



What are the drivers of cross-generational physical activity? Exploring the experiences of children and parents

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Received: 26 June 2018 / Accepted: 7 September 2018 / Published online: 22 September 2018
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Abstract

Aim Little is known about what drives engagement in physical activity involving children and parents together. To date, when this phenomenon has been studied, the focus has been upon parent support for child physical activity, ignoring the child perspective. This article explores child and parent drivers of cross-generational physical activity.

Methods A qualitative, hermeneutic methodology was employed. Primary school children and parents took part in semi-structured focus groups, family unit interviews, and individual interviews. Data was transcribed and analysed thematically.

Results Engagement in cross-generational physical activity was driven by much more than physical health benefits. Emotional and relational drivers of cross-generational physical activity were identified, highlighting the mostly positive impacts it had upon both family and child–parent relationships by providing connecting and bonding experiences. Children identified it as a unique physical activity partnership, which provided a safe context for practising their sporting skills. Parents reported that cross-generational physical activity facilitated parenting by providing opportunities for them to teach and nurture important life skills, while also providing their child with support for physical activity. Holidays were identified as a time when the focus of physical activity for families was more often cross-generational.

Conclusion Cross-generational physical activity is a complex, bi-directional physical activity partnership that takes place within a child–parent relationship, within a family. Its drivers are manifold, extending well beyond the dose of physical activity it provides, to strengthening relationships and skill development. Future research should include the child’s voice to provide a more holistic view of this phenomenon.

Keywords Cross-generational physical activity · Child · Parent · Ecological model · Qualitative research · Drivers

Background

The benefits of physical activity have been found to extend beyond disease prevention to many other social, mental, and physical health benefits for both children and adults (Boreham and Riddoch 2001). Despite this, worldwide, many children and adults perform insufficient physical activity (PA) (Bauman et al. 2012). Cross-generational PA (hereafter known as *cross-gen PA* in this article) constitutes a familiar PA partnership involving children and their parents. Situated

at the nexus between child and parent PA, cross-gen PA may provide a mechanism to increase both child and parent PA.

Previously reported drivers of cross-gen PA have included providing parental support for child PA (Beets et al. 2010) and opportunities for parental role modeling of physical activity (Yao and Rhodes 2015). However, little research has captured children’s perspectives on PA (Wright et al. 2010), and as a result their views on cross-gen PA have been only cursorily reported. Explorations of parents’ views on parental support for a child’s PA have found that mothers enjoyed engaging in cross-gen PA with their children and used cross-gen PA as an opportunity for the family to spend time together (Vanderworp and Ryan 2016). In addition, Thompson et al. (2009) reported that parents considered family cross-gen PA was important because it increased communication between participants and was enjoyable. Findings also indicate that children may perceive cross-gen PA as a way parents could show support for their children’s PA (Stanley et al. 2012) and as a mechanism to enable child PA (Wright et al. 2010).

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Although cross-gen PA appears to be predominantly associated with supporting child PA, it is important to consider other drivers, including those arising from children. Social ecological models that encompass a variety of interdependent drivers of specific behaviors have been found to be useful for examining PA behavior (Bronfenbrenner 1989; Giles-Corti et al. 2005). These models facilitate exploration of environmental drivers such as social and cultural contexts, on individual and psychosocial drivers. Considering cross-gen PA through the lens of a social ecological model indicates that it should be examined as a PA partnership, with both child and parent having an influence on the activity.

This paper reports on a qualitative study which sought to explore, from a social ecological viewpoint, the experiences and perspectives of cross-gen PA from both primary-school-aged children and parents, with a specific focus on findings regarding the drivers of cross-gen PA.

Methods

The study was conducted within a constructivist paradigm, using a hermeneutic approach. Additional information on the methodology can be found in Freire et al. (2018). Approvals to conduct the research were provided by the Charles Sturt University Research Human Ethics Committee and the New South Wales (NSW) Department of Education.

Research setting

The research was carried out between August and December 2013 in a large regional town in NSW, Australia.

Recruitment and participants

Separate child and parent focus groups, family unit interviews, and in-depth interviews were undertaken. This multi-method approach was used to provide tailored opportunities for child and parent participants to discuss their perceptions and experiences of cross-gen PA, including elements important to their own generation.

Recruitment of participants for parent-only focus groups, family unit interviews, and parent in-depth interviews was through invitation to parents who had provided their contact details while completing a survey on cross-gen PA. These parents had been recruited for the survey via schools in the regional town. Maximum variation sampling (Patton 2002), based on overall PA level and cross-gen PA level, was used to ensure that participants with a broad range of perspectives and experiences were recruited for the current study.

