and that "multiple sites are opened up as vital spaces for children" ("Introduction to Section 9: Childhoodnature Ecological Aesthetics and the Learning Environment" by Rousell and Williams, 2018, this volume). Possible spaces are opened up for children's exploration and wondering, inspired by contemporary artists who practice aesthetics of engagement (Carson, 2012) and promote eco-aesthetic ways of doing and being. The eco-aesthetic, patterned possibilities discussed in this chapter illustrate ways of thinking about transdisciplinary practices with a wide reach into natural and cultural environments and within holistic ways. On a final note, as twenty-first-century citizens, we need to be aware of and respond to creative, transdisciplinary approaches in education, to further the conceptualization and embodiment of childhoodnature.

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Nanotechnology, Anthropocene, and Education: Scale as an Aesthetic Catalyst to Rethink Concepts of Child/Nature

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Patti Vera Pente

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Abstract

This paper is based upon the inspiration that I find, as an artist and educator, among areas of nanotechnology, art, and pedagogy in response to the Anthropocene. The notion of scale is paramount to this research: through a shift in scale to include the very large and the very small, dichotomous thought is eschewed for a concept of life understood as continual, material process. This awareness affords a pedagogy of creative imagination about the world that can confront current anthropocentric habits and attitudes. The nanoscale space between the atomic force microscope and a single atom is related to the vast geological time of the Anthropocene so that these extreme scales can function as catalysts for artistic imagining. Furthermore, I consider these extreme, inhuman scales with respect to the child in/of nature. Specifically, I examine the Western, educational norms of nature understood as a benevolent backdrop to human rejuvenation. In doing so, I look to a Deleuze-Guattarian concept of intensity within a rhizomatic concept of measurement as an artistic strategy. Current life

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requires a shift in ontological understanding to first identify established assumptions about planetary relationships and, second, to experiment with novel views offered by emergent conditions and technologies. This can begin with a reconsideration of ideas about the child and nature. Educators are poised to influence how this version of human/non/inhuman relationality will develop. Changes in the ways we live among other species and with the inhuman Earth must take into account a more geologically and ecologically sensitive perspective, and cultural connections between the sciences and the arts can help promote this necessity.

Keywords
Anthropocene · Art education · Scale · New materialism · Nanotechnology · Child/nature · Deleuze and Guattari · Ontology

Introduction

This chapter critiques the educational trend that considers the child and nature as a narrowly constructed dichotomy whereby the typical urban child is imbued with the loss due to a lack of exposure to nature (Louv, 2012). In considering alternative configurations of childhood in education, I expand to connect education to the larger society, something that is necessary to understand how change can be relevant within and beyond educational institutions. I theorize how the nanoscale can expand the imagination of what our human relationship with the planet might become. Given that ecological destruction is evident in this age of the Anthropocene, ways to educate children and the larger public with an ontological shift toward a greater sensitivity about the planet are desirable and necessary. I posit that through art making and viewing, the deeply tacit values with respect to human-non/inhuman relations can be examined and better understood.

Furthermore, the aesthetic approach can help to unpack the constructed duality of nature and culture with specific focus on the child. The expanding understanding of the world to include the tiny nanoscale affords a pedagogical moment to help formulate how humans are part of a material process of natural/cultural emergence. With this in mind, I probe what significance this might have for creative, cultural, and educational work. This fosters another avenue of investigation: what does it mean to be human within relationships fostered through imaginative considerations of materiality? Put differently, when anything can be created by manipulating atoms through nanotechnology, what might be made of ourselves in the face of this power? Specifically, I ask how nano-culture is explored so that an understanding of this scale develops with respect to social and environmental implications and so that students and teachers are able to take full advantage of the imaginative potential and the social implications of nanotechnology in the continued development of an entangled world.

As a form of education, meaningful aesthetic experiences that open up ideas about life occur when notions of self are linked to ways that social values are cultivated, communicated, and/or questioned (Emme, 2001; Pente, 2008, 2010).

By considering a shift of scale, the ways that we, as educators, take the human scale regarding Earth for granted can be highlighted through imagining the world at the very small level of the nanoscale. By including consideration of this scale, I call into question the pervasive underlying assumptions of human exceptionalism, including an assumption of fixed identity that purports a superior self as contained within the world, yet separate from it. Variations of this position play out within education in the correlation of notions of the child with an idealized form of nature (Louv, 2012). This is the Anthropos-centered perspective of human experience. Obviously, different species perceive different ranges within scale, but the problem in which I engage is the implication of perceiving multiple scales of life at this contemporary Anthropocentric moment. When nanotechnology stretches scales of perception, the artist can catalyze movement into uncertain, new territories, and this has the possibility to change notions of what life might become and what the world might become.

Nanotechnology is about the study and manipulation of materials at the scale of billions of a meter: beyond what the eye can see without the prosthetic of electron microscopy. Such a specific size positions the nano-world between the physical properties and behaviors of quantum mechanics and those of the macro-world. In other words, unique events occur among and within materials at this range. In a sense, it is a hidden world within our everyday lives. Nano-science is a relatively recent influence within the public imaginary and will continue to have an accelerated, exponential impact on the world (Drexler, 2010). Given that visualization of phenomena is key in education and given that there exists a creative confluence of science and art within many contemporary art and educational circles, we have what philosopher, Gilles Deleuze, might appreciate as a perfect storm of generative possibility with regard to nanotechnology, art, and education. The eye of this storm is the ethical and social imperative to consider our relationship with the Earth and each other in these Anthropocentric conditions. As Jami Weinstein and Claire Colebrook observe, "what we know as 'life' and 'nature' is always given in multiple, fleeting, partial, haunting, and disturbing encounters" (2017, p. 13). I inquire into ways that aesthetic encounters with measurement and expanded scales might open up and "disturb" the multiple relationships among concepts of the child, nature, and education. Significantly, this kind of ontological thinking can support renewed educational practices in the classroom with respect to our ecological selves.

Accuracy of measurement is desired tremendously within all scientific and educational areas that use scales to seek exacting representations of the world. There is an unspoken quest for *the* empirical truth in such activities of measurement. As sophisticated instruments measure at the nanoscale, the data expands knowledge beyond the human, thereby extending thresholds of the known/unknowable regarding our material world. By rethinking the act of measurement as a process of differentiation, disruption, or interruption, rather than as a form of representation, the potential for the aesthetic and imagination to open possibilities for considering the human as integrated with the world is possible. The significance is the influence of difference, in a Romanticism (1994) sense, rather than the influence of identity: with such a focus, the world becomes strange and thus renewed in moments of perception. This parallels aesthetic experience and/or artistic acts of exploration.

In delving deeply into generative questions and answers to these probes, I organize the chapter with a critique of nature and child in education, followed by a discussion about nanotechnology. Next, I expand with comments about the Anthropocene. Finally, I will link the previous sections to opportunities within art, anticipating the future educational world that will continue to mix technical, physical, and virtual relationships as part of the material world.

Nature and the Child in Education

There is a customary division between nature and the child within educational circles that reflects a form of human exceptionalism: it underlies a perpetuation of "man" as manipulator of the land, as evidenced with his environmentally destructive planetary use of resources. This perspective underlies environmental and outdoor education in North America (Clarke, 2017; Malone, 2017). Specifically, these fields are based upon understanding of the child as a separate being who acts within a rural environment that is called "nature." This has the unintended result of sustaining larger social, humanist assumptions that William Connolly (2017) identifies as "ghosts of mastery, sociocentrism, and human exceptionalism" (p. 13). Connolly warns that none of these social realities can be sustained over years if we are to adjust to and change our current, Anthropocentric realities of this planetary, climactic situation. With our continued mix of capitalism and planetary overuse, our educational systems in the West are complicit with these tacit values that continue to gird an understanding of childhood as a time of individual development where this separation of human and planet is maintained. For example, there are typical lessons surrounding sustainability where the phrase, "recycle, reuse, and reduce," is common in North American schools. On the surface, this is, of course, a good attitude to introduce to children, yet this also maintains a division between human and the planet in terms of agency. The child is the agent in this scenario and is encouraged to act upon the planet through consideration of her environmental footprint. What is often missing in these practical assignments, however, is a consideration of our human and non/inhuman relationships. Alternatively, introducing a posthuman perspective situates children, along with adults, as ontologically invested with a relational world among other living and nonliving agents. This aligns with Weinstein and Colebrook (2017) who purport a renewed examination of life in a philosophical sense, and now that life in a biological sense has moved so far beyond the human into – for example – nanoscaled entities. In recent posthuman studies and philosophies of new materialism, this perspective is championed as a potential way of considering life. With respect to moving into a different relationship with the Earth, educator, David Clarke, draws upon a Deleuzian focus to envision an ontological middle in order to eschew the familiar, linear story of beginnings and endings. As he suggests, a middle "... may be one way to help engender new materialist and animistic ways of seeing with learners, demonstrating the intra-relational becoming of the world with students in any way we can" (2017, p. 317). Taking his lead, I consider the threshold between notions of child and nature as active and mobile,

so that the relationship between these two can move toward a new understanding of our planet and our human selves in education. I build on work that has already begun in this area.

On the topic of the usual shaping of human/planetary or child/nature relations, educator, Karen Malone (2016), identifies and debunks three assumptions within current discourse regarding the *child in nature* as a movement that has developed within Western educational circles. Firstly, she observes the assumption that the child is separate from nature; secondly, that nature is romanticized as a backdrop, like an "inanimate object" for human use; and thirdly, that the ways the child is theorized hide a white, middle-class, male bias. All three points are key to analyzing a Western residue of Cartesianism (referenced as a mind/body division) that is maintained through the narrow perspective that there is a "thing" called nature that is benevolent, rejuvenating, and kind. This cultural depiction is reflected in popular forms of entertainment when notions of wilderness and untouched green spaces are presented as idyllic. The person is made whole through physical experiences within this utopian idea of wilderness. Identified as ecocriticism or green Romanticism, this view of nature is found in much Western English literature. As Vince Carducci (2009, p. 633) explains, "the 'problem' of ecocriticism is its putting nature on a pedestal, casting it as the pristine other of modern civilization and of the autonomous individual self..." This version of untouched nature as healer is also found in ubiquitous advertisements for various products, in movies and television, and in other forms of visual culture. It is so prevalent that the population tends to accept this perspective without question. However, in actuality, all of the land, air, and sea are worked, used, marked, and/or occupied by the human footprint in some way. The Anthropocene adds geological evidence of this fact (Crutzen, 2002).

I return to the idea of a benevolent nature as a Western male bias (Malone, 2016). What is missing in this normative assumption is the important fact that humans, male, female, or otherwise identified, are also part of nature, along with nonhuman and inhuman entities. It is more productive to think about all life anew through a Deleuze-Guattarian (1987) notion of mobile intensities and processual change within and of the world. The child understood as an emergent, material agent along with the rest of the living and nonliving agents reflects this perspective. Significantly, in reference to her research with children in La Paz, Bolivia, Malone describes how "these approaches allowed me to imagine a view of agency not tied exclusively to humans. Nonhuman entities became more than simply objects being directed by humans, but as subjects in their own right, they were shaping an exchange and co-merging with children" (2016, p. 48). Alas, this perspective is not yet as pervasive as the romantic idea of the child in need of benevolent nature to become whole and to have agency, which continues to perpetuate the notion of human domination over "nature" and at the same time limits the multiple ways that materiality presents as the world. The relationships among entities in/of the world are much more complicated than a simplified duality can accommodate. This becomes evident in various areas of knowledge. For example, in the development of nanotechnology, the division of life/nonlife at this very small scale becomes moot. These nanoscaled workings have repercussions for thinking about the reshaping of the

terms human/child and nature in this time of the Anthropocene because they provide material force of the particle without the familiar macro-sized divisions (e.g., human and other).

Nanotechnology

Nanotechnology refers to the study and use of materials at the small range of 1–100 nm, where 1 nm is equal to 1 billionth of a meter. To put this into perspective, one human hair has a diameter of 80,000 nm. It is at this size that materials exhibit unique properties and behaviors. For example, melting points, magnetism, color, tensile strength, reactions to other materials, etc. are different at the nanoscale, and this allows for novel applications (Ramsden, & Freeman, 2009). Organic and inorganic take on new meaning. Although still experimental, scientists can manipulate and move individual atoms with the use of electron microscopy. Future applications continue to expand (Drexler, 2010). Industry and academia are very active and efficient in self-regulation (Rip & van Lente, 2013), but there is much that is unknown because discovery moves to application relatively quickly (Dorbeck-Jung & Shelley-Egan, 2013; Hunt, 2006). The drive for economic profit has produced items as variable as cosmetics, paint, and drug delivery systems (Khan, 2012). Importantly, nanotechnology may hold keys for stronger environmental sustainability: a goal that is increasingly becoming urgently needed (Newberry, 2012; Smith & Granqvist, 2011). Many scholars agree that nanotechnology is the most influential change of our times (Bowman, Stokes, & Bennett, 2013; Corner & Pidgeon, 2012; Feyman, 1960; Goldenberg, 2006; Hayles, 2004; Lively, Conroy, Weaver, & Bimber, 2012; Mehta & Hunt, 2006; Ratner & Ratner, 2003; Wolfe & Medikonda, 2012; UNESCO, 2006). With this in mind, I question how nanotechnology is taken up in the consideration of our ecological relationships regarding the child and nature in education. Greater discussion about the concepts of nanotechnology in the public realm and in K-university education systems is necessary (Duncan et al. 2010; Light Feather, 2012). Firstly, with greater discussion about the natural/human world filtered through the nanoscale, students may make connections that take them beyond the conceptual separation of their physicality and their world. At the level of the nanoscale, commonalities and traits between living/nonliving take on new meaning. While careful not to fall into yet another romanticized version of life whereby all living and nonliving entities are viewed simply as various compilations of small atomic particles, as an initial perspective, the nanoscale is useful in opening conversations regarding the established dualities within child/nature. Importantly, these multiple ways of understanding the world differently emphasize the idea that nature is cultural: that a person's point of view, bias, and upbringing all contribute to how nature is understood. As Congdon (2006, p. 50) notes, "we must ask questions about who has the power to make new knowledge, represent new ways of seeing the world, and participate in the construction of new cultures and a rapidly changing world." In this regard, questions about the nature and reception of that knowledge are important. Consequently, scholars have cautioned against demonizing or

deifying this emergent nanotechnology, where fantastic scenarios about products and effects of nanotechnology have instilled fear or hope in unrealistic ways (Gimzewski & Vesna, 2004; Rogers-Brown, Shearer, Herr Harthorn, & Martin, 2012; Siegrist, 2012). Ultimately, the ethical compass of policy is in the hands of individual governments, and so it is imperative to have an informed public who can guide and provide input for future direction (McGinn, 2012; Newfield, 2012; Peterson, 2004). This is not an easy task, however, if information about nanotechnology is minimal, distorted, or incomprehensible to the average person. Scientist, Ahmed Khan, notes, "as we design systems on a nanoscale, we develop the capability to redesign the structure of all materials – natural and synthetic – along with rethinking the new possibilities of the reconstruction of any and all materials. Such a change in our design power presents tremendous social and ethical questions" (2012, p. 25). Khan's point brings to the forefront the urgency to examine the ways that education continues to support human exceptionalism in either covert or overt ways. Rather than considering nanotechnology as a tool that humans use to control the world, it can be employed in a philosophical sense to create linkages among entities along with the human: a distinctly posthuman (Braidotti, 2013) interpretation of nanotechnology.

Measurement as an Artistic Methodology

One interesting challenge for educators considering nanotechnology is the relationship of the "invisible" materials at the small nanoscale with the visible character of the human scale. This becomes an ontological question about the human in relation to other entities due to the fact that the electron becomes key in understanding "nature" at this level. The assemblage of electron scanning microscope – human eye – electron acts to dissolve barriers between nature and the human, opening thought to relationships among human/nonhuman/inhuman/posthuman. All of these prefixes indicate the expanded conversation within new materialism to reposition the human in relation with the Earth. One move toward this goal might be found through creative explorations of nanotechnology concepts of self-assembly, volume-to-surface ratios, electromagnetic forces, and electron spin: all of which focus attention on actions at the level of the electron – within and beyond the human.

