

Behavior Science: Theory, Research, and Practice

Traci M. Cihon
Mark A. Mattaini *Editors*

Behavior Science Perspectives on Culture and Community

Behavior Analysis: Theory, Research, and Practice

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Editors

Behavior Science Perspectives on Culture and Community

 Springer

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Interviewer: What do you see as the future of behavior analysis?

Murray Sidman: Well, I don't know that I can predict the future really.

*The future's in the hands of our students—the younger people
—they're going to determine that.*

*—Behavior Analysis History Group,
University of North Texas (2014, 27:57)*

*This book is for “our students—the younger
people”—the future is yours to create.*

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Chapter 1

History and Progress in Cultural and Community Science



Traci M. Cihon and Mark A. Mattaini

Behavior scientists have long recognized that human behavior, our cultural practices, and the contingencies we arrange are responsible for many social and global challenges. Some have described social and global issues as “wicked” (Rittel & Webber, 1973) or even “super wicked” (Levin, Cashore, Bernstein, & Auld, 2012) problems. In addition to being caused by those who are also seeking the solutions (i.e., humans), the time needed to affect change is running out. There is no one system or entity that can impose a solution (even if one were readily apparent) or that can organize the contingencies that would promote large-scale behavior change. Moreover, we often convince ourselves that the impending catastrophic effects are so far off in the future that there is no need to make immediate changes to our behavior (i.e., discounting; e.g., Green & Myerson, 2004). And so we go on engaging in behaviors that are harmful to ourselves or others.

Given that human behavior poses the greatest threat to humanity, it is fortuitous that behavior science is now moving seriously toward being able to provide realistic, although challenging, solutions. Through the systematic design of systems and contingencies that promote widespread adoption of alternative cultural practices (e.g., sticky interventions; Levin et al., 2012), we might succeed at changing our current cultural practices and the corresponding cumulative effects, arranging contingencies that motivate, evoke, and select cultural practices that instead produce benefits for society at large. The solutions to the world’s most pressing challenges, if there are to be solutions, must reside in the networks of contingencies that make up our social and cultural environments, the networks of contingencies that we create, whether by accident, chance, or through intentional design.

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From the beginning of his work in the middle of the last century, Skinner (1948, 1953, 1971, 1987) recognized the possibility of taking a behavior analytic perspective on larger social and cultural processes, with an eye toward the potential to address social and cultural issues. Skinner's (1948) *Walden Two* is often cited as one of the earliest attempts to create, albeit fictional, an utopian community founded upon and informed by a natural science of behavior. Beyond *Walden Two*, Skinner (1953) discussed characteristics of behavior as it occurs in its social and cultural environments—as interlocks between two or more individuals behaving in concert, in response to the contingencies arranged by our own cultural practices and controlling agencies, and in the construction of social institutions that embody the networks of contingencies that select and maintain cultural practices.

Since Skinner's early discussions of social behavior, systems, and culture, behavior scientists have sought to explain behavior as a function of the contingencies that comprise the numerous social and cultural systems and environments in which we live, work, and otherwise behave. Scholars and practitioners working in applications of behavior science to cultural and community change come from numerous traditions within behavior science including behavioral community psychology (e.g., Bogat & Jason, 2000), organizational behavior management (e.g., Diener, McGee, & Miguel, 2009), behavioral systems analysis (e.g., Houmanfar, Rodrigues, & Ward, 2010; Malott, 2003), and cultural analysis (e.g., Glenn, 2004), and have been influenced by a number of complementary disciplines including social work, psychology, education, biology, systems science, anthropology, and more. These behavior scientists are united by the philosophy of radical behaviorism and by their commitment to apply the natural science of behavior to understanding behavior in its *social* and *cultural* environments.