Permission was gained from principals of public and independent primary schools to organize child-only focus groups in schools within the same geographical location. Four

schools provided permission. Invitations, which included separate child and parent information sheets, were sent out to all Year 5 and Year 6 parents via the children (age range 10–12 years) at those schools. Both parental consent and child assent for participation were gained for all children who chose to take part in the study. Thirty-one child participants (23 females, eight males) agreed to participate, along with fifteen parent participants (ten mothers, five fathers).

Data collection

Interview guides were developed based on findings from a literature review and a survey of parents and children regarding cross-gen PA (see Freire et al. 2018, Table 2). Congruent with semi-structured methods, there was no set ordering of questions. Rather, questions were ordered as appropriate to the participants and in ways that allowed previously unknown material to arise (Minichello et al. 1996). Each focus group and interview started with a broad definition of PA (recommended by the World Health Organisation 2004) to facilitate discussion across the range of cross-gen PA categories.

Strategies were used to enhance the child's recall of their experiences and their voice (Horstman et al. 2008). For example, data collection involving children commenced with all participants being asked to draw experiences of cross-gen PA on paper, with speech bubbles. These drawings were then used to initiate discussion (Liamputtong 2007), commencing with children, so participants were encouraged to interpret their own drawings. This strategy led to discussion evolving from the child participants' frame of reference for cross-gen PA, and what was important to them. The researcher also used confirming summaries to ensure participants' views were fully understood.

Data management

Interviews were audio-recorded and transcribed verbatim. The transcripts were de-identified and pseudonyms have been used to report findings in this paper.

Data analysis

Hermeneutic analysis requires a systematic movement between the text as a whole and its component parts, to revise and illuminate understanding through thematic analysis (Kinsella 2006). Analysis was divided into three phases. Preliminary analysis occurred concurrently with the data collection process and continued until saturation was achieved, such that no new elements were emerging. The next two phases of analysis focused upon authentic capture of both child and parent perspectives, in order to identify differences and commonalities in experiences between the two generations. A systematic approach to Gadamer's hermeneutic analysis described by Fleming et al. (2003) was employed for the

second and third phases of data analysis, with the process starting with deep, separate analysis of child and parent data. Transcripts were analysed individually, line by line. To maintain a strong link with the child or parent voice, descriptive coding used, where possible, participants' language. Codes assigned to individual transcripts were then reviewed across all child transcripts and all adult transcripts to identify potential duplication or replication, in order to refine the list of codes and form collections, or 'trees', of aligned coded material. The final phase of analysis involved analysis of the phenomenon of cross-gen PA across the entire data set. During this phase, writing about emergent themes continued to test the interpretation that was emerging. Reflective journaling of the process and decisions made during the research enhanced trustworthiness and provided an audit trail.

Findings

Before discussing findings from the study regarding the *drivers* of cross-gen PA, it is useful to briefly consider findings regarding the *nature* of cross-gen PA. The analysis of the transcripts indicated cross-gen PA was a complex collaboration between a child and parent, which took place within the broader child–parent relationship. PA partnerships evolved within multiple family relationships. Within each child–parent relationship there might be no cross-gen PA or several different types of cross-gen PA partnerships. Each child and parent could have more than one cross-gen PA partner, and any cross-gen PA episode could include more than one parent or more than one child. Hence, the cross-gen PA partnership was not necessarily restricted to a dyad (a *duet*), as in some instances it reflected a *chorus*, subject to multiple contributors and drivers. As will be further detailed below, cross-gen PA was in many ways integral to family relationships, and as such it influenced and was influenced by the family's habits or traditions.

A range of *drivers* of cross-gen PA were discussed by child and parent participants (Table 1), and these are now further described.