Historically, we have always instinctively measured our positionality in the world through corporeal comparisons which are automatic responses to our bodies in/of place. However, as Nordmann (2006, p. 56) notes, the "inconceivability" of the complexity of nanotechnology results in a "decoupling of the technical control with causal representation." This occurs, in part, when we attempt to understand the ramifications of nanotechnology capabilities that are so distant from our physical perceptions. The very small size and inherent complexities baffle human perception. A useful approach to this "lost sensibility" is found in the work of new materialism. In this body of literature, the mixtures of culture, nature, and technology can shift the hierarchy among entities in the world so that humans are no long at the ontological pinnacle (Bennett, 2010). Scholars highlight our embeddedness in the world through

shared, material connections (Ahmed, 2010; Barad, 2007; Connolly, 2010; Coole, 2010; Grosz, 2010). This perspective aligns with Malone's (2017) understanding of the complexities of the child enmeshed in daily encounters and historical experiences with other entities.

Within nano-measurement, divisions are shaken as the logic of dichotomy is re-tasked. Dualities at the nanoscale are physically softened as borders and membranes become permeable at the size of the particle. While this is an unnerving possibility for many, it also loosens thought toward a metaphorically thinner skin. Thus, subject/object, child/nature, or culture/nature is eschewed for a Deleuze-Guattarian (1987) middle of emergent subjectivity (Braidotti, 2011) that focuses on notions of surface (Deleuze, 2003) and manifests in opportunities for wonder. By thinking the act of measurement differently, not as a quest for truth and/or confirmation of existence as it currently plays out within a stationary, corporeal positionality, but rather, as a creative act of continual emergence as the surface of the Earth, measurement shifts from a scientific act toward one of philosophical and artistic inquiry. Such a renewed consideration of measurement can be pedagogical, suggesting a deterritorializing of attitudes, identities, and possibilities. By rethinking the act of measurement as art praxis, the artist pushes out from within the norms of the human scale. Thus, in aesthetic exploration, measurement becomes a line of flight, as the artist "becomes" surface through a shift in scale (Deleuze & Guattari, 1987). This focus on the surface of the Earth, and on the skin of the body, sets up a commonality that functions to think other than the separation of the body and world. Both are surface, albeit with different textural qualities. The "ontological gap" of dualities, Karen Barad (2003, p. 802) suggests, is sometimes better addressed without language. Thus, artistic moments influenced by the nanoscale provide opportunity to think about one's place in the world metonymically as part of the surface of the Earth. This is significant because surface areas, so key in nanotechnology, become the "between" or middle when two surfaces touch through electron force.

This way of thinking about one's "place" as a continuation of the surface of the Earth not only erodes the separation of self and others but also works as a form of smooth space. Deleuze and Guattari (1987) describe the smooth and striated as ever changing, always connected, and open to possible ruptures within normative behaviors. In this case, normative considerations of the body are fixed in a particular place as striated space remains within dichotomous forms of representation. Like the nano-surface, however, the psychological, aesthetic middle space is active and continually changing in unpredictable ways so that to consider surface as smooth space can be an inroad toward thinking anew. The human/nonhuman duality is reconsidered. The advantage might be a more responsible attitude or outlook toward the Earth and to children with whom we, as educators, teach/share/connect as part of this convoluted surface. It is in creative thought such as this that the child/nature machinic assemblage can emerge and be transformative for education.

Deleuze (1994) thinks through the significance of repetitions that are found, not in representation (identification of one thing as being different from another) but in the activity that is repeated through, in this case, creative linkage of nanotechnology to

concepts of the self in relation to the world. Following Deleuze, rhizomatic linkages among extremes of scale offer a very different approach to measurement than what is normally assumed as the metaphor of linear sizes that move from larger to smaller, or the reverse. Instead of this nesting metaphor, so ingrained in approaches to measuring natural phenomenon, the rhizomatic metaphor allows for divergent sizes to affect each other and to work randomly. This is nearer to the function of materials at the nanoscale and to their influence on the macro-world.

This is not to suggest that educators become familiar with and use the materials and/or processes of nanotechnology in depth, for this suggestion would negatively feed into the illusion of human exceptionalism with respect to affordances within new technologies. As a heuristic strategy, however, educators can look to phenomena highlighted by nanotechnology with its focus on the unique activities at this size, and consider what it means to be a child who is emergently living in/with/as the Anthropocene.

Anthropocene

Much has been discussed and written regarding the Anthropocene. As the term suggests, it refers to the levels of human activity that are evidenced in the geological layers of the Earth. For example, rising ocean levels, high carbon dioxide levels, extensive overuse of fossil fuels, species extinction, ozone depletion, and many more destructive changes – some irreversible – are the result of human activity: typically, activity that maintains or drives a lifestyle of affluence (Colebrook, 2016). Atmospheric chemist, Paul Crutzen, along with colleague, Eugene Stoermer, used the term, Anthropocene, to denote these permanent signs of human activity that stand out as a layer of geological strata upon the Earth (Crutzen, 2002; Crutzen & Stoermer, 2000). Currently, the Anthropocene is entrenched within popular culture through disaster cinema, TV, and other forms of culture (Colebrook, 2016; Jagodzinski, 2015). There are many ways that the Anthropocene presents to the public: websites that focus on it as a form of public education, artists who consider the Anthropocene (Anderson, 2015), scholarly journals about the Anthropocene, and advertisements that exploit the term to promote "greener" consumerism. The ways that this term and its connotations are taken up within education are of concern here.

The dualism of human and planet, or as discussed earlier, child/nature, exists in assumptions concerning the Anthropocene. Discussion often results in urgent calls for the human to fix the planetary woes that are the result of continued human consumption. While stopping such glut is necessary, care must be taken that the call does not lump all of humanity together in a way that reinforces a form of humanism whereby "man" is in control of the planet: as Colebrook and Weinstein note, "what has now been referred to as the Anthropocene seems to chasten humanity by noting a destructive impact that reaches geological intensity, but the Anthropocene also invites projects of geoengineering and uncritical uses of a once multiple but now reunified humanity" (2017, p. 22). Such a complicated reaction to this current state of planetary stress reflects an all-too-human desire to fix and stabilize the

environment. However, this may only exacerbate the separation of the human from the world. The relationships among entities on/of the planet are much more complex. The threat of extinction of the human as a species has further united the human, which has had the unfortunate result in strengthening this divide in some instances (Colebrook, 2016).

Politically, such an urgency to act toward a more sustainable relationship with the Earth, while necessary, also entertains a negative side. Colebrook (2016) warns that this perspective opens the door to institutional action that impedes the voicing of multiple, contradictory positions. This dissention and discussion are necessary for healthy democratic process. She notes that the fear of species destruction and other dire consequences surrounding the degradation of the planet can give governments a tool by which they act unilaterally, with the populous in fearful acquiescence. In this scenario, the Anthropocene flattens out all possible differences into the narrative of privileged humanity with respect to the rest of the planet. It erodes theoretical efforts to build new, more symbiotic relations with living and nonliving entities (Colebrook, 2016).

The very large scale of geological time that is brought to attention with discussion of the Anthropocene leaves most of us humanly incapable of deeply internalizing its significance. While opposite in size, the nanoscale suggests a similar incomprehension. There are unique affordances and limitations in every scale, but it is noteworthy that both the inhuman geological time scale and nanoscale emphasize our all-too-human limitations with respect to understanding the complexities of the planet. Within nano-measurement and within geological time, the norms that orient the human on the Earth are shaken. As Weinstein and Colebrook propose, the "…*inhuman* orients us to all that is not human, not just that which comes after the human. It also pushes us to scales beyond the human-temporalities and spatialities both deep and astronomical" (2017, p. 5, italics in original). As scale moves from kilometric to nanometric spaces and as time moves from the hour or year to the eon, it raises questions regarding the very notion of what it means to perceive: a very human activity that begins a child's entry into her world.

Art and Education for the Anthropocene

Imagination and perception of the observable world are two poles upon which an art curriculum often is built. Children are encouraged to tap into both of these methods of understanding their lives through various activities with art materials. Typically, in education, concepts quickly turn to application in the practical school setting. Thus, it can be difficult to maintain a force of inquiry that reveals new ways of considering life and the world. However, through the creative force of art, alternative approaches to the creation of new problems to be investigated are encouraged. It is important to open avenues for children to think about life in new ways such that success in dealing with the complexities within the term "nature" can be broached. As Weinstein and Colebrook advise about approaching the current climate crisis, "this approach must be creative and experimental, expansive and self -overcoming,

insofar as an analysis of life that utilizes traditional methods and concepts risks an unwitting return to the predictable, universal, habitual, and hegemonic" (2017, p. 12). Art within the child's life can be such an avenue, and there is, with its potential for affect, opportunity to reach deeply into ontological thinking about life.

The failure to fully recognize the value of creating and viewing art for the pleasure of exploring the imagination and for making connections between art and the world leaves the child missing important understandings about her place in/of the world and about her abilities to act in public situations that demand her voice. This reality is particularly troubling at the level of the young child, whose imagination is at its most formative, expansive, and vulnerable phase. Part of the responsibility of educators is to help students make connections between their creative efforts and their relationships with the world and with others. Art education can be a form of affective, continual interruption in normative assumptions about the multiple, concurrent aspects of our planetary systems. Art can generate the education that is needed to participate in conversations regarding events, activities, and objects hitherto unknown – like the advent of nanotechnology and the Anthropocene. Influenced by the artistic encounter (O'Sullivan, 2006), there is a powerful opportunity for learning within emergence from familiar, artistic forms to unfamiliar, uncertain ones. Consideration of the nanoscale offers artists, teachers, and children avenues that deviate from the norms of skill-based art education trajectories that often lack thoughtful discussion and learning about our contemporary relationships with/as nature. As art educator Jan Jagodzinski notes, "Nature will continue to enjoy in its own "meaningless" way. It is perhaps part and parcel of the *fetishistic disavowal* of an ecological crisis that is already here. We need an ecology *without* Nature" (2013, p. 279, italics in original). For art educators who might be stuck in a representational cycle of defining art as self-expression that primarily romanticizes nature as beautiful, the discovery of concepts that move beyond these traditional forms can be daunting. However, it is this unique aspect of art that can generate new thinking about social responses to the human/non/inhuman (Garoian, 2014). The magnitude of the problems of the Anthropocene requires this kind of consideration.

Thinking of art and the nanoscale not only suggests alternative ways to investigate this realm of art and science, but more importantly, it opens the possibility that there may be deeply ontological shifts in the child's understanding of her world through these kinds of activities. Importantly, art educator, Thomas Barone, links art and agency when he states, "Art is connected to a political act – to think otherwise is doing a disservice to society, to students, to artists – there is no private aesthetic imagination" (Barone, 2001, p. 147). Art that lays bare, resists, or intervenes in social norms to draw attention to the peculiarities and paradoxes of contemporary life is glimpsed through cultural moments of affect. As a method of inquiry, affect can be a powerful moment for teachers and children to consider their lives in new ways (Hickey-Moody, 2013). Educators can reach for this kind of ontological surprise through experimentation in creative activities along with their students and communities (Pente & Beaton, 2015).

Consideration of nanotechnology can stand as one example of this process. Witness, for example, the work of artist, Les Bicknell, who explores the thinking

processes of scientists working with nanotechnology. The unique interdisciplinarity of these technologies lends themselves to creative thinking so that the borders between art and science tend to meld and blur. In his project, *Unfolding the Thinking*, Bicknell captures, through image and film, the ways scientists move. Their physical gestures are the focus of this work. His artistic investigation is also inspired by the specific capacities of the machinery used in nanotechnology. Much of this work is being completed in a residency at the University of Cambridge (Bicknell, 2017). Furthermore, in work that I am currently exploring, after spending time in a similar residency at the Canadian Institute for Nanotechnology (The Canadian National Institute for Nanotechnology can be found using this link http://www.nint-innt.ca/), the behaviors such as molecular self-assembly are the inspiration for a series of GPS drawings that are underway. This type of artistic work offers insight into the ways that interdisciplinary projects can uproot traditional dualities (such as child and nature) that stifle new approaches to life. Art projects that are informed by the nanoscale can be incorporated into education through an interdisciplinary approach.

Conclusion

In this research, consideration of what might become of education if the child's world is expanded through an aesthetic exposure to the discoveries and processes of nanotechnology is pursued. Based upon the affordances of electron microscopy, rethinking notions of nature/culture (Haraway, 2016) and the child raises questions about what humans might create with their bodies in space and time if the perceptions of the world stretch to the nanoscale and geological time. Teaching and learning with the invisible force of electron activity informing perceptions of bodies on the surface of the Earth can extend a sense of materiality: an ecology that moves toward a greater aesthetic connection with the entities of the Earth – living and nonliving. As Clarke describes such consequences for education, "in this way the student is not urged to 'connect with nature,' as there is no 'nature.' Rather, they are urged to consider how they are materially manifested of the world" (2017, pp. 313–314). Influenced by qualities and behaviors of particles within nanotechnology, a shift to an idea of the body as part of the surface of the Earth is helpful in disturbing social and educational norms that situate the child as detached from a "backdrop" of nature. Furthermore, if children are offered artistic opportunities to imagine materials and locations with/in the surface of the Earth – to imagine that which they cannot see – the scales of nanotechnology and geological time may suggest to them alternate ways of becoming in the world. This expansion of measurement and scale may afford a different kind of perception and an increased awareness of ways that the Earth is linked to/as life in all its shifting permutations.

In closing, the realities of the Anthropocene will instigate a renewed exploration of life that can bring children and their education closer to a more intimate connection with/among entities of the world. Unfortunately, fear and urgency may channel individual agency too far onto the State through a misguided interpretation of the

human acting to correct past ecological wrongs. Current life requires a shift in understanding to first identify established educational assumptions about planetary relationships and, second, to experiment with new concepts offered by new conditions and technologies. This can begin with a reconsideration of the concepts of the child and nature. Educators are poised to influence how this version of human/non/inhuman relationality will develop. Changes in the ways humans live among other species and with the inhuman Earth must take into account a more geologically and ecologically sensitive perspective, and cultural connections between the sciences and the arts can help promote this necessity. With this in mind, I continue to explore the ways that philosophy inspires at the edges of materiality and science pushes at the edges of art to generate educational change.

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Childhoodnature in Motion: The Ground for Learning

80

Martha Hart Eddy and Ann Lenore Moradian

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Abstract

This chapter aims to establish embodied movement as both the physical and metaphysical ground for learning, including aesthetic learning in an ecological context. We advocate the moving body as critical to celebrating and deepening childhoodnature. The disconnections from embodiment that have occurred within western cultures and the implications of educational settings that lack an acceptance of natural movement expression and experiential "whole body" learning methodologies are discussed.

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A *double bind* arises from the split between mind and body, humanity and nature, and scientific materialism and broader holistic views of science (Moradian, Double Bind: Finding our way back home (manuscript in preparation), 2017). Examples of problems, solutions, and research suggestions are provided through a series of vignettes that offer an analysis of bodily disassociation, or disembodiment, and propose a revitalization of thinking, feeling, and living childhoodnature through the body *in* and *as* movement. We suggest that developing a lifelong somatic relationship with our bodies in motion, a relationship in which we bring our attention to our lived (psychosensory-motor) experience, is a powerful way to reclaim that wholeness which allows us to care and connect for self and others, to feel a sense of place and belonging, and to self-regulate our behavior for optimal interaction with our world.

Keywords
Body · Child Development · Dance · Eco-somatics · Embodiment · Experiential Learning · Kinesthetic Learning · Movement · Neuro-Motor · Somatics · Systems Thinking

Introduction

> The body itself holds many of the lessons we need to live sustainably in the world. (Moradian, 2017, p. 9)

Dance has been called forth in recent years as a powerful metaphor, reminding us that time, space, and matter are intimately interwoven through movement (Manning, 2013). Somatic practice, the study of "the living body" or *soma* (Eddy, 2016a, p. 5) "not as an objective 'body,' but an embodied process of internal awareness and communication" (Fraleigh, 2015; Green, 2002), can offer a way of remembering our place in the living world, a way of *dancing* which engages us consciously in the movement of life in its fullest sense, rendering each life a *work of art* (see also Rousell & Fell, in press).