In the fall of 2019, a Task Force on cultural analysis formed by the Association for Behavior Analysis International (ABAI) coined the term “culturo-behavior science” in an effort “to capture the breadth of work focused on cultural and behavioral systems science” (Cihon & Mattaini, 2019, p. 700). The exploration of behavior as a function of its social and cultural environments includes the study of cultural phenomena such as the seemingly simple exchanges between two or more people (e.g., Skinner, 1957), the practices of a family (e.g., Latham, 1994), interactions among members of organizations (e.g., Ludwig & Houmanfar, 2012) or communities (e.g., Briscoe, Hoffman, & Bailey, 1975), and even understanding the interdependencies between and among key actors and sectors in the community (e.g., Mattaini, 2013). Behavior scientists working in cultural and community applications examine the networks of contingencies of specific cultures, organizations, communities, and systems and how these contingencies may select individual as well as interlocked behaviors. These networks of contingencies determine not only the behaviors of individuals and our cultural practices but also how these behaviors and cultural practices create those very networks of contingencies. Although few behavior scientists would argue that most human behavior does not occur in a social environment, the explicit study of behavior as a function of its social and cultural environments or the understanding of how social and cultural contingencies are established and maintained is less common. Perhaps this is due, in part, to the difficulty in arranging

precise control over variables when the dependent variable (i.e., behavior) is also part of the independent variable (social and cultural contingencies). The recursive relation between the behavior of interest and the contingencies arranged by humans themselves is difficult to isolate, let alone predict and control.

Consider for a moment the unique set of conditions facing humanity as a function of the impending threat of climate change and what courses of action are available. Doing nothing leaves us vulnerable to increased temperatures, weather catastrophes, extinction of entire species, and disruption of the ecosystem, threatening our very survival in terms of access to food, water, and air. Yet developing policies and arranging contingencies that promote efficient and effective ways to change the cultural practices of so many people to avert or mitigate the effects of climate change have often felt beyond our reach. Changing behavior in response to the reality of climate change (caused by our behavior) requires adaptations to our current lifestyle that may be uncomfortable or may threaten the very survival of many people. Reducing our reliance on fossil fuels has serious potential to lead to unemployment for some, or to the disruption of entire communities whose livelihoods depend on the collection of these resources (e.g., Midland/Odessa, Texas or Logan County in West Virginia). Altering the trajectory of climate change may require reductions in certain comforts and shifts toward practices that are more effortful than those to which we have become accustomed (e.g., driving cars rather than ride-sharing or taking public transportation). In such scenarios some will need to give up conditions that they value, whether now or sometime in the future, or to choose between self and a real or hypothetical “them.” (An encouraging note, however: as explored later in this book, there is reason to believe that culturo-behavior science can help shift values toward behaviors that begin to address those destructive practices.)

Serious social issues related to collective behavior repeatedly arise not just at a global level, but also locally, and across a range of interlocking systems. Take for instance the city of Detroit, Michigan, where residents watched their previously prosperous lives unravel, sinking into poverty, hunger, unemployment, and lack of access to basic community services with the fall of the auto industry. Consider the city of Ferguson, Missouri where citizens watched their city’s infrastructure destroyed during violent protests after the justice system failed them once again. Recall the events in Flint, Michigan that forced residents to “choose” between drinking contaminated water or to not drink water at all. Could we have prevented the wildfires from ravaging the Brazilian Amazon, the devastation caused by the brush fires in Australia, or the hardships facing families fleeing their homes in hopes of a better future who only find themselves separated from each other and even mistreated once they reach their target destination? We often asked ourselves why society is not doing more, and what action could actually help. Contemporary behavior science now shows promise for providing guidance to understand the systematic breakdowns responsible, and potentially effective collective responses.

Meaningful cultural, community, and systems change is usually challenging, however. It is easier (and perhaps more appealing) to place the blame on some intangible character flaw that cannot be objectively measured or readily changed (e.g., laziness, selfishness, lack of drive, or motivation, etc.) than to accept responsibility

for the changes we need to make in what we value, in our repertoires, and in the environments that shape and sustain them both. Changing contingencies, behaviors, and cultural practices, choosing a delayed outcome over an immediate outcome for instance, or helping an entire community rebuild in a constructive (rather than reactive) manner, is more effortful than blaming others or doing nothing. Many behavior scientists are concerned that we are not doing enough to respond to pressing social issues and that what we are doing is not advancing fast enough.