Spending enjoyable time together

Participants' initial descriptions of cross-gen PA tended to focus on two intertwined themes: the elicitation of an affective response, and enabling families to spend time together. For example, Jody (child, interview) said: "*I do exercise with them [parents] because it's fun and enjoyable and I like spending time with them*". Although affective responses were mostly positive, the full spectrum from "*unenjoyable*" to "*fun*" was evident. Participants' affective responses were unique, and were associated with different aspects of the cross-gen PA experience, including physicality, child–parent bonding,

Table 1 Summary of findings

Spending enjoyable time together	Individual's affective responses helped to determine level of engagement but rarely sole driver. Holidays facilitated engagement in cross-gen PA.
Cross-gen PA facilitates communication	Conversation was easier to generate during cross-gen PA. One-on-one time with same gendered parent was important to children of this age group (10–12 years).
Bonding and connecting through cross-gen PA	Cross-gen PA did not require verbal communication to result in a connecting experience.
Opportunities to redefine the family PA 'pecking' order	Most children and active parents monitored where they were positioned physically in comparison to their parent/child/family.
Cross-gen PA enables parenting	Cross-gen PA supported parenting in general through enabling teaching of life skills. Supported child PA by: role modelling, changing a child's inactivity to activity, ensured child was getting enough PA during holidays and facilitated practising of sporting skills.
Practising and experimenting through cross-gen PA	Children focused on increasing proficiency in their sporting skills by gaining rehearsal time with their parents.
Providing a safe fun environment to compete	Cross-gen PA mostly considered a pseudo-competition by participants.

See accompanying text for detail on these themes

family bonding, benchmarking that allowed for a redefining of the family PA 'pecking' order, and children having the opportunity to practise sporting skills and develop PA skills. It is important to note that one member of the partnership may have perceived the episode of cross-gen PA as "*fun*" while the other perceived the same episode as "*unenjoyable*". For example, Carol was not a keen basketball player but would participate in basketball practice as a cross-gen PA with her two daughters.

Carol (parent): *I find that I get frustrated as I'm not very good at it so I'll do it for a while with her but then we get contained, (...) or the pair of them decides to have a fight and because it's something that I'm not enthusiastic to do I go "OK we're done".* (Family interview).

As can be seen in this excerpt, an individual's affective response helped to determine the level of engagement or investment in the cross-gen PA, but rarely was it the sole driver behind an episode of cross-gen PA.

Holidays were an important time for families to want to do activities together, including cross-gen PA.

Julie (parent): *I would prefer one child or the other unless we're on holiday mode walking in which case it is more about what you are going to see and enjoying the experience together. (...). Holiday exercise is easy because it is an unwritten contract that we'll be doing it together; however, other times are up for negotiation. (Family interview).*

Parents described how an overall reduction in commitments and fatigue, due to being away from work and having no school or after-school activities, facilitated holiday cross-gen PA. In contrast, during school term time, where 'child PA time' was already appropriated by child sporting activities, cross-gen PA was more difficult to fit in. Even though this finding indicates that time was an important factor, the drivers behind an episode of cross-gen PA were often more complex.

Cross-gen PA facilitates communication

Participants embraced cross-gen PA, in part because of the impact it had on conversations. Children found cross-gen PA to be a good time to talk to their parents and a time when they felt more likely to be heard. It is of interest that, as can be seen in the excerpt below, children also recognised the opportunity cross-gen PA provided their parent partner to achieve an alternate outcome.

Rachel (child): *It's when they are in a positive mind and they are willing to hear what you have to tell them.*

Suzy (child): *I think parents think it's easier to persuade you to do something when you are relaxed.*

Researcher: *What do you mean by that?*

Suzy: *It's when they might be able to persuade you to do your chores.*

Rachel: *Or homework.*

Ginny: *Or anything you don't want to do. (Child focus group).*

As can be seen, the importance of communication with their parents contributed to children's enthusiasm for cross-gen PA. Likewise, parents had noticed that it was easier to speak to children whilst doing cross-gen PA, such as walking, biking, cleaning, and weeding, than when engaged in more sedentary activities.

Carol (parent): *I personally find that it is easier for them to open up on a walk than if you go to their bedroom and try to chat. You can just see the shutters coming "kerplonk" down. Even with the evening meal, when we are told we should all sit down and chat with our children about the day, they are not interested in doing that. (...) Even when I've tried to promote that, it didn't work. (...) It did not help create threads of*

communication or whatever it is supposed to do. There's other ways to do that, chatting while walking somewhere or helping me in the house. They seem to be able to talk then, and it's really quite amazing the things that can come up, how they are feeling, and the questions that come up. (Family interview).

One-on-one PA time with their same gendered parent was of particular importance to children of this age group. This was evident even when participants discussed performing menial tasks such as cross-gen PA, for example, when Ava and her mother emptied the dishwasher together. At these times, Ava felt that she could "ask her about anything" (child focus group). As well, Liam, who spent most of his interview enthusiastically describing cross-gen PA sport and exercise with his parents, also sought out uninterrupted conversation time with his father through cross-gen walking.