This chapter aims to set embodied concepts of childhood and nature in motion by establishing an aesthetic of embodied movement as both the physical and metaphysical ground for learning. We advocate the moving body as critical to celebrating and deepening childhoodnature. We begin by outlining the disconnections from embodiment that have occurred within western cultures. We discuss the implications of educational settings that lack an acceptance of natural movement expression and experiential "whole body" learning methodologies. A *double bind* arises from the split between mind and body, humanity and nature, and scientific materialism and broader holistic views of science (Moradian, 2017). These are hurdles we must overcome to return to wholeness. We provide examples of problems, solutions, and research suggestions through a series of vignettes that offer an analysis of disembodiment and propose a revitalization of thinking, feeling, and living childhoodnature through the body *in* and *as* movement. We share views that work through the concept of childhoodnature as a moving experience and the embodiment of movement itself as a

living creative process of learning and transformation. Rather than proceeding in a linear fashion, we have preferred a visceral, intuitive, and creative interplay of words, ideas, movements, metaphors, images, and interrelations, which can be envisioned as a *dance*.

A key thesis of this chapter is that including bodily movement in education is important and that, in order to specifically foster concepts of childhoodnature, selectivity about the types of movement education engaged in matters. We propose the use of activities that meet the goals of whole-bodied engagement merged with teaching somatic awareness that supports compassionate, kinesthetic empathy. We purport that learning both personally and experientially includes the ways that nature interacts within ecologies, providing strategies for self-regulation, sustainable relationships, and coexistence that are necessary for species survival. Somatic movement education, especially within a "social somatic" context, meets these objectives even within the adverse conditions of disruption, displacement, fear, bullying, harassment (Eddy, 1998, 2016a), violence, and torture (Eddy, 2010a). For the purposes of this chapter, the term "somatic movement" is being used in its fullest sense to include not only contemporary practices of mind-body integration but also all practices that engage whole body-mind-being in life-affirming relationships, including the antecedents of somatic practices within indigenous cultures in the East and Global South.

Thomas Hanna, who coined the term *somatics*, defined it as "the body as perceived from within" (Hanna, 2015). We appreciate the expansion of this definition to:

> . . .a holistic change theory that understands both personal and collective transformation from a radically different paradigm. Somatics understands both the personal and collective as a combination of biological, evolutionary, emotional and psychological aspects, shaped by social and historical norms and adaptive to a wide array of both resilient and oppressive forces. (Generative Somatics, 2017, p. 3)

The body itself is an important landscape for learning, a complex system within other complex systems, including not only natural and physical ecologies but also ecologies of thought, feeling, community and culture. Dwelling in the moving body opens directly to the experience of childhoodnature – to the vast field of relational interplay that is life. This state of awareness establishes direct and interactive relationship with nature, teaching us to recognize what is sustainable and what is destructive. Our long experience as movement practitioners indicates that these patterns of movement spill over into a myriad of relationships.

The Double Bind

> Ecological health continues to elude us – and perhaps indeed depends upon the reconstruction of patterns of thought. (Bateson, 2000, p. xii)

The attempt to set humanity apart from nature predated the Cartesian split of mind and body (in the early seventeenth century) by at least a couple of millennia, both in the west and in the east. A dualism between "that which endures and that

which changes" was introduced during the late Bronze and early Iron Age (1550 BCE to 600 BCE), preparing the way "for the distinction between energy and form, later to become that between 'nature' and 'spirit'" (Baring & Cashford, 1993), and followed by a rejection of both body and nature.

Economist John Maynard Keynes "believed that it was fear of the unknown which played the predominant part in shaping the religions, rituals, rules, networks, and conventions of society. The function of belief systems and institutions was to give humans courage to act in face of the unknown and unknowable" (Skidelsky, 2010, p. xix). At least since Archimedes (287–212 BCE), if not well before, enormous effort has been invested in the attempt to systematically understand, predict, manipulate, and control the natural world. Great strides have been made in this direction since that time. Hannah Arendt, however, presciently predicted that in discovering the *Archimedean Point* (that point outside the earth from which we might control and manipulate it), we would find ourselves stranded, outside and apart from our world, unable to find our way back in (1998).

The alarming increase in dysfunctional human behavior (Brown, 2010) and the destruction of planetary equilibrium (Brown, 2009) point to a "self-correcting system which has lost its governor" and has begun a "spiral into never-ending, but always systemic distortions" (Bateson, 2000, p. 212). Despite the advancements of science and technology, persistent behaviors, dominant belief systems, and their constructs (Berger & Luckman, 1966) have brought us to a point that places life on the planet and the *web of life* that sustains us in peril (Capra, 1996). To survive within the human world that we have created, we have learned to shut off our feedback systems of embodied awareness, pretending that we neither affect nor are affected by one another or our world (Brown, 2010; Eddy, 2016a; Stromsted, 2017). This deeply entrenched idea of humanity apart from nature, and the separation of body from mind, has created a double bind (Moradian, 2017). Gregory Bateson identified a double bind as "a situation in which no matter what a person does, he can't win" and suggests that living in a double bind contributes to schizophrenia (2000, p. 201). While our deepest human need is intimacy, connection, and belonging (Brown, 2010; Stromsted, 2017), we have systematically *dis*connected in order to "succeed" in our rational, competitive, consumeristic world. When we disconnect from the body, we lose our sense of place and self, along with our capacity to feel, self-regulate, care, and belong. When we disconnect from nature, we deny the processes and structures of relationship that sustain life. When we disconnect from each other, we render our actions toward each other less and less humane.

In our desperation to fill the vast emptiness engendered by severing ourselves from the experience of our lives, we race ever-faster away from our unbearable discomfort or toward the acquisition of something we hope will relieve it. Western civilization, we find, has developed into a culture of detachment, objectification, competition, and exploitation, with an economy based on relentless acquisition, consumption, and waste of limited resources. In the USA, Johann Hari points out astutely that "We have created a society where a significant number of our fellow citizens cannot bear to be present in their lives" (2015). We suggest that the violence we see outwardly expressed against each other and our natural world reflects this less

visible violence of disengagement that many of us commit against ourselves on a daily basis and that this condition is perpetuated in our schools.

In writing this chapter on the role of movement in re-establishing life-affirming interrelationship – which we see as fundamental to childhoodnature – we recognize that we speak primarily from a western, northern-hemisphere perspective. While accounting for only a minority of the world's population, the western exploitative and hegemonistic perspective has been disturbingly successful in spreading, bringing the world today to the threshold of disaster. Understanding and addressing the issues that lay at the roots of this malaise may help prevent or even inoculate against it, as well as find ways to engage in new patterns of dynamic equilibrium (Capra, 1996; Capra & Luisi, 2014). Furthermore, awakening to knowledge from and rooted in non-western and indigenous cultures is vital to restore balance through holistic self-regulation and health, as well as in giving voice to disparities (Low, 2013).

Vignette 1: Dancing our Lives

> We enter the world through the body, embraced and cradled in the ceaseless motion that is the hallmark of life itself. The body is, simultaneously, a landscape in and through which we discover, explore, and express our being; a vehicle through which we navigate, learn about, and act with/in the world; and our primary dwelling place. All matter is an expression and a part of nature and is in a constant process of change.

An ongoing state of dynamic balance is foundational to all living systems (Capra & Luisi, 2014; Margulis, 2011). This includes the human body and human being. Every child born into this dimension of time-space enters and experiences the moving world through a moving body. Neither movement nor the body can be separated from nature. We suggest that "mindful movement" and the relatively new field of somatic education offer a way, like "Ariadne's string," to remain conscious as we delve deep within our moving bodies, immersing in and merging with our living wholeness (Eddy, 2016a).

In the context of childhoodnature, aesthetics, and sustainability education, we propose that repairing the mind-body split is necessary not only for personal health and wholeness but also for healing our relationship with each other and with nature. Helping children embrace, maintain, and retrain healthy patterns of being in their bodies is critical to transforming the violence both in and against our world into healthy, sustainable, and life-affirming relation with it. Allowing children space and time to move through, in, and with their universe, to feel, sense, ponder, play, and explore what it is to be alive and a part of the world – to *dance with life* – is essential to embracing this sense of wholeness and belonging and to accessing the resilience and creativity needed as we face the unknown future. We purport a dire need to establish patterns of consciously inhabiting the body, caring for and tending to it *before* children shut down access to their senses, emotions, intuitions, and their capacity "to move and be moved" (Moradian, 2017, p. 8). We also advocate for all children being equally important and deserving of healthy conditions for growth.

There are numerous opportunities available through the body to affirm wholeness and explore the complexity, contradiction, and challenge of existence – which is inherently the challenge of *co*existence. As children play, run, roll, and spin through their full-bodied experience of being, we suggest encouraging presence of both mind and body, inhabiting our bodies, and embracing them consciously from the inside out or *somatically*. We emphasize the process of responding to the feedback from both inner and outer worlds, communicating between them, and making choices consciously. As this happens, we as "educators" must prepare to be challenged and to change in response to what we meet, to learn to inhabit our own bodies through moments of both ease and discomfort. Sylvia Miller, well ahead of her time in 1933 when she wrote her *Rhythms Notebook*, said:

> We cannot start with a regimented curriculum and hope to work backwards to spontaneous invention… The child's job is to initiate the activity, attach his media, and develop his techniques as he proceeds, and the teacher's job is to preserve that atmosphere of detached absorption within which creative effort flourishes and becomes operative. (cited in Eddy, 2016a, p. 188)

We suggest that developing a lifelong somatic relationship with our bodies in motion, a relationship in which we bring our attention to our lived (psychosensory-motor) experience, is a powerful way to reclaim that wholeness which allows us to care and connect, to feel a sense of place and belonging, and to self-regulate our behavior for optimal interaction with our world.

Vignette 2: The Importance of Movement for Children

> Children burst forth into the world clamoring with thirst, hungry to be loved, and driven to move, discover, and grow. Each conception and birth comes from movement and is a call for relationship. We enter life engaged with our universe in an ongoing process of motion.

Movement is an elemental part of being alive and functional in the world. We attend the environment with our eyes, ears, nose, and skin and, more, respond with our muscles, joints, and vocal apparati, our full bodies in motion. These movements form the basis for learning and transformation. In this sense, education cannot be separated or abstracted from the environment or the body, nor can it be demarcated to the confines of *a* body, *a* school, *a* program, *a* family, or *a* community. The use of abstraction, logic, language, and linear and mechanistic thinking have been highly successful in comprehending, managing, and controlling our world. These are powerful and important tools, but not our only tools, and not appropriate to every situation (Abram, 1997a; Capra & Luisi, 2014; Williams & Brown, 2012). Indeed they could not work without the primary tools of learning through *listening, touching, doing, and being*.

Our first movements are unconscious, beginning in the womb, and gradually become more conscious as we explore our environment. Maxine Sheets-Johnstone (2009) correlates the beginning of consciousness with the choices made by cells for

survival, to go toward or away from stimuli (see also Capra, 1996; Capra & Luisi, 2014). Successful physical development requires healthy and efficient access to and use of all available body parts and, through exploration with any body parts that are able to move, links to metacognitive processes. Movement provides this critical connection of brain and body that expresses choice; strengthens autonomic functioning, balance, and motor activity; and promotes psychophysical intelligence (Eddy, 2016a; ISMETA, 2003).

Movement stimulates biofeedback. One somatic premise is that "the body itself holds many of the lessons we need to live sustainably in the world" (Moradian, 2017, p. 9). We suggest that it is particularly important to help children establish and maintain healthy patterns of "mindful movement" and "embodied being" *before* the natural skills of full-bodied self-awareness are dismantled. Keeping the body's feedback systems turned on and engaged allows us to sense self and our agency. In the same way that we affect our environment, the environments we interact with can support this process of self-making (Eddy, 2009, 2016a) and communities-in-the-making (Dewey, 1927). We assert that "staying awake" and engaged through movement is a reciprocal relationship, an interactive and collaborative creative process. We further propose a somatic approach to movement as a creative lens through which to experience our lives as a living *work of art* (Roussell & Fell, in press). And when life is the work of art we attend to throughout the duration of our lives, then there is no doubt that art can and does change the world.

Vignette 3: Movement, Creativity, and Play

> Attending to the play of our senses brings us into the present moment, "which is the only place and time in which we can effectively act, feel, communicate, teach, or learn" (Williams & Brown, 2012, p.147)

Movement is a vast domain, from simply breathing to full out dancing, and the scope for study of its impact in different settings is enormous. Learning can be evidenced through successful motor planning, effective nonverbal communication, establishing positive climates through socio-emotionally astute games, play, embodied learning activities, role-plays, assessing the quantity and quality of psychophysical reflection, and the products of art-making.

Each facet of whole body-engaged learning awakens related interneural connections of internal and external perception. Dance is a key resource. Dance education is at the forefront of actively engaging learners in diverse STEM and STEAM subjects – science, technology, engineering, arts, and math. Virtually every imaginable subject has been danced and many have been chronicled. Somatic educators seek to keep the dancing spirit alive whether indoors or outside by creating environments that are sensorially rich and provide freedom for diverse, peaceable responses.

Movement is also inherent in school day transitions (e.g., from classroom to lunch, from hallway to school bus). Indeed, it is these moments that cause many teachers angst and certainly when bullying and other sorts of conflicts arise (Eddy,

1998, 2016a). Embedding movement games, body awareness, and physical activities during these periods are reported to instigate an enjoyable shift in a school's climate. Movement has begun to be built into the day to make time for recuperation as well. Yoga, in particular, has become a familiar component in many school days, largely because it is taught as a series of relatively still, formal postures that promote breath, flexibility, and mental concentration, while helping to manage emotions and stress. Its relative stillness is often easier for teachers to manage than freer forms of movement. However more open-ended movement is a support to higher-order learning.

Education can be evoked through play, sports, dance, and outdoor recreation among other modes. Learning through movement and motor responses may be revealed in numerous more subtle ways, including gesture, whole body "everyday" movement, or the action of the voice in words or song. The full cycle of sensory stimulus and motor response brings us into the cycle of sensory-motor action, also known as perceptual-motor activity. When educators are creative in introducing diverse sensations that allow for full-bodied and "free-to-have-one's-own-truth" responses, we become more sensate and alive. When awareness of both the environment outside of ourselves and our presence within ourselves awakens, we are embodied (Eddy, 2016a).

Play has its roots in nature and seems closest in maintaining childhoodnature. It demands presence, inviting participation and engagement in the moment. It calls upon all of our human capacities, and all of the senses, serving as a form of both exploration and recreation. Play immerses us in a universe of complexity and possibility, demands attention to surrounding stimuli, develops strength and agility, and helps us explore and build relationships. Play allows us to try something new or test out a variety of hypotheses, including those about physical potential, environmental awareness, and social skills. It provides a space in which to take risks and to fail, fostering imagination, creativity, resilience, and responsiveness. Even play fighting has value. While any type of fight is perhaps not a typically desirable goal, it is one of the few socially acceptable outlets in many western cultures for boys to touch one another (Beardall, Bergman & Surrey, 2007; Eddy, 1998, 2016b).

At its best, play is a bodily immersion in experience, fully cultivated in an aesthetically rich multisensory and safe environment. Inviting children to share their experience and stories in movement, rhythm, and sound can awaken awareness to the rich layers of nonverbal communication that make up 60–93% of our communication patterns, tapping into layers of self-expression and creativity (Eastman, 2011; Thompson, 2011).

What environments foster the richness of play and play that enhances childhoodnature? Learning gardens and soil are an excellent example of multisensorial environments that integrate learning about science, aesthetics, life, and interrelation (Williams & Brown, 2012). Like learning gardens, movement activities based in somatic awareness, no matter what the physical environment is, "take us beyond intellectual understanding, opening a door that connects the living world inside to the living world outside" (pp. 147–148).

Play is an active doing, necessary for being more cognizant of our world, especially as an antidote to the overriding experience of being "talking heads." When subsumed by intellectual and technological tasks, we need to reawaken sensorial alertness to the natural world. It is interesting to note how much sensory input is no longer "real" but rather is only available through virtual stimuli and interaction. Play in nature is a dying art form in urban areas and in education. This is unfortunate. Outdoor play allows for a myriad of responses including self-awareness and growth.