We pride ourselves on prediction and control in behavior science, in conducting analyses that identify environmental variables that promote or discourage certain behaviors, variables that once identified give us information regarding what to expect if conditions stay the same or what to expect if conditions change. We conduct studies that explore choice (see Foxall, 2003 for example) and decision-making (e.g., Fantino, 2013) and how to shift our choices to larger and delayed consequences (e.g., Green & Myerson, 2004), or consequences that are better for the group than for the individual (e.g., Borba, Tourinho, & Glenn, 2017). We present historical analyses of disastrous or inspiring events and the contingencies that likely contributed to their occurrence (e.g., Borba, 2019; Malott, 2019; Molina, Deochand, & McGee, 2019) as models for understanding current challenges. We push each other to create diverse training experiences for aspiring behavior analysts and suggest the need for current behavior analysts to work in community settings (e.g., Mattaini, 2019) or on challenging social issues (e.g., da Hora & Sampaio, 2019), to find interdisciplinary partners (e.g., Neuringer, 1991), or to expand the scope of behavior scientific research and practice (e.g., Normand & Kohn, 2013).

Yet, each day we read another headline that describes a situation in which more and more people are denied basic human rights or are further oppressed, or are acting in ways that exacerbate disparities across groups such that one or more groups end up with resources that others do not, creating enduring advantages for one group over those of another. Even Skinner (1987) became doubtful about the potential for a natural science of behavior to affect cultural change, lamenting our lack of impact on the world's most pressing problems and asking "why we are not acting to save the world" (p. 1), a sentiment shared by many other behavior scientists in recent years (e.g., Chance, 2007; Dixon et al., 2018; Leigland, 2011; Mattaini, 2019; Rumph, Ninness, McCuller, & Ninness, 2005). While this is often not remembered, Skinner (1987) ended his paper (originally a 1982 conference presentation), with a brief alternative vision, a "happier ending," guided by something very much like *culturo-behavior science* (p. 14).

More recently, and encouragingly for *culturo-behavior scientists*, it is becoming clear that more scientists, engaged citizens, and youth are actively embracing the tangible realization that human behavior is the source of many of the current threats to humanity. They are searching for cultural and systems change and for scientific help in achieving it, thereby opening opportunities for behavior scientists. The role of behavior scientists in mitigating "super wicked problems" has become not only more acceptable, but necessary, urgent, and desired.

Clearly the time has arrived for behavior scientists to develop a more complete understanding of collective behavior, culture, and systems change. Violence,

disease, overpopulation, the spread of misinformation, economic disparity, and other serious threats to humanity are increasingly onerous. There is a real urgency to create more socially-, economically-, and environmentally- just systems that establish networks of contingencies to support sustainable cultural practices and ensure universal access to human rights—and survival.

Interdisciplinary approaches for addressing social problems are also gaining momentum. Given that the majority of social issues are caused by human behavior, there is clearly a need for behavior scientists to join these research and practice teams. Aspiring behavior analysts are seeking educational and training experiences to conduct experimental research that elucidates basic cultural and behavioral processes and to apply these to improve the human condition, to develop interventions to address structural violence and reduce oppressive practices and policies; to explore the etymology of bias and to create cultures that embrace diversity, equity, and inclusion; to conduct participatory action research involving community members and stakeholders in the process of strengthening their own communities, and more. It is now possible to stop asking where we were or where we are, and to start asking what we could be doing instead. How can we arrange contingencies, systems, and cultures that discourage, encourage, select, and transmit different, healthier behaviors and cultural practices?

Fortunately, the work of culturo-behavior scientists has proceeded far enough to enable the presentation of multiple intersecting—and in some cases usefully competing—perspectives on cultural and systems-level change in adequate depth to prepare a textbook supporting such trajectories for behavior scientists. There is material in this volume to support preparation for specialists who intend to do research or practice with community- and cultural-level systems, while providing enough background for students who intend to do direct and clinical work, and also for those who seek to make contributions as engaged, informed citizens. The culturo-behavior science included in this text has been conducted in diverse settings, domestically and internationally, addressing a range of contemporary issues. The purpose of this book is to introduce readers to the scope and depth of contemporary research and practice in culturo-behavior science. We believe further advances in that science now appear very likely in the near future.

A Brief History of Culturo-Behavior Science¹

Skinner (1948, 1953, 1971, 1974) firmly believed that the natural science of behavior and its foundational concepts and principles held the promise to create a better world. Birnbrauer (1978) recounts early applications of behavior science:

¹Portions of the history of culturo-behavior science are included in several of the chapters in this volume and have been published elsewhere (see for example Cihon & Mattaini, 2019). Nonetheless, we highlight some of the seminal work in the development of culturo-behavior science as it may provide a useful context for some readers as they contact the material included here.