Liam (child): *Sometimes Dad will get up early in the morning and he'll have his shoes on and I'll ask him what he's doing and he'll say he's going to the shops to get the paper and I'll ask if I can come. It'll be early in the morning, on a Sunday usually, and I just want to go for a walk. Sometimes we talk about sport or something like that. It's a good time to talk because it's laid back, you don't have to stress about anything else so you get to talk about your thing. (...) I like having time with Dad. (Child interview).*

Bonding and connecting through cross-gen PA

Cross-gen PA was used by participants as an instrument to build and maintain family relationships. At these times, cross-gen PA seemed to be used to enable family members to check in on each other and to re-establish bonds and connections, leading to a re-grouping of the 'family pack'. For children, in particular, cross-gen PA episodes involving family re-grouping were important to the child's sense of belonging. For example, Rosy, who took part in a child focus group, drew and described her family's weekend walks/runs around a local park.

Rosy (child): *My Dad and my sister will often run together and my Dad goes nonstop. My sister is older than me and faster. I get tired easily and if I can't catch up to them I just go to my Mum and walk with her. I like that it is just us four spending time together and that we get exercise out of it. (Child focus group)*

Children identified cross-gen PA as an important bonding activity for them.

Liam (child): *You kind of bond, you don't really need to but you can get something out of it. It's a bit different to doing it by yourself, it's more social and it's just to have a bit of fun with your parents. It's important and I like it.* (Child interview).

Likewise, for parents, cross-gen PA provided a bonding experience which could enhance their relationship with their child. Cross-gen PA was found to be an effective relationship-building activity.

Colin (parent): *I find it really rewarding the time that we spend together. The physical activity is good for him, it's good for me. But the time spent together and the relationship strengthening is the best bit.* (Parent interview).

Cross-gen PA provided a context that enhanced child–parent connecting. Some parents sought out cross-gen PA because it gave something unique to their relationship with their child that other, more sedentary, activities could not provide.

Nicole (parent): *The kids feel close to you. The kids like you doing things with them. (...) Everyone's having fun together, laughing together, there is camaraderie, a closeness that is more intense than when you read together or watch a movie.* (Parent interview).

Commonly, the participants described cross-gen PA as producing a sense of togetherness that they could not grasp in other contexts. However, this view was not held by all parents. Parents who were less active, like Veronica, felt that “*the conversations we have whilst walking are similar to the conversations we have at meal times*”. She seemed not to appreciate the importance of cross-gen PA partnerships for children, feeling that other PA partners, in particular siblings, were better.

Veronica (parent): *I do tend to think it is not my role. She's got a brother and she's got a sister. They can play together, they can catch the ball together.* (Parent interview).

It is possible that limited engagement in PA impacted upon Veronica's insight into the value that children attached to the cross-gen PA partnership, as she did recognise the importance of doing activities together as a family, such as family meal times. Nicole and Veronica reflect the two extremes of the continuum of the bonding experience of cross-gen PA for parents. Parents such as Nicole, who noticed the intensity of bonding arising from cross-gen PA, intentionally invested in it. For these parents, cross-gen PA was integral to their child–parent relationship and their family's routines and traditions.

Cross-gen PA did not require a verbal conversation to result in a connecting experience.

Colin (parent): *I want to keep that communication, that bond between us pretty strong for later on as he will strike some times in his life when he needs to come home to Dad and talk about things so we need to have a good relationship.(...)Talking does not work so much.* (Parent interview).

Colin and his son were communicating, but not verbally. Cross-gen PA was used as an amplified version of gesture, providing a physical conversation that could create an emotional camaraderie that was difficult for some participants to put into words.

Cross-gen PA enables parenting

Critically, parents recognised that cross-gen PA supported parenting, and was a tool that facilitated relationship-building with their child. For example, parents described monitoring the amount of time that they spent with their children and if found to be falling short in their parenting “*bank balance*” took steps to ‘pay in’ more time. Essentially, for some parents, cross-gen PA was a preferred way to repay their ‘time debt’.

Julie (parent): *There's an element of the bank balance in a parenting role. How much time you think that you owe the kids to spend with them. (...) It is more directed at them and sometimes by them than me. It's, “can we have a piece of your time Mum?” More often than not I'd probably prefer to do a game of football than Monopoly or something like that.* (Family interview).

Teaching and enabling life skills was also a part of cross-gen PA. Some skills were mundane, such as cleaning or other household duties and ensuring that children contributed to the household. Others, like those described in the excerpt below, had depth.