Nonetheless, where play in nature is not possible for logistical or conditional reasons, there are many forms of movement through which proprioception (knowledge of self) and kinesthesia (self-awareness of movement) can be taught. Dance improvisation is a form of play that can happen in simple open and even fairly confined spaces. Dance/movement education out of doors brings us closer to the dances and ritual derived from ancient tribal and indigenous practices. Somatic dance allows for this sense of ritual and interconnection, whether indoors or outdoors. Educational policy is supported by research that demonstrates that these methods help us to keep our humanity and our animal wholeness intact, along with our ability and willingness to respond, connect, communicate, interact, and tend to our world in healthy, constructive, and sustainable ways. Musical Seeds is one such curriculum that brings classes outdoors to meet educators devoted to preserving the cultural heritage of planting and harvesting. In the process of learning about plant life, students are exposed to the music and dance that accompanies the agricultural process in diverse continents.

Vignette 4: Neurodevelopmental Movement Inroads

Important to movement research is finding more information about what and how physical activities enhance all aspects of development (Lovatt, 2011; Ratey, 2008). Several schools of somatic education hypothesize that the progression of movement development corresponds to neurological development (Bainbridge Cohen, 1993; Dart, 1950; Dimon, 2003; Feldenkrais 1989, 1997; Hannaford, 1995; Miller, 1933; Murray, 2005). A powerful choice is to focus on those movements that accompany brain development. Embryonic movements through the first year after birth performed in sequence include skill-building, beginning with control of the head and senses; learning to lift and strengthen the upper back; rolling over (which also helps shift attention); waggling and then crawling to get somewhere using core muscles necessary for becoming upright; sitting (a crucial social skill); creeping on hands and knees; cruising along a table or with other upper body support; standing independently; and taking first steps, critical to individuation. These accomplishments are relatively uniform for all human beings with variation due to disability and across cultures (e.g., as in Bali where children in traditional environments are not placed on the floor). Somatic movement educators often have students follow this developmental movement sequence (or adaptations of it) as a way of working toward more efficient overall function (Bainbridge Cohen, 1993; Dart, 1950; Dimon, 2003;

Eddy, 2012; Feldenkrais, 1989, 1997; Thelen & Smith, 1994), but there is little empirical research substantiating it (Eddy, 2002, 2012). While Thelen and Smith found physical coordination could be gained, and Arnold Gesell hypothesized brain development in response to movement, research is needed on specific potential cognitive changes.

Research on mindfulness and meditation has been underway for some time now, and research into the effects of conscientious movement practices has begun (Kabat-Zinn, 2003; *Psychology Today*, 2015). For example, results from studies in neuroscience begin to distinguish between the effects of breathing practices, meditation, and physical yoga postures; between mindful practices like yoga or tai chi and walking; or between formal sequenced dance movements and improvised ones (Lovatt, 2011; Telles, Sharma, Yadav, Singh, & Balkrishna, 2014; Villameure, Ceko, Cotton, & Bushnell, 2015).

More subtle instrumentation is needed to answer how the brain-body, neuromotor experience impacts cognition and communication. Readings by fMRIs that penetrate to the wavelengths of deep brain structures such as the basal ganglia, the pons, and the midbrain would answer many questions (Ironically, it may be the study of how computer exposure is damaging our brains that may help us study our brains more fully.). In the meantime, research can progress with correlational studies of brain development, motor coordination, and quality of life. Just how specific movements stimulate the brain could eventually reveal how *embodied cognition* works. Embodied cognition is the idea, pioneered by cognitive neuroscientist Antonio Damasio, that consciousness is not isolated in the cerebral cortex, but that the brainstem plays an important role in our awareness as it passes afferent information from the body and viscera to the brain (Craig, 2013). Further understanding is that correlated emotions within the cerebellum and limbic system impact memory, thought, and learning (Röhricht, Gallagher, Geuter, & Hutto, 2017), that we need to "move to think."

What is more easily studied than the response of deep brain structures to movement is how the brain responds to thoughts about movement – also known as imagination, ideation, or ideokinesis (Bernard, Steinmuller, & Stricker, 2006). Ideokinesis, a somatic movement system developed by Lulu Sweigard and based on the work of Mabel Todd, works with images of movement – ideation of kinesis, movement, primarily to improve performance (Matt, 1993) and reduce injury. It asks participants to track their proprioceptive cues before, during, and after their practice. Current research on goal-oriented movement, like dance virtuosity, shows that thinking about movement is best timed in advance of an action and results in heightened movement performance.

Vignette 5: Sensory Awareness Includes Awareness of Self

> Our bodies are not only our access to nature; they are nature. Awakening to the senses is a necessary and important part of reclaiming relationship with ourselves and orienting in our world – knowing who we are, how we are, and where we are. Our bodies are the sensory

lived experiences of nature that are ever present in our lives. Movement teaches responsiveness. It is the active, creative, and life-sustaining response to paying attention to our world. It includes ease as well as challenge, falling, and balance.

Somatic movement highlights the simultaneous experience of sensory awareness and carefully interlaced responses, providing an interface between our inner and outer worlds. It is this type of perceptual-motor interaction that the authors advocate as a perfect way to affirm the importance and value of childhoodnature. Its strategies can aid in repairing the fractures that have led us to unhealthy patterns of relationship at all levels. *Perhaps it is here that the potential to transform unconscious (and often negative) life patterns into "conscious positive habits" resides.*

Somatic movement happens when the mover is aware of his or her psychophysical experience. Proprioception, the ability to know one's own body position via information from the joint and muscle receptors within the nervous system, and kinesthesia, being aware of how one is moving through space – as perceived by proprioception combined with information from the vestibular system and eyes – assist awareness of more than bodily experience (Eddy, 2016a). They awaken a sense of self, including our emotional self (see Fig. 1).

Environmental stimuli are also known to trigger emotions. Emotion within decision-making is embedded in the concept of embodied cognition, as discussed earlier. Somatic movement practices recognize that emotions and thought correlate with body movement and bring awareness to this. Hence through somatic awareness of bodily experience, researchers and practitioners often describe a capacity to sensitize more fully to self, other, and surroundings (Bales & Nettl-Fiol 2008; Williamson, Batson, Whatley, & Weber, 2015).

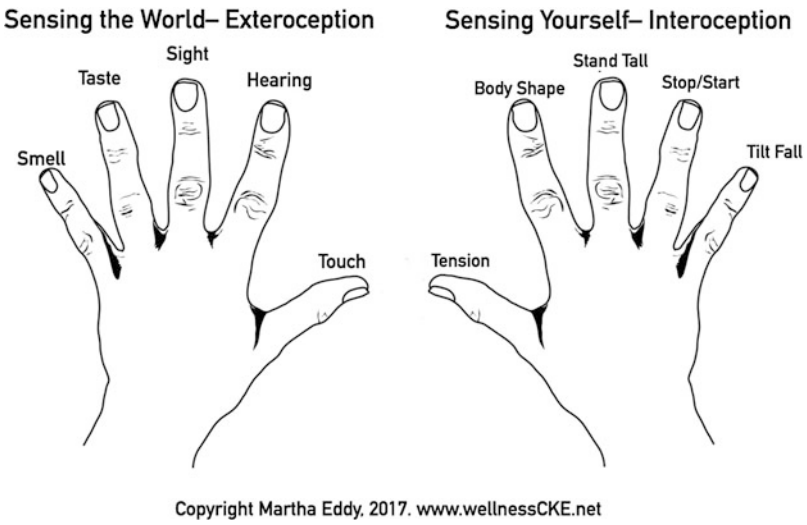

Fig. 1 There are 10 Senses /Credit: © 2017, Martha Eddy, www.WellnessCKE.net

Karen Olness proposes that every child "have an opportunity to be hooked up to a biofeedback system, maybe some sort of computer game that was cued to a physiologic response" so they might understand "Aha! I change my thinking, and my body changes" (cited in Moyers, 1993, p. 78). Access to simple biofeedback instrumentation is a great goal. Given budget limitations in many education settings, it is also important to consider avenues to self-awareness that involve minimal costs. Somatic education and mindful movement practices offer a type of personal biofeedback enhancement (Eddy, 2016a). Giving children the sense that they can have control over their behavior is a critical strategy for self-regulation. Within the somatic paradigm, rather than receiving feedback from technology, the feedback comes from a refined ability within oneself to register changes in the body-mind through the other five senses our body provides – proprioception of (1) muscle tension; (2) joint angle and kinesthetic; (3) awareness of posture; (4) self-perception of stopping, starting, and velocity; as well as experiences of (5) tilting, falling, or turning.

In the domain of biofeedback, we undervalue the importance of having permission to "fail," particularly in learning environments. Falling is a case in point. We learn about our place in the world by striving to become upright and stay upright. The process of finding balance includes working with a combined experience of gravity, surfaces, natural and man-made objects, and atmospheric pressures. Learning includes both finding balance and sometimes falling and learning how to get back up. Learning is, after all, an encounter with the unknown. In her work with teenagers, Moradian finds it particularly important to help students become comfortable with imperfection and meeting the unknown. Once students understand that "perfection is a moving target" (2016) rather than an achievable goal, their entire body language changes: eyes brighten, spines lengthen, and they breathe more freely. It is easy to impose our own fears and limitations onto others' honest and sincere process of growth and learning. As educators, we need to know when to step back and give our students the time and space to explore *their* questions (like *How does this relate to the world I know and care about?*) and not just answer ours. This "validate(s) their own experience and give (s) them the courage and clarity they need to live their lives with authenticity, confidence and creativity." It also "invite(s) them to *participate* in and take ownership of their lives" (Moradian, 2016) and their learning.

Vignette 6: The Rhythms of Nature: Racing with Time

> From our first entry into the material world, we are immersed in an ocean of not only space but also time and rhythm. Each body has its own natural rhythms of breath and blood; work, rest, and play; and birth, regeneration, and decay. These cannot be separated from the body or from our world. Natural rhythms surround, embrace, and weave their way throughout our lives.

Trying to bypass nature's rhythms, like pushing children to reach developmental markers ahead of their body's natural development, is actually counterproductive. The documentary film *The Moving Child* interviews experts in motor development,

occupational therapy, dance therapy, and psychology who espouse the necessity of allowing babies the time to discover their natural movements. There are dozens of articles on the deleterious impact of baby walkers and other products used to accelerate a child's development (Lamont, 2015). Toddlers shown the "solution" for how to traverse a jungle-gym bridge, for example, miss out on the exploration of their own embodied and lived "questions." Parents and educators can, instead, take a moment to scaffold experiences with verbal and nonverbal prompts, like: *What is this thing? How does it feel? What part of your body is touching it? How might your body and this object interact? What can you do with it?*

Time is an invisible, inseparable, and often forgotten aspect of space (Abram, 1997a). It critically influences how we relate with ourselves and our world. Pushing ourselves to do more in less time – this adds a layer of stress. Taking time to "do nothing" or immerse in a soothing natural environment seems to wash stress away and often helps us function better. Having the perfect environment serves little purpose if we do not also make the time to experience it. When we allow ourselves to pause, "suspending" the moment between experience and action or inquiry and response, we open a fertile space of not knowing (Bigé, 2017; Fiadeiro, 2017) which can provoke fear but can also expand into a state of listening, imagining, questioning, searching, experimenting, and discovering. Like play, this time for listening is a powerful place where creativity, new possibility, and transformation reside.

The compression and expansion of time-space becomes evident when observing the difference between the martial arts of Aikido and Kinomichi. Developed by Masamichi Noro (a disciple of Aikido's founder Morihei Ueshiba), Kinomichi uses many of the same forms, techniques, and principles of Aikido but encourages encounters to slow down in time and expand in space. Much like somatic inquiry, this slowing down opens up more internal space for a deeper, more conscious, and nuanced exchange of information through the bodies' contact. At faster rhythms, the time to process and become conscious of information diminishes, increasing the risk of injury for inexperienced practitioners. This extension of time and space in Kinomichi reveals how the same movement slowed down can unblock tension and heal, without losing its capacity to guide and direct. This expansion of "embodied time" is the basis of somatic movement therapy and somatic psychology.

Speed and efficiency can be useful in competition (like running a race) or in an emergency (like dousing a fire), but when misplaced they "compress time" and abbreviate our experience. In many countries, our business, social, and economic systems propel us forward ever faster. This trend, evident since the beginning of the industrial revolution, is exacerbated intensely today by the speed of information exchange through the internet and digital technologies (Fleurot, 2017). Always on "high speed," we often set our adrenal systems on high alert, affecting our mental and physical health (Eddy & Zak, 2011). By habitually moving too fast, we shut down receptivity to our own feelings and to those of others, effectively numbing our senses and in turn our sense of self. The pressure to accelerate the rhythm of our lives toward relentless efficiency not only diminishes our capacity to inquire, engage, and assimilate but can also be seen as a form of violence (Moradian, 2017). Alan Block (1997) views the lack of contemplative, Thoreauvian space and movement within

the school day as a form of violence as well. All rhythms have their value, but in high-speed, high-stress, reactive cultures, the somatic maxim of "slowing down to feel" (Eddy, 2016a, p. 140) is called for. Racing with time leaves no space to wander, wonder, ponder, respond, or integrate, the very experiences that connect us with our naturalness.

Vignette 7: Cultivating Space for Embodied Learning through Movement

> Ergonomics is concerned with mechanics and parts of the body. I'm more concerned with total systems, the role of culture and psychology, and making cultural change. We're not just dealing with a mechanical problem about how we're going to be more comfortable. It's a cultural problem. Galen Cranz (in Dalton, 2008)

Though typically situated in studios, gymnasiums, out-of-doors, or other open spaces, learning through the body can occur in any environment. Schools with an ecological focus often structure their programs in naturalistic environments like parks and learning gardens or other nature-rich settings, which are all ideal. Many educational institutions, however, have limited access to nature and open spaces and minimal funding for field trips, special equipment, or events. Ideally all school administrators would have data on what types of natural and man-made environments, beyond gymnasiums and natural spaces, best foster childhoodnature and different types of learning and design curricula accordingly. The goals of embodied learning in educational environments can range widely and may include all subject areas, as well as environmental empathy, socio-emotional development, aesthetic development, and somatic awareness.

Curricula that encourage bodily play or creative interactions can also be supported by shifts in school environments – introducing a new suite of sensory learning and responsive possibilities. This engagement can happen indoors or out. Indoor spaces *can* foster movement and body awareness. One school in Cambridge, Massachusetts, brought physio-balls (large gymnastic balls) into the classrooms to be used as chairs, others are using standing desks, or, in the case of Adaptive Design Associates lead by MacArthur winner Alex Truesdell, schools work with local artisans to create cardboard seats and desks that suit the varied bodies of children, including those with disabilities (Lomot, 2013; www.AdaptiveDesignAssociates.org). As another example, the Pono Learning Center in New York City (www.PonoLearningCenter.org) is a school that has explicitly chosen to use a limited amount of low-to-the-ground furniture, with open wooden floors, low platforms and tables, and well-sanded tree stumps. These are moved around, and children are found sitting, standing, lying, or balancing on them throughout the day. They are thinking, drawing, writing, reading, and discussing with the "furniture" available to support any of these activities. Learning groups happen here in circles or clusters of children, with occasional lines.

Varying spatial formations among people foster different ways of relating – horizontal, vertical, and sagittal. These relationships with each other and within

the space allow a person to bodily self-adjust for the sake of comfort, focus, and health but also promote new perspectives within relationships. Varying spatial formations in the classroom is like being invited to change your seat during a performance. This flexibility of place allows for multiple perspectives, inbuilt recuperation, and ever-changing contact within the group process of relationship building.

Another example is EcoMoves for Kids, a curriculum from the Center for Kinesthetic Education (www.WellnessCKE.net) that engages students in physical activities (e.g., dance, hikes, cleanups, etc.) outdoors, reflects on these experiences indoors using movement and dance, and then strives to bring awareness to the needs of local flora and fauna around the school, teaching advocacy for students' suggestions for adaptations to their school environments (e.g., use of water fountains and bottles, roof gardens, etc.). Providing ergonomic furniture (including adjustable standing desks and varied seating options, like balls and kneeling chairs, Lomot, 2013) and outdoor exploration are emerging exploratory trends. Including more movement within these indoor and outdoor environments is critical to completing the sensory-motor cycle and to overall well-being that comes from being present and aware of the body and the environment.

Vignette 8: The Lure of Detachment: Overcoming Violence

> The powerful drives and emotions the body contains can be, like nature itself, exhilarating and joyous but also confusing, uncomfortable, and disturbing. Ultimately, the body decays and we come face-to-face with death. Like nature, the body is a wild space where life brushes up against us and challenges and defies our control (Abram, 1997b). The body may be our home for the duration of this experience called life, yet cultural practices alternate between celebrating our embodiment and escaping it. The body is our birthright, yet many of us reject it.