When behaviorists moved from their laboratories to wards and classrooms in the latter 1950s and early 1960s, it was considered crucial to secure administrative support and to work on problems that the staff (nurses, teachers, etc.) found most distressing. The rationale was that since staff controlled the diapers, feeders, and arrangement of the living/teaching environments, their behavior had to be changed. Changes in client behavior that were reinforcing to staff were to be the principal means by which further research and further changes in the environment would be accomplished. (p. 176)

What is important to note is that early behavior scientists focused on the *interlocks* between change agent and client behavior; these pioneers sought to help change agents see the relationship between changes in their behavior and changes in their client's behavior (i.e., the interlocks). Much like culturo-behavior science today, the early work of behavior scientists emphasized the relation between behavior and its *social* environment. But despite Skinner's early optimism, an initial focus on interlocking behaviors, and calls to focus on systems-level change (see also Goldiamond, 1974/2002; Holland, 1978; and Willems, 1974, for example), more and more behavior scientists instead focused their attention on the challenging behaviors, a pattern we still see today (with some exceptions; e.g., Brethower, 2008; Mattaini & Aspholm, 2016; and much of the work included in this volume).

In 1981, behavior scientists were again reminded of the importance of studying behavior as a function of its social and cultural environments. Skinner (1981) introduced a "third kind of selection" (p. 502) in "Selection by Consequences." Although Skinner had written about culture, social systems, and cultural practices before, the idea that cultures evolve by virtue of selection processes parallel to those that affect the evolution of the species or operant behavior opened the door for behavior scientists to return to explorations of how the networks of contingencies comprising our social and cultural systems were established and maintained.

Just a few years later, Glenn (1986) introduced behavior scientists to the concept of the metacontingency. Originally defined as "the unit of analysis describing the functional relation between a class of operants, each operant having its own immediate, unique consequence, and a long term consequence common to all the operants in the metacontingency" (Glenn, 1986, p. 2), Glenn's (1986) metacontingency sparked the interest of many behavior scientists. And while Skinner's optimism was fading as evidenced by his 1987 chapter "Why We Are Not Acting to Save the World," Glenn (2004) and others (e.g., Biglan, 1995; Mattaini, 1996; Malagodi & Jackson, 1989; Ulman, 1998) saw the promise in advancing a behavioral science of culture and cultural practices.

For example, Lamal (1991) edited the first behavior analytic text on cultural contingencies and cultural practices. A number of behavior scientists applied the concept of the metacontingency, analyzing cultural practices related to health (Hovell, Kaplan, & Hovell, 1991), apathy (Kunkel, 1991), correctional settings (Ellis, 1991), socialism (Rakos, 1991), and other important social issues. Biglan (1995) proposed a behavioral science of cultural practices, emphasizing how the practices of various community sectors contribute to the onset and maintenance of a range of social issues. He suggested that behavior scientists focus on arranging contingencies that promote cultural practices that make the continuity of social

issues less probable (i.e., opposing practices), highlighting examples of reducing tobacco use, improving child rearing practices, and reducing sexism. Lamal (1997) organized a second book, again showing the strength of the metacontingency in interpretations of social and cultural phenomena.

The first decade of the 2000s was wrought with a flurry of activity from culturo-behavior scientists continuing to refine and apply the concept of the metacontingency to advance our understanding of cultural phenomena. Malott's (2003) *Paradox of Organizational Change* brought the metacontingency to behavioral systems analysis and organizational behavior management (see also Glenn & Malott, 2004), accentuating the idea that metacontingencies could be applied to select targeted sets of interlocked behaviors resulting in a common (or shared) outcome. Glenn (2004) offered a revised definition of the metacontingency, noting that the metacontingency,

addresses evolution by selection when the lineages that evolve are not the recurring acts of individuals, but rather are recurring interlocking behavioral contingencies (IBCs) that function as an integrated unit and result in an outcome that affects the probability of future recurrences of the IBCs. (p. 144).