Denise (parent): *Physical activity together I think is a really fabulous way to stretch them without being dangerous. On a bushwalk for example this is getting tough but that's alright because I've got a few muesli bars in my pack and we'll get through it together. There is some preparation but you can actually push them physically and mentally without it being dangerous and I can literally see the resilience that my kids get from that.* (Parent interview).

Denise was using cross-gen PA to challenge her children in a controlled environment to build resilience.

Commonly cross-gen PA was used as a parenting tool by both active and inactive parents to encourage children to do PA. This included using cross-gen PA to: role model PA, change a child's inactivity into activity, show their child how to incorporate enjoyable PA into their lives, and ensure that they got enough PA during less active times such as when on school holidays.

Hugo (parent): *It is my job to be physically active with them because I should lead by example. That's simply it. You've got to be fit to have a healthy life.* (Parent interview).

They showed, by example, how to incorporate enjoyable PA into their lives

Denise (parent): *You have conversations with them because it comes up in their education about how you need to look after your body and that involves physical activity. You can make it fun and there are so many different things that you can do together so it does not have to be a chore.* (Parent focus group).

Parents had noticed that once they had managed to get their children up and moving with them, their children were more likely to continue to be active rather than return to more sedentary pursuits.

Nicole (parent): *Children turn into zombies when the TV goes on. I like action and I like them to be active. I use physical activity with them as a way of getting them outside and then they stay outside and play. They'll often end up trampolining or playing.* (Parent interview).

Like many parents, Nicole was time poor and she performed limited amounts of cross-gen PA with her children. However, she used cross-gen PA as a way of getting her children outside and then playing actively.

Parents also used cross-gen PA during holidays to ensure that their child got enough PA during their break.

Debbie (parent): *May be if our kids weren't sporty kids we'd have to plan it more, promote it. (...) I will in the holidays because I'm conscious that's four hours lying on the couch, let's do something!* (Parent focus group).

Opportunities to redefine the family PA 'pecking' order

Another driver of cross-gen PA, discussed by participants, was the opportunity to determine where one stood in the family PA 'pecking' order. Most children and some of the more active

parents volunteered their opinion of where they were positioned physically in comparison to their parent or child, or within their whole family. In other words, for some participants, cross-gen PA was the PA equivalent of measuring heights of the family members and monitoring growth on a wall chart. Liam, in the following excerpt, describes playing with his father alongside his younger brother, Angus, in their yard.

Liam (child): *We just practise kicking in the yard. Sometimes we'll have a marking contest just to muck around though. (...) Sometimes Angus will kick the footy for Dad and I, that's different because Dad's so much taller, he wins. I like having the competition, I don't mind losing to Dad. If I get a run up sometimes I'm close. Dad used to go easy on me when I was smaller and he does to Angus. He knows he can't go easy on me because I'm getting bigger and better.* (Child interview).

There was a sense from the children of an underlying inevitability that they were about to overtake, or had already overtaken their parents for some types of PA. As can be seen in the excerpt below, they had a clear idea of what was needed to gain physical superiority over their parent.

Researcher: *What do you think it will take for you to beat him at wrestling?*
Daniel (child): *For him to get really old and me get really strong. I'm still growing and he's not!* (Child interview).

This element of cross-gen PA may have been reflective of the age of the children, as some children were already faster or more skilful at certain sporting activities than their parents, or were on the cusp of becoming so and were eagerly monitoring and anticipating the event. However, children were not the only ones checking where they were positioned in the PA pecking order; parents were also monitoring their child's progress.

Denise (parent): *I wouldn't want them to beat me at swimming! I know where they are in the lane beside me and I won't let them get past me! I keep an eye out for them in the things that matter to me.* (Parent focus group).

Similarly to the child participants, Denise was covertly monitoring her children's capacity to beat her. Cross-gen PA could be a bittersweet experience for parents. They enjoyed witnessing their child's progress though at the same time witnessing their own decline. However, most appeared to see the humour in their predicament.

Hugo (parent): *As for my ten year old we'll race to this post on the way home from school and sometimes she'll beat me and then the next day I'll pick up the pace a little hoping my Achilles doesn't snap!* (Parent interview).

The PA pecking order illustrated both a competitive driver of cross-gen PA and the possible influence of cross-gen PA on the evolution of the family.