A *sense of place* is not only about the surrounding physical environment. From a somatic vantage point, place begins with the body. Disregarding the need to listen and to give voice to human movement or to learn movement skills is a way in which we reject not only the body but life and our very place in the world. When life is tough, or as Hari (2016) suggests, "unbearable," people take flight from their bodies, disconnecting from embodied experience in numerous ways (van der Kolk, 2014). These disconnections may be expressed as numbing (which, according to Brené Brown, "cannot be done selectively"), imposing certainty on uncertainty, imposing or insisting on perfection, pretending that we do not have an effect on other people or our world, perpetuating systemic racism and classism, intellectualization, addictions (including workaholism, overstimulation, and technology use), post-traumatic stress disorder (PTSD), and "spiritual bypassing" whereby people use spirituality as a way of avoiding their embodied emotions (Brown, 2010; Masters, 2010; Stromsted, 2017). When we disassociate from the body, experience and learning remain only partial. Partial, disembodied existence makes wholeness, healthy functioning, and, according to Antonio Damasio, even full consciousness impossible (Pontin, 2014).

Movement not only helps us to be present, but it makes us visible. In safe environments this can be a cause for joy and pride. However in hostile environments (whether socio-emotional/psychological or physical), people often prefer to cut off from their physical selves in order to become "invisible." For instance, in the film *Invitation to Dance* (Linton, 2014), people with disabilities struggle to find private venues for parties to avoid being blatantly visible while dancing. In a "safe space," they overcome their fears and open up to the joy of dancing. In many western cultures, people dim the lights or imbibe mind-altering substances to lessen self-consciousness that comes from "showing our bodies in movement." Another example is the courage it takes for female students with hijab to play soccer – one of the only semi-acceptable ways to engage in physical movement as teenagers in Muslim countries (Sheerazi, 2017).

Harsh judgment and strictures about the body, body image, and body action may make for caustic learning environments. What causes judgment may be rooted within cultures or the minds of individuals. Economics may play a role as well. Instead of striving for nonjudgment, awareness of interdependence, and creative interaction, a commercialized, objectified, competitive world fosters indifference to others. This can lead to negative judgment of one's self and others, repressive power dynamics, bullying, and violence. These types of interactions can be seen in corporations and governments, as well as among individuals, and within schools (Katz, 2013). The effects of bullying and self-consciousness are enormously deleterious – from shame to suicide among children, teens, and adults.

When working with the body and movement in school, awareness of the continuum from stress to trauma and how these conditions are impacting youth can be important. In an ethnographic analysis of six violence prevention programs across the USA, Martha Eddy (1998) gathered information about embodied movement practices in conflict resolution and peace education. The study found that all educators benefit from skills for dealing with abuse and trauma, given how rampant physical, psychological, and sexual abuse and cultural dislocation are (one-quarter of the world's population lives in nonpermanent housing). Teaching in nature is often a wonderful way to calm the nervous systems of students and teachers alike. Any teaching community can strive to provide, or devise democratically as a group, guidelines that contribute further to calm, by ensuring emotional and physical safety. Another set of findings from Eddy's research revealed that excellent educators of conflict resolution selected topics for exploration such as self-control, increasing awareness of potential violence (with the goal to detect and avoid it), developing the strength to stand up to injustice and violence, and/or pointedly engaging in peacemaking. Eddy has created a matrix using these features to ensure that programs meet their own objectives (1998, 2016a) across the continuum of violence prevention and peace education. For instance, when teaching peace education, it can be deemed insufficient to simply teach self-control; adding self-defense, self-assertion of one's own strength and power, and compassionate work with others for peace makes for a fuller experience of diminishing conflict within the context of societal injustice (Eddy 1998, 2010b).

Within the conditions of discomfort including, but not limited to, fear, overwhelm, hopelessness, confusion, callousness, indifference, pain, negative judgment,

poverty, bullying, abuse, and violence, people of any age may disconnect from the body, becoming numb to one's own sensations (Eddy, 2016a). Some people might stay physically connected with their bodies, building up irritability that may result in bouts of aggression or even violence (Eddy, 2016b), which can be further amplified by interaction with violent media, television, and games (Carlsson-Paige, 2008). More education is needed.

Vignette 9: Combining Indigenous and Somatic Approaches for Well-Being

> In Chinese medicine, the movements of tai chi and chi gong teach people "where their center is, what is a balanced form, where the right and left are. . . In the Chinese culture that defines health. If you can figure out where your center is and how to concentrate your mind, you're healthy, and once you lose that, you get sick" (Eisenberg cited in Moyers, 1993, p. 282).

While teaching at Columbia University, a native of mainland China reported to Eddy (2002) that "finding center somatically" was new and not part of her traditional Chinese experience. The somatic work transformed an abstract idea into a powerful and visceral experience. Eisenberg explains that it is the combination of mindful attention and conscious movement that is essential to the Chinese idea of well-being in the world. "One without the other is not enough." The Chinese consider the universe to be made up of both the physical and spiritual, "and the struggle is in maintaining the balance between the two forces." In addition, movement is experienced within an ethical framework that includes how you treat others and yourself (cited in Moyers, 1993, p. 283).

This idea of *holistic* experience, a relationship of "systems" within systems (Capra & Luisi, 2014), is central to wholeness and health from an ecological perspective. It is also foundational to somatic approaches such as Laban-based Bartenieff, Body-Mind Centering, or Dynamic Embodiment and in the Feldenkrais method, as well as many eastern and indigenous approaches (Eddy, 2016a). In these embodied practices, "We can touch this place of wholeness where body and mind, emotions and thought, matter and energy are given to us as one" (Ford cited in Eddy, 2016a, p. 255). The challenge in this state of complex and interrelated wholeness is to be awake fully to the internal *and* external – *self* and *more-than-other* (Abram, 1997a) – which "lies at the heart of the challenge of co-existence" (Moradian, 2017, p. 11). Helping children become conscious of the body's experience, affirming its wisdom, and learning to moderate its impulses are important steps to dwelling, at home and at ease, in the body. Only then can we really begin to experience what it is to dwell on the planet. This harkens back to Gregory Bateson's "ecology of mind" (2000).

Somatic education is built on European, Eastern, and Afro-Caribbean constructs (Eddy, 2002, 2016a) that unify the physical and the mental, action and contemplation. Mind-body movement techniques use the mind to "control the body" (Eddy, 2016a). As is hopefully clear by now, the "body-mind" approach of somatic

education (with various forms shaped by cultural framework and/or historic settings) offers the particular vantage point of listening to the body to learn from *it, mining psychophysical wisdom*.

Educational approaches akin to somatic education are understood in the psychological and sociological domains as well. Bessel van der Kolk finds that "mindfulness" helps emotional regulation, physical health, and stress-, psychiatric-, and psychosomatic-related symptoms including depression and chronic pain (2014, pp. 211–212). He highlights yoga, tai chi, qigong, African drumming, and the martial arts which "focus on the cultivation of purposeful movement, and being centered in the present" and points out that they all combine ". . .physical movement, breathing, and meditation" (p. 210). Cognitive linguist George Lakoff also acknowledges the importance of embodiment (2004). Celebrated educator Nel Noddings asserts that education should expand its focus from linguistic and logical intelligence to include also spatial, bodily kinesthetic, musical, interpersonal, and intrapersonal intelligences (based on Howard Gardner's theory of multiple intelligences) with a focus on *caring* (cited in Williams & Brown, 2012). Somatic education builds upon all of these, and particularly upon caring and empathy, by building the capacity to feel, to integrate, and to respond creatively and appropriately to life circumstances, linking directly to agency (Shafir, 2015). Noddings focuses on developing students who are healthy, competent, and moral people even if this is at odds with a national agenda of education, which in many cases may be "disconnected from life." In the same way that Williams and Brown argue for the living soil as "a dynamic metaphorical guide" that affirms life and "brings attention to relationship as a central feature of education" (2012, p. 139), we suggest the living body is a learning landscape that both affirms and teaches us about life, complexity, responsivity, and relationship.

Vignette 10: Movement: The Ground for Learning in Educational Settings

> The body in motion is the foundation for experiential learning. Ironically, some experiential learning does not highlight, or even recognize, the knowledge gleaned from the vehicle of our very experience – the body itself. As we embrace an awareness of self in relation to the ongoing movement of life, in all its complexity – as we begin to dance with that ongoing interrelated process of transformation that is our life – we can readily extend this understanding to the classroom, community, culture, ecosystem, and biosphere.

Movement can be used to teach, exemplify and improve content learning, smooth out school-day transitions, provide brain and body recuperation, and be a powerful source for aesthetic experience and development (Selver-Kassell, 2008). When any of these movement activities are done in nature or with nature in mind, one is entering into the domain of eco-somatics. An eco-somatic approach can be central or adjunctive in curricula. It is a reflection on bodily experience, sensation, and response to sensation as experienced in whatever nature is available that completes

the childhoodnature cycle. By learning with the whole body and bringing awareness to what is learned *through* the body, we experience the very essence of being interdependent with and part of nature.

Lessons on breath are the quintessential example. A somatic approach to learning could focus on oxygenation, the human cardiovascular system, chemical processes, and our interdependence with plant life, all while actually breathing, smelling, and tasting the quality of the air. Experiences, like feeling the pulse and the pumping sensation of the heart, the rhythm, textures, length and depth of the breath, and visualizing the five lobes of the lungs and their three-dimensional, balloon-like expansion and contraction, are best followed by reflection and discussion about the sensations, discoveries, and curiosities that emerge. Moradian invites her students to "release the resistance to the breath" by incrementally letting go of contractions in the throat, chest, and heart region that restrict the lungs' capacity to breathe fully. She encourages them, both viscerally and through the imagination, to slow the breath and become aware of the "nourishment and support, cleansing and release that come with each and every cycle of breath" (Moradian, 2015). Breathing immerses us experientially in our deep interconnectedness with the living planet and can tangibly remind us of the dynamic processes and balance inherent to all living systems. In addition to deep inner awareness and awakening to our interdependence with the world around us, breathing practices like these prepare the learner to be more comfortable "at school" by massaging the abdominal organs, oxygenating the body's cells, and calming the nervous system (Eddy & Zak, 2011; Iyengar, 2010).

Similar teachable moments can be infused in numerous situations, including eco-aesthetic and ecological contexts. For example:

- Bringing attention to the sensations of the feet while walking on different surfaces, to the living nature of the soil beneath the feet, to the relationship of bodies and plants to gravity and their movement and growth, to the vestibular system with eyes open and closed, and to how occluding different senses alters sensory awareness.
- Discussing what happens when living organisms become dehydrated, malnourished, or poisoned and then paying attention to the sensations that arise in the process of drinking water or eating a snack, followed by imagining how a plant "drinks" or "eats." These could be followed by reflection on metabolism or the liquidity of our bodies and the planet.

To shift beyond sensation into motoric, creative expression, it is critical to allow for more options. Free movement is the most explicit choice. Allowing a student to choose three postures and move between them teaches the making of a "movement statement." The postures or movements selected can be related to a discussion theme – like representing three states of water, three moods, three types of stress, three different trees, and three animals. Three is a key number because it represents a sentence – a beginning, a middle, and an end. Group discussion can go in a myriad of directions.

In her doctoral research, Eddy found that the process of co-choreography enhances problem-solving and builds peer leadership (1998). Peter Lovatt's research in dance psychology shows that improvisational movement opens up a world of "divergent thinking" (2011), including experimentation, invention, and creativity. Dance education research is adding to the canon of how to enhance information retrieval including the potency of movement memory, and discussion among dance education professionals supports the hypothesis that experienced improvisers are not only more comfortable encountering the unknown but also often even relish meeting change and challenge.

Conclusion

> Sensory perception is the glue that binds our separate nervous systems into the larger, encompassing ecosystem. (Abram, 1997b, p. 9)

In reclaiming our bodies and our place in the larger world, dwelling within the living system of our bodies and nested within the living systems of the earth, we shift from what might be a parasitic or exploitative relationship with our world to a symbiotic interaction with nature. Biologist Lynn Margulis defines symbiosis as "the living together of more than one species." She asserts, "all organisms that you can see with the naked eye are living in symbiosis with others," and cooperation between species is more common than competition for evolutionary survival (2011). In a videotaped presentation to NASA in 1984, Margulis explained how life on earth (including humans) can actually make the world greener and more alive, as long as it is in *dynamic balance*. For adults and children alike, equilibrium depends upon the ability to respond appropriately to the feedback we receive, through and also from our bodies (which includes, but is not limited by, what we think of as our "minds"). We cannot disconnect from our bodies and still hope to respond optimally. In welcoming movement and the ongoing process of change it stimulates, we can move from stationary dis-ease into ease, presence, and a natural state of flow; we move toward health and wholeness, not simply as individuals but as ecologies of community and place. This takes time and attention, along with a willingness and ability to respond to the intricate, subtle, complex messages coming from the myriad of relationships that we, in the west, have tried to ignore or deny. Neglecting our bodies in education teaches us to disconnect from nature. To embrace our interdependence demands humility and requires a willingness to recognize both our power and our vulnerability – that we affect and are affected by all that we encounter.

In conclusion, we suggest that changing conditions in both our human and more-than-human worlds demand better communication and optimal responsivity at all possible levels. The ongoing state of dynamic balance that *is* life demands our willingness to *dwell* here and now, consciously in our bodies, face-to-face with complexity, contradiction, and the unknown. This expanded consciousness, or "reconstruction of patterns of thought" (Bateson, 2000, p. xii), moves us to recognize

our interdependence with our world, helping us to treat the earth not as our possession but as our home and as our symbiotic partner. Embodiment processes like somatic movement can help us to reconnect with the multilayered worlds of our living body in place. The goal is to reclaim the natural, any-shape, any-person's, nonobjectified, non-commercialized body and to live in healthy relationship with it. As we do this, we engage and participate in our learning processes and nourish our ability to respond to challenges with creativity and agility. Life-affirming, movement-friendly environments need to be cultivated. Caring for ourselves, each other, and the earth is called for, not simply as a "good" thing to do, but as a necessary part of thriving in and with our world. This is more than just a dance. It is the dance of our lives and life.

The history of progressive, constructivist, and existential schools of education has hypothesized that enactive education that includes sensitivity to the needs of planetary and community sustainability produces learners who are aware of and care for the environment (Eddy, 2016a). By promoting awareness and self-management of the feelings and sensations that come up in the process of learning, we can encourage children to experience and shape the world in life-affirming ways. Our contention is that aligning education and conscious embodied movement intensifies not just self-awareness, self-knowing, self-care, and self-regulation but also moves us to act and interact with greater awareness and care for others and our world, including the places we inhabit and share (Eddy, 2016a). "The body (is) the portal through which we can re-enter the world – even after we have locked ourselves out. . . Consciously attended, the body offers a living landscape for *deep ecological experience*" (Moradian, 2017, p. 8).

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Propositions for an Environmental Arts Pedagogy: A/r/tographic Experimentations with Movement and Materiality

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Abstract

This chapter works through a series of methodological experimentations with movement and materiality in order to explore the potentials of environmental arts pedagogies. We address the question of what environmental arts pedagogies might come to look like in the ever-changing contexts of children's social and environmental worlds. This leads us to engage with the movements and materialities of learning environments as they come to co-compose pedagogical encounters. In doing so, we draw on new materialist accounts of matter as agentic, fluid, and dynamic; movement as a choreographic architecting of experience; and a/r/tographic approaches to pedagogical engagement and embodied practice. Taking up the use of concepts as methods, we develop a series of artistic and pedagogical experimentations with concepts of "corridors," "flight," "viscosity," and "construction." In teasing out the implications of these concepts for an environmental arts pedagogy, we combine imagery and text to both render and diagram the movement of bodies, materials, and environments in passage through each of these four conceptual enactments. This leads us to develop a series of propositions for an environmental arts pedagogy based on our creative research process. In doing so, we aim to sketch the contours of an environmental arts pedagogy that combines the speculative imagination with embodied, sensorial, and empirical experiences.