This revised definition served to differentiate the metacontingency from the macrocontingency, the latter referring to the frequent occurrence of similar behaviors and/or cultural practices that collectively produce a cumulative effect (though the cumulative effect is not serving a selective function for the individual behaviors nor are there necessarily interlocks among the individuals' behaviors).² The critical attributes of these concepts have remained largely consistent since but can lead to some confusion for aspiring culturo-behavior scientists as early work (and even some work after 2004) still uses "metacontingency" when referring to phenomena more consistent with the definition of macrocontingency, and because the macrocontingency is not a contingency as currently defined.

As momentum was growing for a behavioral analysis of culture, a small group of behavior scientists interested in discussing concepts, trends, and issues pertaining to cultural analysis, met for the first time in 2005 in a Think Tank on cultural analysis held in Brazil (Todorov & Malott, 2005). Glenn, Branch, and Mattaini facilitated the discussions, subsequently published in *Behavior and Social Issues* (e.g., Branch, 2006; Housmanfar & Rodrigues, 2006; Malott & Glenn, 2006; Marr, 2006; Mattaini, 2006a; Sandaker, 2006; Todorov, 2006). Many were critical of the metacontingency. Marr (2006), for example, suggested that the metacontingency may give a sense of understanding of cultural selection but that it was too complex. Mattaini (2006a) asserted that the metacontingency did not occasion measurable or manipulable units necessary for scientific explanation. Both suggested that general systems theory be integrated in a behavioral analysis of culture. Many were skeptical due to the lack of experimental analyses of the metacontingency (e.g., Branch; Hobbs, 2006), later addressed by Vichi, Andery, and Glenn (2009).

²This usage is different, however, than Ulman's (1978, 1998) macrocontingency.

Another point of discussion centered on the shift in levels of analysis, moving from operant to cultural analyses. Houmanfar and Rodrigues (2006) pointed out that interlocked behaviors (not the IBCs Glenn, 2004 proposed) were likely selected through operant contingencies and the aggregate product (AP) produced by the socio-IBs seemed more likely to be what is selected through cultural contingencies. They also suggested that the cultural milieu might provide a cultural-level parallel to the antecedent in the operant contingency. Houmanfar et al. (2010) returned to this discussion, building in Kantor's (1982) distinction between psychological (i.e., behavioral) and sociological levels of analysis, proposing an expanded (five-term) model of the metacontingency suggesting that,

how interlocked behaviors taken as a whole unit (i.e., a whole organization) are selected by the larger community while the interlocked behavior of individuals (e.g., the behavior of individuals within an organized group) is a function of local contingencies within the organized entity (e.g., organization, family, etc.) and the policies and rules promoted by management (or managing members). (p. 57)

The expanded metacontingency included the following elements: (1) the cultural-organizational milieu, (2) socio-IBs, (3) the AP, (4) consumer practices, and (5) group rule generation.

Further developments in culturo-behavior science were stimulated by Mattaini's (2013) *Strategic Nonviolent Power: The Science of Satyagraha*, advancing earlier work on cultural-level analysis and intervention (e.g., Mattaini & Thyer, 1996). In *Strategic Nonviolent Power*, Mattaini outlines how an analysis of community sector practices and their corresponding controlling variables (i.e., motivating context and consequences) can inform the development of practices to disrupt these contingencies. He also explains how cultural practices and the corresponding motivating contexts and consequences form interdependent relations such that the consequence for one sector's cultural practice may, for example, serve as the motivating context for another sector's practice(s), similar to the notion of interlocks in IBCs or socio-IBs but with target community sectors. This work provided an opportunity for behavior scientists to explore the complex interactions among community sectors and to consider strategies that could disrupt damaging interdependencies to mitigate social problems while creating new interlocks to shape and support positive systems- and community-based change.

Developing a Vocabulary for Culturo-Behavior Science

Communication of scientific advances can be challenging, particularly at times when multiple novel questions are being investigated concurrently, by multiple research groups, using multiple conceptual models, and perhaps even more so when that work is being done in multiple countries. Much of the work of culturo-behavior scientists has been heavily influenced by Glenn's (1986, 2004) metacontingency;

more than 150 peer-reviewed manuscripts have included the concept in their conceptual, experimental, and interpretive work since its inception. Some of this work applies or defines the metacontingency differently due to the refinements and expansions of the concept over time. Inconsistent applications and definitions of concepts and principles can complicate communication among cultural-behavior scientists, posing challenges for aspiring culturo-behavior scientists, and potentially slowing the advancement of culturo-behavior science. Another Think Tank in cultural analysis was organized in 2015 to “resolve differences in terminology used in behavioral publications on cultural-level” (Glenn et al., 2016, p. 2).