Practising and experimenting during cross-gen PA

Practising was a key driver of cross-gen PA for the children who participated in this research. They compared practising during cross-gen PA to practising in other contexts such as at school or in a team coaching environment where there were other children all concentrating on their own skill acquisition or disrupting others. In contrast, in a cross-gen PA context, the children felt that their parents collaborated with them and were engaged in the practice. Practising was distinct from (but often related to) learning from their parents. They described practising a sport that they enjoyed and participated in regularly. Although these children already had some skills in their chosen sports, they acknowledged that there was room for increasing proficiency in their skills and they were keen to gain rehearsal time with their parents.

Suzy (child): *Sometimes me, my Dad and sister, and sometimes my Mum, we go out to the front onto the driveway and we've got a hoop out there so we shoot. We've got this game where we've got a marker and we shoot from the line and then take a step back if we get it in. You keep stepping back until we're at this crack and then if you shoot it in from there you win and the game's over. I beat my sister a lot at that but not so much Dad.*

Researcher: *How do you feel about that?*

Suzy: *It's really fun.*

Researcher: *What's fun about it?*

Suzy: *Because I'm learning to shoot from different lengths away from the goal and that helps a lot.* (Child focus group).

Suzy's excerpt underlined the multiple elements that could contribute to a single episode of cross-gen PA. For example, time spent with her whole family, or with her Dad and younger sister, and the competitive elements. Suzy's focus was upon shooting practice. Despite this practising was rarely mentioned by parents, with only active parents expressing enthusiasm for it. Greg was an example of this. He had played sport to a high level and had some knowledge and experience in training and competing. He recognised that practising in a cross-gen PA context allowed children a different experience to that provided by participating in school or other organised sport.

Greg (parent): *They need to get the opportunity to practise in a different environment. Doing things with a parent is less structured, they can muck about, they can whinge about something being sore, stuff that they might not do in front of a coach. I think it is an environment where they feel a bit more confident, they get to try things out in an environment where they are confident.* (Parent interview).

Greg recognised that the informality of cross-gen PA provided opportunities for children to experiment. This was not lost on Liam who was very keen on his cricket.

Liam (child): *If you're mucking around in the garden you might try something but you wouldn't try and do something when you are playing in a team in a match because you might get out. When you're playing seriously you can't try new things but when you're practising with Dad in the back yard you can because it doesn't matter if you get out. You're not scoring, you're practising and you're improving.* (Child interview).

As can be seen, Liam valued cross-gen PA as it was a more relaxed and less performance-orientated context where it did not matter if an experiment went awry, and this helped him develop as an athlete.

Providing a safe, fun environment to compete

Adding fun to cross-gen PA competitions was commonly described by both children and parents. It appeared to be a strategy used by parents to soften the experience of losing and to enable competition despite inequities in skills or physical capacity. Episodes of sport-related cross-gen PA could involve competition, but generally the competition was not considered authentic by either children or parents but a light-hearted pseudo-competition. Essentially, often the children's focus was on just *being* with their parent so that ultimately the score did not really matter. For example, Darius (child, child focus group) said that "You just try to go better so you can beat them. It doesn't change my enjoyment of it because it's not really a competition. It's just spending time together having fun".

Children showed some insight into the control that some parents brought to the competitive element of cross-gen PA. Ryan (child, child focus group) noted that, "I like beating my parents, it makes me happy. It is exciting. I think my parents feel alright about it. They've probably gone easy on me. My Dad goes easy on me sometimes, so sometimes I win and sometimes I lose". Even with this knowledge, the opportunity and challenge of playing against a more skilled opponent was commonly an important driver of cross-gen PA for children. For example, Suzy, when talking about playing basketball with her father, said, "I think it's more fun if they can do

something better than me and I just have to run that little bit harder to get it.” (Child focus group). However, as can be seen below, parents needed to finely balance their approach to pseudo competing when a child liked to compete.

Pete (child): *I don't like it when you let me win. I don't like it when she lets Lance [brother] win either. It's not fair. It's just because he's little and younger. He finds it fun but I don't. I like to win but not have it too easy. I don't mind being allowed to win as long as there was some challenge in it.* (Family interview).

Some parents, such as Greg, had skills to achieve this.

Greg (parent): *I usually try and make it close because if you're competing at something that you're close at you get a better idea of what it is like to actually compete rather than either win too easily or be thrashed too easily.* (Parent interview).

These findings highlight the multiple drivers of cross-gen PA and the complexity of the cross-gen PA partnerships by showing that the two, or more, participants may have different drivers for the same episode of cross-gen PA.