Keywords

Environmental arts pedagogy · Movement · New materialism · A/r/tography · Speculative empiricism

Introduction

In this chapter we address the need for environmental arts pedagogies that are responsive to the rapidly changing material conditions of children's social and environmental worlds. Children are growing up in increasingly precarious times, as rates of anthropogenic climate change, loss of biodiversity, human overpopulation, ubiquitous computation, and biotechnological innovation continue to advance and proliferate with alarming frequency (Malone, 2016; Rousell, 2016). How might environmental arts pedagogies become more attuned and responsive to the material conditions of contemporary life? What role might environmental arts pedagogies come to play in the lives of children in these times of accelerating change? This chapter responds to these questions through a series of a/r/tographic experimentations that explore the relationship between movement and materiality through new materialist theory and artistic practice. As a methodology that operates through relational practices of artmaking, researching, and teaching/learning (Irwin, 2008), we take up a/r/tography as an ecology of practices in which human and nonhuman agencies are always entangled in processes of co-composition, negotiation, and constructive functioning (Stengers, 2005). This chapter thus contributes to an

emerging body of scholarship that uses new materialist theories to explore the relational spaces between art, environment, and pedagogy (see, for instance, Garoian, 2012; Knight, 2016; Rousell & Fell, 2018).

Our focus on the environmentality of art as a pedagogical encounter urges us to think and work outside the limitations of human(ist) discourse and identity. We seek to explore the ways that "art also does its work without human intervention, activating fields of relation that are environmental or ecological in scales of intermixings that may include the human but don't depend on it" (Manning, 2015, p. 72). We define environmental arts pedagogies as transdisciplinary processes that merge, transmute, and cut across environmental and arts fields in their doings, knowings, and tellings (Cutcher, 2015; Cutcher, Rousell, & Cutter-Makenzie, 2015; Irwin & O'Donoghue, 2012). Environmental arts pedagogies are artful and open-ended processes that both condition and modulate learning experiences through environmental engagement and creative experimentation. As McKnight et al. (2017, p. 10) suggest, this reorientates the concept of pedagogy toward forces of affect, movement, materiality, and sensation as they are "actualised through the bodily experience of teaching and learning." We therefore propose a shift in the emphasis and enactment of pedagogy toward more-than-human processes that cut across bodies, environments, materials, concepts, surfaces, feeling, sensations, and ideas. This is necessarily an ethical as much as an aesthetic shift, as it brings an ethico-aesthetic paradigm to bear on the embodied and emplaced practices of environmental arts pedagogy (Guattari, 1995).

In the sections that follow, we begin by contextualizing our approach to environmental arts pedagogy within new materialist theorizations of materiality and movement as forces that exceed human intentionality, knowledge, and control. We then introduce the a/r/tographic fieldwork that we used to develop a series of creative experimentations with concepts of "corridor," "flight," "viscosity," and "construction," each of which explores the entanglement of matter and movement in different ways. This is followed by a series of visual and semiotic renderings that work through each of these concepts in turn, drawing on the images, field notes, and theorizations that emerged in and through our a/r/tographic fieldwork. These renderings are followed by a diagrammatic analysis of the four conceptual practices. This analytic process leads us to develop a series of propositions for an environmental arts pedagogy that integrates empirical movement and materiality with the flight of the speculative imagination.

Matter, Movement, and Art

Our approach to developing an environmental arts pedagogy builds on new materialist theorizations that position movement and materiality as agentic forces in the production of works of art and associated learning experiences (Bolt, 2013; Rousell & Fell, 2018). New materialism is a strand of speculative philosophy and theory that has emerged over the last decade. While new materialisms encompass a wide variety of theoretical positions, approaches, and investments, their ontological orientations

generally hold that all of existence is embedded in some manner of material substrate, including not only material objects and bodies but also conceptual, discursive, semiotic, and incorporeal constructs, ideations, and projections (Coole & Froste, 2010). As Coole and Froste (p. 10) note, new materialist philosophies outline a political ecology in which "matter is no longer imagined. . . as a massive, opaque plenitude but is recognised instead as indeterminate, constantly forming and reforming in unexpected ways." In positioning matter as a force that both materializes and expresses the potentials of nature's dynamic indeterminacy, new materialism ultimately "sees its task as creating new concepts and images of nature that affirm matter's immanent vitality" (p. 8). This also confirms new materialism's compatibility with Indigenous ontologies (e.g., Hunt, 2014) that acknowledge the vitality and agency of animals, plants, metals, minerals, and elemental forces such as wind, rain, and electricity (Ingold, 2011).

While new materialism has its roots in feminist-materialist thought associated with poststructuralism (Alaimo & Heckman, 2008) and ecofeminism (Mies & Shiva, 1993), it explicitly breaks with dialectical, Marxist traditions predicated on social constructivism, deconstruction, relativism, and "critical theory" more broadly (Braidotti, 2013). Instead, new materialisms tend to draw on fields such as quantum physics, the life sciences, and posthumanist philosophy to propose visionary and creative "alternatives to critique" (Dolphijn and van der Tuin, (2012), p. 14). In challenging the ongoing dominance of humanist and anthropocentric ontologies and practices, these emerging materialisms seek to develop new conceptual tools that are responsive to the changing social, technological, and environmental conditions of the contemporary world. While new materialist theory is having a timely impact in the arts, humanities, and sciences, the movement has also impacted significantly on the field of education, including the areas of environmental education (Malone, 2015), arts education (Rousell & Fell, 2018), and post-qualitative methodologies for educational research (St. Pierre, 2016).

In developing a new materialist approach to environmental arts pedagogy, we build on recent scholarship that has theorized the materiality of creative practice beyond the limitations of representational and anthropocentric thought (Bolt, 2013; Tiainen et al., 2015; Triggs & Irwin, in press). Drawing on the work of theorist and physicist Karen Barad (2007), this involves a movement away from *reflection* as the core practice of teaching and learning through the arts (e.g., Schön, 1983). In lieu of reflexivity (an "iterative mimesis" that produces reflections of reflections ad infinitum), Barad (2007, p. 88) proposes a turn toward *diffraction* as a creative practice that is orientated toward patterns of difference. Rather than the "self-referential glance back at oneself" associated with reflection and identity, diffraction attends to the interference patterns that are generated through the "specific material entanglements" of heterogeneous agencies (p. 88). The work of art, in this sense, is produced not *by* the agency of the individual artist but *through* multiple agencies which disrupt and interfere with one another within an "ontologically heterogeneous field" of environmental relations (Bennett, 2010, p. 23). To learn through the arts, then, is to become entangled with "the shared materiality of all things... of which we are all composed" (pp. 12–13). The work of art becomes a "co-collaboration" in

which "matter as much as the human has responsibility for the emergence of art" (Bolt, 2013, p. 6). The question is to what extent the artist become "attentive to, and responsive/responsible to, the specificity of material entanglements in their agential becoming" (Barad, 2007, p. 91).

Studies of movement have also been central to new materialist scholarship in the arts, in which choreographic processes are seen to operate outside of human intentionality and knowledge (see Knight, 2016; Manning, 2013; Massumi, 2011; Manning & Massumi, 2014. Movement is understood to be as ubiquitous and all-encompassing as matter, as Manning (2013, pp. 13–14) writes:

> Movement is everywhere, always, at all scales, speeds, and slownesses. There is never stability. And there can never be non-movement – even in what appears to be complete stillness there is a quality of movement-moving, force of form.

This makes choreography a more-than-human phenomenon that "attends to the immanent field of relation that is part and parcel of an environment in-forming ... a self-generating practice of difference" (Manning, 2013, p. 76). In linking such distributed and ecological conceptions of movement with pedagogy, Knight (2016, p. 19) further describes how "choreographic movement emerges as rhythmic through the effect of energy as it flows between diverse sensory, temporal, and material agents." Choreographic movement thus becomes pedagogical in its capacity to "initiate reactions and responses between agents that change course of direction, prompt reconsiderations, and adjust trajectories" (p. 25). We therefore see a profound connection between movement and materiality as primordial elements of the environmental arts, with pedagogy emerging as a choreographic force that brings movement and materiality together in ways that generate novel assemblages, environments, events, experiences, and ecologies of learning and participation.

A/r/tographic Fieldwork

Drawing on this genealogy of thinking in new materialist theory and artistic practice, we set out to design a series of experimentations that would unfold through collaborative a/r/tographic fieldwork. For the last two decades, a/r/tography has developed as an international methodology that operates in the dynamic interstices between the relational practices of artmaking, researching, and teaching/learning (Irwin, 2013). In taking up a/r/tographic fieldwork as an ecology of practices, we aimed to discard the all too human identities of artist/researcher/teacher in favor of a more distributed and environmental process of becoming (Stengers, 2005). We also sought to negotiate a consonant shift away from the calcified identities of the adult/teacher and child/learner, as captured within a closed system of dyadic stimulus and response. In foregrounding the immanent ethics of the event of encounter as the basis for environmental learning and art, we chose to pursue a tentative movement toward the learning environment itself as productive of new forms and manners of life-living (Rousell, 2017). The result was that a/r/tography began to operate as a loose

assemblage of framing practices that modulated the relations between elements of life/nature/environment/movement/matter and worked to put theoretical concepts into play through creative experimentations with materials and media (Tiainen et al., 2015).

Our starting point for this a/r/tographic fieldwork was the question: **How does movement come to matter in environmental arts pedagogies?** This question was initially formulated through a series of research dialogues, in which we discussed the methodological, conceptual, and practical issues facing the field of arts education at the contemporary moment. In order to investigate this problem through creative, philosophical, and empirical experimentation, we firstly worked collaboratively to establish a series of enabling constraints. This allowed the research to emerge through a series of negotiations within a problematic field of entanglement. After a series of intensive dialogues, we settled on the following six protocols as the basis for our a/r/tographic fieldwork:

1. Each of us would draw on a concept from our own arts/educational/research practices in addressing the research question.
2. Each of us would design a creative research activity for experimenting with our chosen concept.
3. We would not disclose the concepts and their associated activity designs prior to their enactments on the day.
4. We would use Southern Cross University Gold Coast campus and surrounds (airport and beach) as the context for these experimentations over the course of a single day.
5. Each of us would select a site for experimentation within this geographical location, thus forming the itinerary for our collective movements over the course of a single day.
6. The four activities would be followed by a period of discussion and artmaking that explores the conceptual and material yields, provocations, and movements instigated by the fieldwork.

In foregrounding the process of "concept as method" (Lenz Taguchi, 2016), we aimed to explore how the actual movement of thought occurs in/through/as matter and how the nondiscursive and affective capacities of art enable concepts to proliferate outside the limitations of human language and cognitive interpretation. By restricting prior knowledge of each other's concepts and activities, we sought to avoid the trap of a consensual framework that would have simultaneously delimited and "answered" our research problem preemptively. Rather, our conceptual designs were formulated discretely as nodes of experimental knowledge practices within a problematic field that remained virtual/unknowable (Deleuze, 1994). This allowed for a continuous tension between the structures of our individual "setups," and the ruptures, immediations, resonances, and dissonances that emerged spontaneously between them. Each of the conceptual designs also operated as a machinic "suspension" of concrete procedures/constraints and abstract indeterminacies with regard to the qualitative enactments they

engendered internally. We could say that each of the individual activities exhibited *intensive* properties particular to its design (both concrete and abstract) and *extensive* properties particular to its emergent relationships with the other three activities (both virtual and actual). It was in this sense that the conceptual framing of the research problem took shape through a series of pedagogical experimentations, in which semi-structured conceptual designs mobilized an emergent theoretical framework that only became perceptible in and through its enactment and subsequent articulation. We thus allowed each concept to materialize through the enactment of the research design as an emergent a/r/tographic process. In doing so, we aimed to "strengthen the concept's abilities to reach beyond the generalising classificatory tendencies of language toward affecting how the world's specificities are felt, perceived and lived with" (Tiainen et al., 2015, p. 16). The following four sections of the chapter provide a visual and textual rendering of each of the four concepts as they were set into motion through the a/r/tographic fieldwork process.

Corridors

We begin our investigation into movement and matter along a strip of Kirra Beach that stretches for miles along Queensland's Gold Coast. The beach provides a relational playspace to explore the extended site as well as the theoretical implications of beyond human relationships or what Barad describes as the "interconnectedness of all things" (in Cahill, Coffey, & Smith, 2016, p. 80). Movement, and its expression through the art of dance, "is an embodied practice that engages bodies as matter" (Ulmer, 2015, p. 39). The body has limitations within itself and inspires both matter and movement to play within the imaginary boundaries. A body enables and disables depending on the constraints of relation, and the creativity happens in the spaces between, stretching the material availability to explore and investigate the potentialities of the body as a conduit for relationships of matter to itself. As a composition of choreographic movement and materiality, it is plausible that the "body becomes an ontological site of being" (Ulmer, 2015, p. 38). The aim of the excursion is to employ and deploy choreographic practices to account, analyze, and create movement and appreciate the embodiment of matter's capacity for self-relation.

The provocation is simple. Movers are invited to develop a spatial limitation in the sand, to draw the outline of an identified space or "corridor" using only their feet. The design needs to be drawn within 10 s and reflect some thought about the beach on which they create. The movers are also asked to configure a movement pattern, which needs to be repeated twice in order to commit the movement to bodily memory while deepening and intensifying the markings more with each iteration. Ironically, it is the subduction of thought that is an indicator that body memory is being enacted. A reliance emerges on the body itself to provide knowledge, to build awareness of capacities and dispositions, and to structure and guide through movement (Koch, Caldwell, & Fuchs, 2013).

The Movement Is Fleeting and the Capture Elusive

The beach as a site emerges from fluidity with boundless limitations. There is a proliferation of lines, imposed, imagined, observed, and disregarded. The purpose of controlling flow seems at odds to the reality being explored a/r/tographically, and yet the constraint of the task is the very impetus for movement.

The Movers Play

Movement is the central focus and as movers we imagine and create. The beach provides an open surface for gesture and inscription, while also activating a geographic spatialization of education outside of institutional boundaries. As a kind of autonomous zone or deterritorialized space, the coastal landscape becomes the cloth from which a choreographic body-space-time can be cut. This becomes our task to craft a block of body-space-time as the corridor for a choreographic experience.

What emerges from the process of diagramming, this enactment of corridors is the relationship between a choreographic impetus (or the will to move), the enabling constraints of the spatiotemporal proposition, and the emergence of a series of structured improvisations that produce difference through bodily repetition.

The movers immerse themselves in the sand. For moments the sand and their skin become one, and it seems difficult to know where one started and the other ended. The movement has a linear legacy, a suggestion of a corridor embodying inside and outside of the constructed perimeters. The design is made obvious through the indent in the sand, yet the movement suggests that the lines extend upward into the air creating corridors. The base of the space is evident and implied as it permeates the air with suggestion. The movers' respect their imaginary walls, deliberately working

within or without the corridor, suspending (dis)belief, reminiscent of days when a childhood thought allowed for potentialities only barely grasped.

The product of the practice was artifact/relationship/teaching moment. The contributions of the audience, the dancer, the sand, the imaginary corridors, and the potentials of pedagogy for all make for a fertile investment of affect

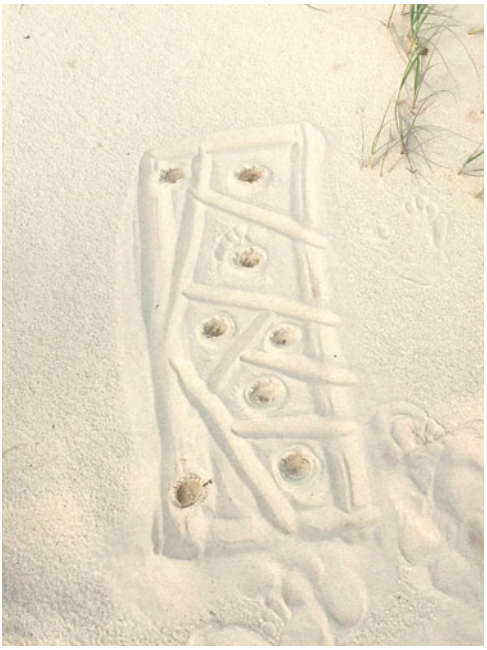
In the dance world, "corridor" is a choreographic term used to describe spatial constraints that are designed to enable "structured improvisation." Corridors are commonly used to break up the studio or stage space into blocks within a larger floor pattern, allowing choreographers and dancers to enact improvisational movement designs within a complex spatiotemporal structure. The corridor on the sand gave a start to an a/r/tographic field day; with limited instructions the bodies drew or perhaps just moved. In creating the corridor, the responses varied in size and shape and in directions against the backdrop of the foreshore. One forward, one sideways, and one on the diagonal: the experience becoming the borders, and the borders becoming the canvas. The corridors were complex, simple, and yet multidimensional, stretching the possibilities of what a corridor could be and what it could house. The movers performed with rhythm and dynamics and manipulated the sand for effect, and the sand pushed back. The movers' focus became intensive and intimate and entwined: with the activity, with the lines, with the sand, and with their imagination.