Developing an agreed upon set of terms and definitions for culturo-behavior science is an admirable goal and an important feature of many well-developed sciences; yet, culturo-behavior science is still an emerging science (cf., Mattaini, 2019) and it is likely that concepts will be further refined as the science progresses. Glenn et al. (2016) caution that the definitions are:

working definitions...the concepts planned for discussion were not assumed by participants as being the only concepts needed in the analysis of cultural phenomena. Rather, they were prioritized because they had been found useful conceptual tools both in guiding experimental analysis...and in understanding and changing everyday cultural-level phenomena. (pp. 2–3).

The Think Tank discussions resulted in a set of terms and definitions for several culturo-behavior scientific concepts. These definitions were published in *Behavior and Social Issues*, and are reprinted as Chap. 2 of this volume as an introduction to many of the concepts commonly (though not exclusively) employed in culturo-behavior science.

Not all of the contributors to this volume adopt the vocabulary defined in Chap. 2 or employ only those concepts. Some culturo-behavior scientists have opted to maintain terminology consistent with operant selection, to adopt the expanded metacontingency proposed by Houmanfar et al. (2010), or to build on concepts and principles from other disciplines such as systems science (Mobus & Kalton, 2015). The language of culturo-behavior scientists is not yet complete, and it is likely that as the science develops additional central concepts will emerge and definitions will be further refined (see Baia & Sampaio, 2019 for a recent discussion).

Contributors to this volume include many of the major scholars and practitioners conducting research and/or practicing in communities and larger cultural systems. Their work includes scientifically guided, systemic, and ecologically valid efforts related to community health, sustainability, and social policy work, among others, as well as basic research. All science proceeds by progressively building on the work of others, while remaining open to new findings and challenging existing conceptual frameworks. The same is true of culturo-behavior science. This process is explored and elaborated throughout this volume, intentionally assisting students both to learn and to question current theory and methods, while shaping and developing their own research and practice.

Systems and Selection

Behavioral systems analysis developed from the work of Brethower (2008) and others who merged principles from general system(s) theory (e.g., von Bertalanffy, 1968) with those of behavior analysis. The integration of principles from both organizing frameworks has long been part of the discourse among culturo-behavior scientists (e.g., Marr, 2006; Mattaini, 2006a). Recently, however, there has been a resurgence of interest in this area with a focus on how systems science and selection work in tandem (Couto, 2019; Couto & Sandaker, 2016; Krispin, 2017, 2019; Mattaini, 2019; Sandaker, Couto, & de Carvalho, 2019), particularly related to the process of self-organization.

In Chap. 3, Mattaini provides an introduction to concepts from both systems science and cultural analysis, that when integrated with Skinner's (1981) third kind of selection (i.e., Cultural Systems Analysis) could help culturo-behavior scientists to address the complexities often encountered in social and cultural phenomena. In Cultural Systems Analysis, the analysis focuses on the cultural practices and corresponding motivating contexts and consequences. These variables form interdependent relations such that the consequence for one sector's cultural practice may, for example, serve as the motivating context for another sector's practice(s), similar to interlocks in IBCs or socio-IBs but among target community sectors (see also Mattaini, 2013). Recognizing the potential controversies inherent in bridging concepts from two organizing frameworks, Mattaini highlights important considerations for those doing so while emphasizing the importance of working collaboratively with members of other disciplines, organizations, and systems.

Another path by which culturo-behavior scientists have started to explore the integration of systems and selection has focused on exploring the interdependence among process, function, and structure (Couto, 2019; Sandaker et al., 2019), the latter has largely been ignored by behavior scientists. In Chap. 4 of this volume Bento, Tagliabue, and Sandaker report their latest analysis of how the interdependencies among process, function, and structure function in complex systems and social behavior. Building from social network analysis, the authors introduce the philosophical distinctions between Being and Becoming, and suggest opportunities for collaboration between culturo-behavior scientists and network theorists that could further our understanding of the transmission and selection of cultural practices.