Discussion

This research found that the drivers of cross-gen PA were much more complex than a simple desire to enhance the physical health of participants. Importantly, this study sought both child and parent participant voices. The absence of the child's voice has been identified in PA research in general (Brunton et al. 2003), and little was known about how children viewed cross-gen PA. This study was purposefully designed to enable children to initiate their own memory retrieval (Butler et al. 1995) and to enhance the child's voice. Giving children opportunities to relive and retrieve both positive and negative elements of *their* experiences has provided a more inclusive and less negatively focused impression of the PA they were describing than other papers have reported (Stanley et al. 2012).

The child's voice showed that children's experiences of the cross-gen PA partnership were different to their PA experiences with other PA partners. Cross-gen PA enabled children to have connecting experiences with their parents, enhanced opportunities for practising their skills, the chance to benchmark progression of their skills against their family, and the challenge of playing against a more skilled opponent.

The findings challenge the simplicity of drivers of cross-gen PA reported by previous researchers. This research does support findings from previous research that cross-gen PA may be used by parents to model PA participation to their

children and to support their child's PA (Yao and Rhodes 2015). However, these drivers were often secondary to emotional and relational drivers that were prominent for both children and parents and found across a diverse range of cross-gen PA contexts. Although this finding does not negate awareness by children and parents of the health benefits of cross-gen PA, the current research has found that drivers of cross-gen PA include child and parent desires to strengthen family relationships and develop emotional well-being — including children's self-perceptions of physical competence and identity.

This research expands upon and explains previous work by Thompson et al. (2009), who found that parents considered cross-gen PA to be important, and Wright et al. (2010), who found that children wanted their parents to use cross-gen PA to help them in their PA. However, prior to the current research, no known research had been undertaken to explain why children and parents value cross-gen PA. Instead, previous literature has generally reported participants' positive evaluations of cross-gen PA with scepticism, perhaps due to a focus on its health impacts, noting that as participants may not engage in cross-gen PA regularly it would not contribute significantly to a child's or parent's total PA on a daily or even weekly basis (Thompson et al. 2009). Notably, children and parents who took part in this research primarily apportioned value from engaging in cross-gen PA to benefits arising for their child–parent relationship, rather than to the *physical dose* (frequency, duration or intensity) of the PA that they achieve. In other words, cross-gen PA was often not about the physical dose of the PA at all.

Commonly, the participants engaged in cross-gen PA for the positive bonding and connecting experiences that cross-gen PA provided. The bonding experience was difficult for some participants to put into words, perhaps in part because the experience did not require verbal communication. Previous research examining the child–parent relationships of school-aged children and adolescents described reciprocal models of “connectedness” (Lezin et al. 2004). Connectedness is positively associated with indicators of health (Boutell et al. 2009). Boutell et al. (2009, p.309) suggested that “interventions aimed at strengthening parent–child relationships throughout adolescence may protect emotional health and prevent longer-term emotional consequences in young adults”. A link between connectedness and PA has been found in previous research, with one study finding that the closeness of the child–parent relationship was positively associated with reciprocal PA support between the child and parent (Haye et al. 2014).

Focusing on the health benefits of child PA is likely to prove ineffective for family-based interventions aimed at increasing levels of child PA, as Rhodes et al. (2013) observed that mothers scored extremely high on an attitude measure, suggesting they were already convinced about the health benefits of regular PA for their child. The findings of the current

research provide insight into other ways to facilitate family-based physical activity. Understanding the powerful relational and emotional drivers of cross-gen PA provides insight into new approaches to family-based interventions that move beyond the physical health focus. In this way, this research provides new direction for future interventions or public health messages designed to encourage parent and child engagement in cross-gen PA.

Benchmarking PA performance between family members was found to be a cross-gen PA driver in this research. Some child participants of this age group had already overtaken their parents in some types of PA, and were eagerly monitoring and anticipating the day on which they would surpass them in other types. In previous research, comparative achievement against peers has been found to be a part of enjoyment for children in sport (Scanlan and Lewthwaite 1986), and in a study by Spurr et al. (2016), social comparison skills were associated with increased levels of PA in both female and male adolescents. While previous studies identified that children and adolescents compared themselves to their peers in PA contexts, this phenomenon has not previously been identified as an element of cross-gen PA. This finding may have implications for the ways in which a family evolves. Steinberg et al. (1994) suggested that adolescents form their identities by renegotiating their place in the family. Thus, cross-gen PA may provide children and adolescents with important benchmarking opportunities that enable them to alter their perceived standing in the family. This may contribute to identity formation and children's perception of stature and autonomy within their families. In this way, cross-gen PA may influence both the child's and parent's PA identities and this may, in turn, have an impact on their PA participation.