These relationships, as elements of movement, are concerned with the interactions between the body and itself, the body and other bodies, the body and the objects it can grasp, and the body and the environment it coinhabits with myriad

others. While this event was stimulated by spatial exploration, the trace elements of the activity were the residue and accretion of these material relationships. We can see evidence that the body behaves differently when objects and environments are introduced and considered as part of movement, and bodily responses are altered and augmented in response to the surrounds (Davies, 2003). Trying to capture what a/r/tographic fieldwork looks like gave way to what it *feels* like. As Ulmer (2015) states:

> What new materialism offers to dance-based practice-as-research, therefore, is an emphasis upon dancers as knowing beings within dynamic systems of movement. By sharpening the focus on dancers as embodied beings, new materialism offers an additional approach for embodied methodologies. (p. 39)

As a/r/tographic fieldwork would encourage, the opportunity arises to creatively document understandings of movement and matter as process. The movers were asked to find unexplored spaces away from their canvas and visualize themselves creating the lines. They recreate smaller memories of the drawing on the sand. The accessibility of the sand both geographic and material afforded ample opportunities and could be adapted and adopted into any learning site irrespective of age. The invitation of new materialism to reconfigure movement foregrounds the materiality of thought, imagination, and poetics as the concrescence of bodily experience. The dance of drawing also moves with rhythm, space, dimensionality, and the sharing of meaning as a public intimacy.



We are invested in movement,
And that it is matter.
And it matters.
And the matter is movement,
And that matter moves
is moved
and is moving.

Flight

As we step off the beach and back onto the esplanade running parallel to the ocean, we transition into the next experiment with how movement comes to matter as we consider lines of flight as advanced by Deleuze and Guattari (1987). We stand in a circle and utter single words associated with the concept of flight: the emphasis being on the materiality of the words rather than their syntactic properties. It's a simple algorithmic design in which each word spoken provokes the next, each word taking on some liminal, subconscious relation to the previous. There is a speed involved, a movement circling at the speed of thought – the very notion of words as transcorporeal entities (Alaimo, 2010), passing through the bodies that make up a pack or collective, weaving thoughts together. This is indeed flight, a way of putting the concept to flight in ways that change the consistency of the concept itself: how flight can be thought.

A six-word memoir: In-between invisible lines of flight

We break the huddle and drive to an area of the airport that is lined by security fences and signs to keep out, a strange kind of borderlands in between the university and the actual runway. Curiously, the campus borders intersect two side-by-side federal states, and amidst these visible/invisible borders, an international airport stretches across large swatches of land. Two time zones playfully engage with habits of mind, and while no signs dedicated the land to Indigenous peoples, we remain aware of the contested ownership and colonization of the land. As we take all of this into account, we walk

the terrain considering a proposition inviting us to experience borders in relation to flight. As Deleuze and Guattari (1987) state:

> Lodge yourself on a stratum, experiment with the opportunities it offers, find an advantageous place on it, find potential movements of deterritorialization, possible lines of flight, experience them, produce flow conjunctions here and there, try out continuums of intensities segment by segment, have a small plot of new land at all times. (...) Connect, conjugate, continue: a whole "diagram" as opposed to still signifying and subjective programs. (p. 161)

Together we walk though these disjunctive borders and time zones, peering into and beyond the secured borders and the invisible borders. We write six-word memoirs, take photos, and linger within interpenetrating territories of conflicting agency. Our bodies constantly navigate the open and closed spaces as we move, experimenting with our own lines of flight as flights soared above and beyond. We feel an entanglement of experiences emerging. Using Karen Barad's (2007) concept of intra-action, we come to appreciate how each person's study within the space influences our own. Rather than doing this work on our own and experimenting with self-initiated ideas, working together in relation to one another, in a co-emergent space, brings forward multiple lines of flight that pursue diverse directions, points of view, and purposes, creating an assemblage of diagrams. Indeed more potential emerged together than if we were apart.

Six-word memoir: Origins are coming, move away now

It is here that our "work" of art exists – in the spaces where nothing yet everything exists. We accepted the ascribed borders and escaped them to imagine the places and spaces as open to potential. Deleuze (1994) would say: 'The work of art leaves the domain of representation in order to become "experience"' (p. 56). As our collaborative a/r/tographic fieldwork experience focused on the potential of flight, we encountered movement as a choreographic architecting of experience (Manning, 2013). It was through our diversity that we experienced the potential of how environmental arts pedagogies might respond to a changing world. By creating an assemblage of lines of flight intersecting, eclipsing, falling into, rising from, and entangling one another, we glimpse how movement comes to matter.

Six-word memoir: Borders collapsing remain intimidating, nature reigns

Deleuze's project of immanent ethics asks us to consider how we should live in the world. In this sense, ethics is always about becoming: that endless state of change that moves us into unexpected encounters. After all, becoming is always in the middle. A middle space is in constant movement as all entities vibrate in connection to all other entities. Becoming is therefore not about moving toward transcendent values; instead, we embrace life's immanent ethics (Deleuze, 1988) and pursue our desires through experimentation with ideas. Environmental arts pedagogies that embrace these middle spaces are moving us toward an experimental, personal, societal, and ecological emergence where movement matters in our immanent becoming.

Six-word memoir: Pulled to the limit we expand

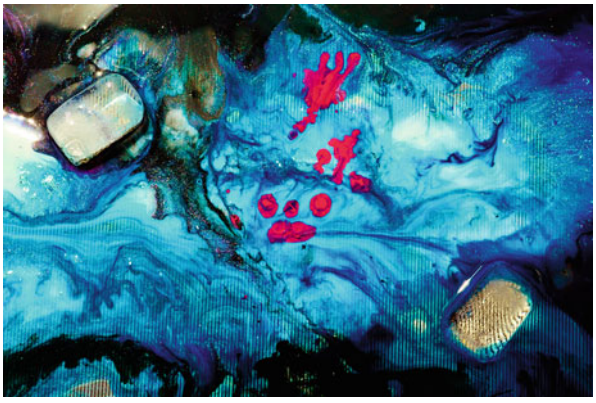
Viscosity

We reassemble from our forays into the borderlands between territories, walking together into the university campus proper and taking the elevator up to the tenth floor. Suspended in the glass-paneled staircase that flanks the building's northeast corner, we find a peculiar assemblage of found objects and media for exploring the concept of *viscosity* through material experimentation. There are two upended wooden boxes, between which is suspended a ribbed sheet of toughened glass taken from the front of an old oven. A range of found art materials are arranged on either side, including variously colored inks, solvents, binders, varnishes, and fluxes, along with a bucket of ice cubes. A high-resolution camera is placed in the space underneath the sheet of glass, allowing the movements of bodies and materials to be captured from the lower surface. It's a cross between an interactive artwork and a science experiment: what Barad (2007) might call an apparatus of material production.

Viscosity

1. The quality or state of being viscous
2. The property of resistance to flow in a fluid or semifluid
3. The ratio of the tangential frictional force per unit area to the velocity gradient perpendicular to the direction of flow of a liquid – called also *coefficient of viscosity* (Merriam-Webster, 2016)

Viscosity is not only a property of fluid materials but is theoretically a property of matter in all possible states, whether liquid, solid, or gas. There is even scientific evidence of viscous movement observed over long periods of time in concrete formations such as granite (e.g., Kumagai, Sasajima, & Ito, 1978). Attending to viscosity reveals that everything that exists materially is also in movement but that these matter flows have varying speeds, consistencies, and coefficients of resistance and mutability. Even the elemental material flows of air, light, and water vapor exhibit viscous resistance in relation to other materials and fluctuations in temperature. For instance, flight only becomes possible through the dynamic resistance between air and water vapor ratios and higher viscosity materials that make up the wings of birds or airplanes.



Situated in the corner of the 9th floor stairwell overlooking the university parking lot and the Gold Coast's highways and beaches, we begin to realize that the glass structures joined with steel and granite continue to move at ever so slight and miniscule speeds. We begin to squeeze, flick, squirt, and layer the materials onto the surface of the glass, probing and guiding mixtures of varying viscosities into differential patterns of color, light, movement, texture, and form. As we drop the ice cubes into the mix, they immediately begin to change from solid to liquid, gliding on their own volition across the surface while releasing water molecules into the concentration gradient of the materials. Never does the paint become muddy – it upholds its consistency, discerned as a mixing of colors that somehow retain their origins. The surface is dappled with moving patterns of colored sunlight and shadow:

> Viscosity is a feature of the way in which time emanates from objects, rather than being a continuum in which they float. (Morton, 2013, p. 35)

The surrounding social and ecological environment becomes part of this molecular experiment: the stairway surrounded by glass in every direction, light flooding in from multiple sources, and the panoramic tableaux of ocean, roadways, airport, and parklands. We begin to notice the numerous viscosities operating within this vista. The viscosity of a flock of birds in flight, the viscous flows of human and nonhuman capital across the surfaces of the landscape, the burning of fossil fuels with each car that drives by, or plane that takes off. The concept of viscosity takes on a new consistency, as we raise questions regarding the viscosity of thought and bodies in movement, the flows of desire, engagement, and creativity in classrooms, as well as the distributed viscosities of social networks, economic capital, and political ecologies.

> Viscosity wants to emphasise this mobile spatiality of togetherness, of coordinated flowing and relative stability . . . Human flows become viscous in crowds, in large airports and in traffic jams . . . packs, cities, nation-states, social classes and racial formations are also examples of human viscosity. (Saldhana, 2008, p. 329)

As a concept for environmental arts pedagogy, viscosity enables us to account for the primacy of movement in materiality itself, the way that movement puts bodies into

motion and thoughts into flight. We can begin to consider learning itself as a viscous material flow of transcorporeal movements that pass through, activate, and rearrange the capacities of bodies (Alaimo, 2010; Tuana, 2008). The viscosities of light passing through a classroom window; the increased metabolisms of children when they go outside to play; the shifts in temperature, air pressure, and humidity that alter the capacities of bodies; the viscosities of affect in the compositions of porous social assemblages: the inclusions and exclusions, engagements and disengagements, mixtures, dilutions, diffusions, permeations, precipitants, and calcifications of experience within a classroom, or playground, or museum.

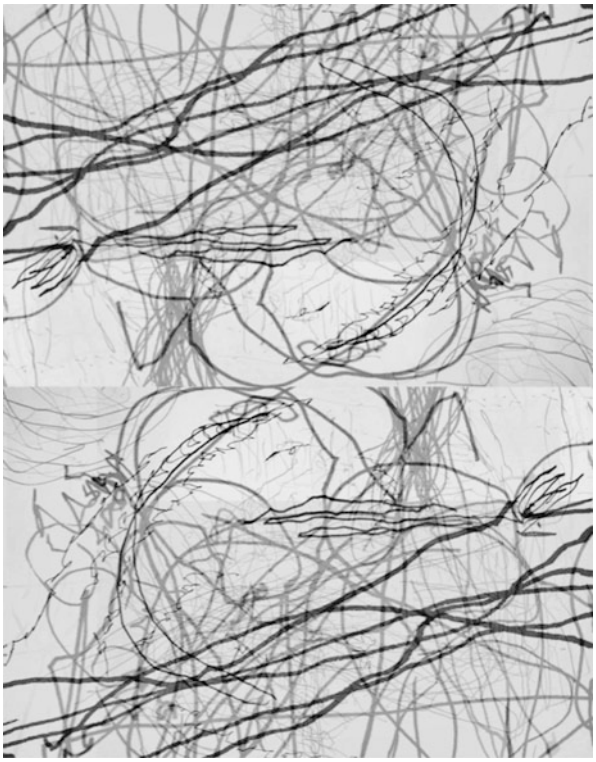
Construction

In returning to the office level, we regroup, astonished to near-silence by the aesthetic positionings of our actions and our thoughts and our documents of these movements and these matters. All at once we begin to speak eagerly as our thoughts follow our actions, jumbling and tumbling in excited dialogue. Reluctantly we restrain and constrain; we have yet another concept to interrogate and further work to explore. We drift into the next episode and bring ourselves back to the quiet, back to the flow (Csikszentmihalyi, 1997).

The hushed space of intensive artmaking is contrasted with the noisy space of construction next door. The campus we inhabit is growing, expanding, and developing around our very bodies, as another building is added to our footprint. Once a lovely

green space of swamplands, small animals, and native flora, it has been excavated and repurposed in order to accommodate a further wave of student occupation and learnings, growings, and doings. We have watched, from the end of our corridor, as the space beyond us is transformed: once a place to rest our eyes, now a place to avert and anticipate. The ground has been cleared, and a machinic assemblage (Deleuze & Guattari, 1987) of human and nonhuman agents is working vigorously to construct our next building. Its monstrous presence in our working day is one of immanent capture. The place of construction today is not the same, as yesterday and tomorrow again it will be altered further. Issues of encounter, emplacement and displacement, synergies, and discords are present and in constant flux in this space, and it is those movements that we now seek to map, somewhat inadequately, as each collides and interrupts and glides with and against the other (Knight, 2016).

The material process of construction has been a daily reality for those of us who inhabit this campus. It has interrupted, inconvenienced, and intruded in our lives. In positioning this last experimentation, we call forth Ingold's (2007) work on lines and surfaces, specifically those that track and document movement, such as the passage of feet on the ground, or the movements of tank treads across the landscape. In short, the passages and lines and movements through time and in place, this place, become ecologies of entanglement, a meshwork.



> Indeed nothing can escape the tentacles of the meshwork of habitation as ever-extending lines probe every crack or crevice that might potentially afford growth and movement. . .for inhabitants, however, the environment does not consist of the surroundings of a bounded place but of a zone in which their several pathways are thoroughly entangled. In this zone of entanglement – this meshwork of interwoven lines – there are no insides or outsides, only openings and ways through. An ecology of life, in short, must be one of threads and traces, not of nodes and connectors . . . Ecology, in short, is the study of the life of lines. (Ingold, 2007, p. 103)

In this experimentation, we seek to create traces, entanglements, meshworks, as we follow the lines of movement over time and in place, even as that place is itself in constant motion and in mutability. In this instant, and for a comparatively fleeting moment, we follow those lines by engaging the technologies of drawing, of making marks, in this case abstract lines, on a recording surface. We find our way through this meshwork of construction, as drawings.

The language form of drawing has been a sensemaking device in all of human existence. It precedes written language through history but also through life, as children engage with mark making prior to the development of a coherent writing schema. Drawing also requires a different type of cognition to writing, or speaking, although it is indeed a language form. As we draw, our chatter ceases, and we continue in silence through this engagement with seeing, with following, and with way-finding (Lasczik Cutcher & Irwin, 2017).

The drawings have been further troubled and extended through the use of layered digital media, so that the images created by the four individual artists have become enmeshed, further entangled, and curated as a single artwork that enables the viewer to see in and with. All four drawings have been layered together to robustly portray the suite of marks: the energies of the construction site, the movement of feet, tires, tank treads, trucks, and cranes that were followed and mapped. The drawings become a layered document that constructs construction, a network of aesthetic engagements, and a c/a/r/tography (Lasczik Cutcher & Irwin, 2017; Rousell & Cutcher, 2014). Thus, the artwork both describes and embodies these situated c/a/r/tographic events, becoming itself a curated display of sensory encounters with construction and its evidentiary passages.

Diagramming Pedagogical Propositions

In taking a new materialist approach to a/r/tographic fieldwork, the four renderings above have put concepts of movement to work through artistic and pedagogical experimentations with bodies, places, times, events, and materials. In order to further analyze the potentials for these renderings to inform an environmental arts pedagogy, we now undertake a process of diagramming the pedagogical forces and movements at play in each of the experimental situations described above. Diagramming has previously been used as an analytic process in new materialist educational research, including the diagramming of classrooms as topological assemblages (de Freitas, 2012) and the diagramming of concepts through arts-based research (Rousell, 2017).

As Deleuze and Guattari (1987) write, such diagrammatic processes "do not function to represent, even something real, but rather [construct] a real that is yet to come, a new type of reality" (p. 142). Accordingly, the diagrammatic processes we undertake differ from conventional understandings of diagrams as visual or textual representations or mimetic descriptions of pre-existing processes. The diagram is instead associated with mapping the pedagogical potentials of each rendering as an abstract machine that produces new movements of thought. In this way, diagramming necessarily involves analytic techniques that operate at the very limits of thought, as a speculative process of analysis that is always opening onto the next threshold of thinking and practical action. As Watson (2009, p. 12, emphasis in original) writes, such "diagrams do not *represent* thought; rather, they *generate* thought." As heuristic devices for generating pedagogical thinking and action, the diagrams below aim to mobilize the forces at play in the concepts of corridors, flight, viscosity, and construction as they emerged through a/r/tographic fieldwork. In this way, we diagram the concepts themselves as *methods* for generating pedagogical designs that implicate matter in movement and movement in matter.

Diagram 1 shows how the concept of the "corridor" operates as an enabling constraint for the production of improvisational movement within a series of open structures. The choreographic impetus for movement is seen to come from a source external to the corridor, and this could be attributed to the ideas, techniques, affects, and propositions for movement that are embedded in the formulation of a pedagogical design. In this case, the design is based on applying the constraints of repetition in order to produce difference, such that each corridor renders a unique configuration of gestures and patterns in response to a proposition for movement held in common. Rather than functioning as a container or backdrop for human experience, each corridor is actively constructed through embodied practices that mutually implicate space, time, and materiality. Crucial to this formulation is the embodied activation of

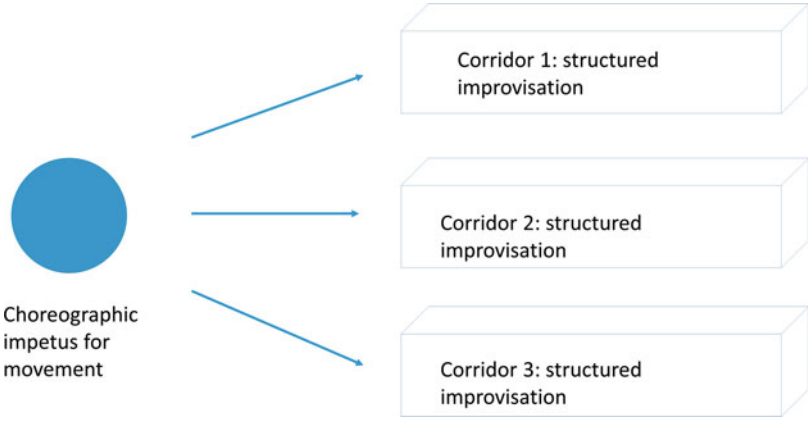


Diagram 1 In which the concept of **corridors** produces the enabling constraints for the structured improvisation of movement

the corridor as a space for intensive, experimental processes of individuation. From there, the question is how this concept of "corridor" might come to matter in educational contexts, particularly in terms of how we think about and construct learning environments across a wide range of disciplines and learning areas. We might, for instance, rethink the design of a primary or early childhood classroom in terms of experiential corridors for structured improvisation and movement, rather than prefabricated "spaces" for sedentary forms of reading, art, science, and mathematics instruction.

Diagram 2 follows the formations and distribution of bodies as the concept of **flight** shifts from a semiotic to a visual register. The two-stage nature of the pedagogical design reveals the differences produced between different arrangements of bodies in relation to patterns of movement. In the first instance, there is a circular arrangement of bodies that facilitates the rhythmic movement of wordplay and symbolic associations with "flight" within a collective huddle or pack formation. This generated a feeling of togetherness among the a/r/tographers, while at the same time generating a semiotic movement of thought across bodies in a unified group. In the second instance, there is a dispersal of individual bodies moving separately and yet together through the environment, with the shared aim of capturing photographs. The distributed movement of the group then contracts once again, back to the circular formation of discussion and consolidation of the collective experience. What becomes palpable through this diagram is the way that the collective assemblage of bodies holds together while passing from one state and configuration of movement into the next. Each stage of the process appears to resonate through the next, modulating the learning process without direct intervention or didactic instruction. In applying this pedagogical diagram to the classroom, we can conceive of similar processes that could modulate the degrees of collectivity and autonomy in children's "flight" through different activities and arrangements of bodies. The setting of circular patterns of movement, thought, and association could be used as the starting point for more dispersed and distributed explorations of ideas and environments, which then lead back to group discussion and the collective consolidation of diverse experiences.

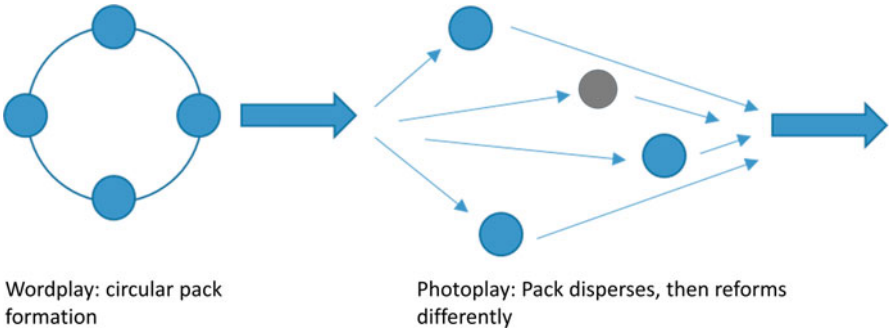


Diagram 2 In which the concept of **flight** moves from a cyclical to a distributed formation as bodies shift from wordplay into photoplay

In Diagram 3, we see the pedagogical design of a material apparatus for experimenting with different viscosities of movement and flux. Differential forces are seen to intervene in the apparatus from the outside, including the forces of human bodies that engage with the apparatus as well as elemental forces, such as light and temperature, that affect the states and consistencies of different materials. The machinic apparatus of the setup becomes the locus for the bodily activation of potentials for organic and molecular movement within the learning environment. This experimental confluence of forces is captured by a camera as a sensing "body" or "device" that registers the patterns of light, shadow, color, movement, and form as materials with different viscosities come into contact with one another. By bringing participatory art and science together through aesthetic and material experimentation, this pedagogical diagram foregrounds the ways that heterogeneous elements of the learning environment congeal into dynamic, spatiotemporal events. If we extend the applications of this diagram into the classroom, we can imagine learning environments that are designed for children to enter and experiment freely with a wide range of viscous materials that mix, meld, and change state depending on environmental conditions. Capturing these interactions through oblique cameras or other ubiquitous sensing technologies would allow both teachers and learners to view the event from the perspective of the apparatus itself, introducing further opportunities for understanding the material and aesthetic processes at play within the environmental arts classroom.

In Diagram 4, we grasp the material processes that enable movement to be translated or "transduced" through practices of empirical observation and inscription. Drawing is seen to offer a technique for converting movement from one medium to another, feeding the ongoing construction of the external environment through the intensive processes of attunement and creative expression. The observer, in this sense, becomes a conduit for aesthetic expression through movement as it is

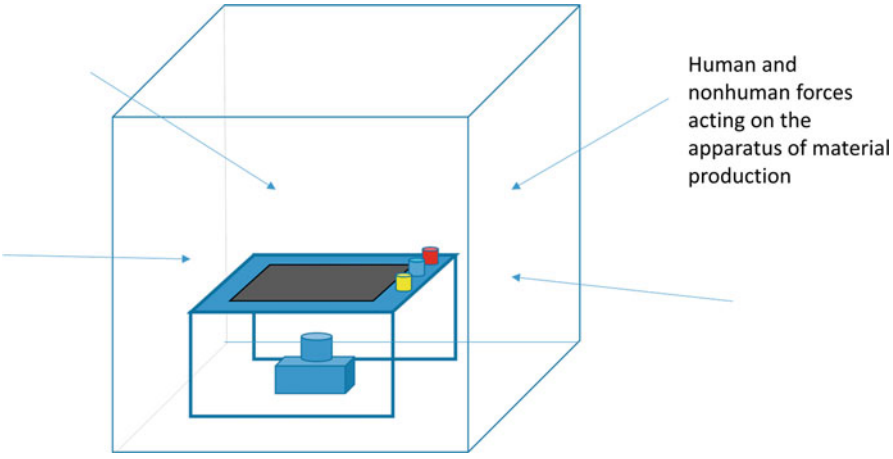


Diagram 3 In which the concept of **viscosity** follows the movement of matter across different forms, states, and consistencies

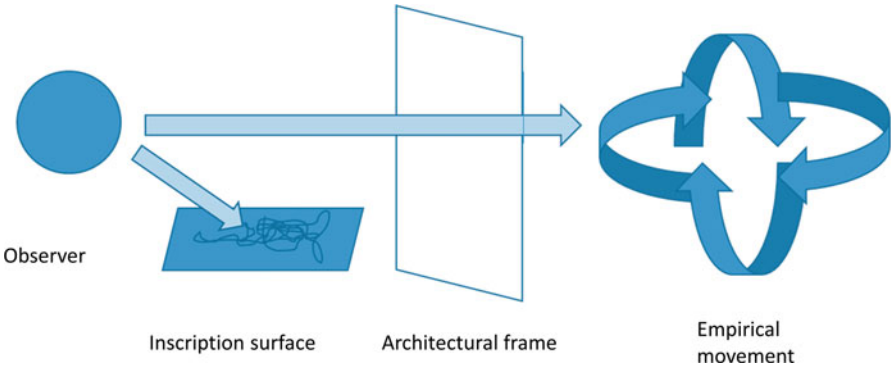


Diagram 4 In which the concept of **construction** connects the observer, the surface of inscription, the architectural frame, and sources of empirical movement in the external environment

mediated by architectural framings of the sensible world and the substrates and inscription materials at hand. In converting this diagram into a pedagogical design for the classroom, we can envision children learning to observe and translate environmental movement through various practices of transduction, such as drawing, painting, dance, music, or creative writing. By focusing on the transduction of movement through environmental attunement and responsive observation, children's artistic learning experiences could move from a representational to an enactive, embodied, layered, and embedded mode of aesthetic engagement.

In Diagram 5, we consolidate the previous diagrams within a pedagogical sequence of conceptual experimentations that are linked to Whitehead's (1978) methodology for speculative empiricism. This configuration shows the relationships between the free play of the creative imagination and the embodied materiality of sense experience and rational thought. As Whitehead writes:

> The true method of discovery is like the flight of an airplane. It starts from the ground of particular observation; it makes a flight in the thin air of imaginative generalisation; and it again lands for renewed observation rendered acute by rational interpretation . . . the success of the imaginative experiment is always to be tested by the applicability of its results beyond the restricted locus from which it originated. (p. 5)

Diagram 5 shows how the concept of the corridor can provide a spatiotemporal architecture for the flight of the imagination; the viscous flows and mixtures of ideas, sensations, bodies, and materials; and the return to constructive observation and interpretation of empirical phenomena. Rather than positioning this sequence as a blueprint or template for environmental arts pedagogies, we see it as a heuristic diagram for how teachers and children might collectively configure and produce their own learning activities and experiences. In other words, Diagram 5 offers an operative modeling of environmental arts pedagogy as an open-ended and participatory process of learning through artistic and environmental experimentation. Any number of concepts could be substituted for the ones that we have selectively chosen based on our interests in movement and materiality. What is crucial to our

Diagram 5 In which the concepts of **corridor**, **flight**, **viscosity**, and **construction** are arranged into an assemblage that produces new concepts, practices, and knowledge applications

pedagogical formulation, however, is the use of *the concept itself as a method* for empirical experimentations with environmental and aesthetic phenomena (Lenz Taguchi & St. Pierre, 2017). By following the movement of concepts as they modulate and condition material processes, we were able to open up a whole domain of potential learning experiences connecting movement with matter, body with environment, and imagination with empirically observable phenomena.

Conclusion: Propositions for an Environmental Arts Pedagogy

In this chapter, we have shown how a new materialist approach to a/r/tography can be used to investigate the relations between matter and movement, thus contributing to novel configurations of environmental arts pedagogy. We see the entire process of designing, enacting, analyzing, and theorizing this project as an exploration of what environmental arts pedagogy might come to look like and how it might come to work. Drawing together the aesthetic, material, and conceptual yields that have been rendered through this emergent process, we conclude with a series of propositions for those who might adopt a resonant approach to environmental arts pedagogy in other places and times. As we employ the term here, a proposition is a theoretical lure or provocation that combines virtual potentials of the speculative imagination with the empirical dimensions of embodied experience in the actual world. We activate the term "proposition" proactively in the Whiteheadian (1978, p. 22) sense, as a "matter of fact in potential" and also as the source of enabling constraints. "Thus propositions grow with the creative advance of the world" (p. 188). Much like the diagrams in the previous section, the propositions below should be taken as heuristic provocations, vehicles, and catalysts for learning activities and experiences that exceed our capacities to foresee.

First Proposition: Use Concepts as Methods

We began with new materialist theories of movement and materiality as the points of departure for this project. From there we each selected a concept as the vehicle

for practical experimentation with specific locations, environments, activities, dialogues, materials, media, techniques, and technologies. On the one hand, this approach situates, expresses, and materializes the concept through concrete practices and artful experimentations. On the other hand, the concept retains a consistency throughout the experiment that contributes to the pedagogical yield of the process. This lets us learn *through* concepts as we put them to work creatively within an architecture of engagement, rather than trying to learn *about* concepts in ways that are detached from worldly experiences and emplaced encounters.

Second Proposition: Modulate the Thresholds Between Individual and Collective Learning Processes

Our experiments were designed individually, and yet they were enacted, documented, analyzed, and theorized collectively and collaboratively. This allowed us to see how the thresholds between individual and collective learning processes could be warped, stretched, conditioned, and modulated in relation to different concepts and practices. We therefore propose that the individual become just another element in the pedagogical machine, a learner among learners, a mover among movers, an organism among organisms, and a flow among flows.

Third Proposition: Foreground the Environmentality of Art and Pedagogy

Rather than making art *about* the environment or environmental issues, we tried to create spaces for thinking and working artfully across environmental scales, durations, and life processes: quantum, molecular, genetic, cellular, organismic, social, ecological, planetary, and cosmic. Ultimately we found that waves crashing on the beach, an airplane taking flight, an ice cube moving across a sheet of glass, or machines moving tons of earth and steel all became active and agentic elements of an environmental arts pedagogy – with or without the intentionality of the artist, researcher, or teacher as masterful human identities. This makes the environment itself the medium and milieu through which artful learning process occur, rather than being the background, object, or container for learning that is primarily determined by human design and interpretation.

Fourth Proposition: Set Protocols for Experimenting Wildly

Our project began with a relatively tight series of protocols for selecting a single concept and a specific location and set of activities for experimenting with matter and movement. Nonetheless, the actual learning processes that emerged from these protocols turned out to be wildly experimental, experiential, and productive for creative thinking and dialogue. The rigidity of the initial protocols also allowed us

to analyze and assemble the four concepts and associated practices into a diagrammatic sequence, which gave the project more consistency as a modeling of environmental arts pedagogy. What is crucial in this proposition is the design of constraints that support open-ended learning processes and novel forms of participation.

Fifth Proposition: Fold Cartographic Practices into the Learning Process

In each of the conceptual experimentations that we engaged in this project, we can see that cartographic practices of mapping and documentation were embedded into the actual process of learning. We mapped **corridors** by drawing in the sand with a stick and photographing them; we mapped **flight** with six-word memoirs and digital cameras; our experimentations with **viscosity** were mapped by cameras placed above and below the surface; and our engagement with **construction** was mapped through the drawings that were created and then layered digitally. Each of these cases demonstrates how the mapping and documentation of the learning process was folded into the process itself. This reveals ways that cartographic processes can increase the aesthetic, material, and conceptual yields of a given learning activity, allowing the experience to be translated through aesthetic renderings, conceptual diagrams, and material transductions of the learning process.

We hope that these five propositions are both provocative and useful for those seeking to develop an environmental arts pedagogy for engaging children with movement and materiality or with any number of other concepts, issues, questions, or concerns about the changing environmental conditions of our times. As we continue to experiment with the relations between concepts, environments, pedagogies, artworks, bodies, spaces, technologies, and times, we note the urgency of finding ways to coinhabit the world more artfully, more relationally, more sensitively, and more experimentally.

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