This research found that parents use cross-gen PA as a general parenting instrument, rather than purely to provide parental support for a child's PA as has previously been assumed. As already stated, in previous literature, the focus has been upon the role-modelling function of cross-gen PA, either in isolation or as one aspect of parental support for PA (Yao and Rhodes 2015), with the consensus being that parental support positively contributes to children's total PA levels. The current research found other drivers of engagement in cross-gen PA, thus extending understanding of the phenomenon of cross-gen PA and its influence on both children and parents. The notion of using cross-gen PA as a way to assist parents to provide emotional and social support to their children is a concept that has not previously been described.

Cross-gen PA was also found in the current study to be a significant and unique PA partnership for children. One-on-one time with their same-gendered parent was of particular importance to children of this age group. In addition, for child participants of this age group cross-gen PA provided benefits that other PA contexts and partnerships did not provide. Child participants valued the safe environment that cross-gen PA

provided to practise and experiment with their sporting skills. Cross-gen PA was a context in which they felt safe to experiment, as it did not feel like 'real' competition to the children and there was no pressure to score highly or to consider their team. The children revelled in being encouraged by their parents and their parents witnessing their progress. Thus, importantly, the current research increases understanding of reasons for the child's enthusiasm for cross-gen PA.

Previous research (Cockburn and Clarke 2002) has identified that lack of competence and skills are barriers to PA for adolescent girls in sporting contexts. Practising sporting skills in families could be used as an intervention to increase confidence and enjoyment in a skill before children are exposed to more public and potentially-critical contexts. Cognitive evaluation theory, which is a sub-theory of self-determination theory, posits that both competence and autonomy are required to sustain or improve intrinsic motivation for a behavior (Ryan et al. 2009). To this end, cross-gen PA provides a very different sporting and practice environment to that of the school or sporting context, and may influence not only a child's intrinsic motivation for sport but also their intrinsic motivation for undertaking other categories of PA, including, for example, exercise.

Limitations of the study

All participants were drawn from a single, geographically-defined region of Australia. In addition, despite a second round of recruitment, the study was able to recruit only half as many fathers as mothers. It is acknowledged that these factors, together with the qualitative nature of the research, limit the generalizability of the findings. The approach employed was essential to elucidate the previously little-understood phenomenon of cross-gen PA, from both child and parent perspectives, but it is acknowledged that other participants are likely to give differently nuanced results.

Conclusion

This study conceptualized and examined cross-gen PA, through a social ecological lens, as a bi-directional PA partnership. The study design, which highlighted the previously undocumented child's voice and experience, elucidated the focus of parents and children during cross-gen PA, finding that it was on nurturing the child–parent relationship and developing the child's skills and identity rather than completing their required dose of exercise. These findings help explain why children and parents value their time spent in cross-gen PA, even if it is infrequent, and highlight the value of cross-gen PA in strengthening the child–parent relationship and child's skills and identity.

A number of recommendations stem from this research. First, it is important to recognise that children contribute a unique voice and that a child's experience of cross-gen PA is different to that of their parents. Thus, the parent's voice, experiences, and influence upon the cross-gen PA partnership should not be used in research as a substitute for the child's voice, experiences, and influence. There should be recognition that engaging in cross-gen PA provides an important opportunity for children to talk and bond with their parents and family, in addition to other health benefits; and that children of this age group use cross-gen PA as an important time to practise and so develop their sporting skills.

Engagement in cross-gen PA may be infrequent, particularly during term time and sporting seasons; but the values families attach to a cross-gen PA episode are not encapsulated in the traditional physical measurements (frequency, intensity, duration, and type) of a PA episode. Therefore, it is possible that the influence of cross-gen PA, as part of a person's PA, may not be adequately assessed using only physical measures. It is recommended that researchers use additional ways to measure and research all the drivers and benefits of cross-gen PA, such as, social, emotional, and cultural drivers and benefits, as well as physical and psychological drivers and benefits, in order to provide a holistic understanding of cross-gen PA.

Acknowledgements The authors wish to thank all the participants for sharing their experiences, the NSW Department of Education for permitting their schools to engage with the study, and each of the schools, both public and independent for their engagement with the research.

Funding The authors declare that no funding or grants were obtained for the study. The study was part of the corresponding author's PhD program of research which was funded by a scholarship from the university that the author is associated with.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research ethics committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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