Introducing Students to Culturo-Behavior Science

Opportunities to develop expertise in culturo-behavior science have thus far not been easily accessible for aspiring or current behavior scientists as there are few university-based programs that provide such opportunities. For programs (and students) to develop expertise in culturo-behavior science, courses need to be offered

in more institutions. Expansions of faculty-advised research as well as student practice opportunities are also needed. One way to increase such opportunities is to arrange supporting contingencies and provide resources for faculty members who might then develop these opportunities for students. The work of the Behaviorists for Social Responsibility Special Interest Group (BFSR SIG) of ABAI on the Matrix Project (Mattaini & Luke, 2014) is one example of such efforts (see also Seniuk, Cihon, Benson, & Luke, 2019). The BFSR SIG provides helpful resources to faculty (such as course units on behavior principles in the context of social issues such as sustainability), students (such as a mentorship directory of behavior scientists working on social issues), and practitioners (such as how to incorporate sustainable practices in their clinical settings) of behavior science interested in pursuing social and cultural action.

Recently, the ABAI Task Force on cultural analysis also developed a course sequence in this emerging science as another way to support aspiring culturo-behavior scientists. The course sequence includes coursework in foundational knowledge in behavior science and behavioral systems analysis as well as an experiential learning course. Experiential learning courses often occur in the context of faculty-advised research and practice laboratories (labs). The University of North Texas Department of Behavior Analysis has supported two such labs dedicated to culturo-behavior science—the Behavior & Culture Lab (Glenn, 2006-2012) and the Cultural Design & Systems Lab (Cihon, Becker, & Ortu, 2018-present). In Chap. 5, Cihon, Becker, Ortu, and Glenn describe their experiences with these labs and offer suggestions and considerations for faculty members starting a culturo-behavior science lab and/or creating experiential learning opportunities for students in culturo-behavior science. Told collectively but from multiple perspectives, Cihon and colleagues speak to faculty and students in various stages of their careers who seek to begin, transition, or just dabble in culturo-behavior science.

Experimental Analysis in Culturo-Behavior Science

A cornerstone of behavior science is its reliance on scientific principles (Baer, Wolf, & Risley, 1968; Skinner, 1938) and some culturo-behavior scientists have focused on identifying and exploring basic principles of cultural analysis. Much of this work has developed in partnerships established among universities in the US, Brazil, and Norway and focuses on several of the concepts introduced in Chap. 2 such as the metacontingency and how it operates in experimental microcultures. Experimental microcultures consist of experimenter recruited and organized groups of individuals who agree to participate in a laboratory investigation of a cultural phenomenon, typically described as cooperation or coordinated behaviors. Initially, much experimental work focused on determining whether sets of interlocked behaviors could be selected in their own right, often attempting to separate operant from cultural contingencies (cf., Tourinho, 2013). Experimental analyses of cultural phenomena have also informed our understanding of socially significant cultural phenomena such as

overuse of common pool resources (e.g., Camargo & Haydu, 2016) and ethical self-control (e.g., Borba et al., 2017).

Cihon, Borba, Lopez, Kazaoka, and Carvalho (Chap. 6) review the basic laboratory research on the metacontingency that has been published in English or in Portuguese since 2009. Readers are introduced to the important features of the most commonly used experimental strategies and tactics before the authors summarize the dominant themes and general findings of culturo-behavior scientific experimental analyses. Cihon and colleagues also offer suggestions for extending the experimental, translational, and applied research in culturo-behavior science.

Contextual Factors and Cultural Practices

Houmanfar and Rodrigues (2006) and Houmanfar et al. (2010) proposed the elaborated, five-term metacontingency, underscoring the importance of verbal behavior and of contextual factors in the selection of cultural practices. The elaborated account of the metacontingency has been applied to numerous cultural phenomena including organizational practices (e.g., Reimer & Houmanfar, 2017) and community resilience following a natural disaster (e.g., Ardila Sánchez, Houmanfar, & Alavosius, 2019), for example. In Chap. 7, Houmanfar, Ardila Sánchez, and Alavosius further develop the idea of the cultural milieu, its role in the formation and selection of cultural practices, the contextual factors that influence the socio-IBs leading to the products of organizational practices, and the collective behaviors of the consumers of these products (i.e., macrobehavior). The authors also provide examples from the leadership and production practices of the Tesla Corporation alongside examples of shifts in consumer practices related to energy consumption.

Large-Scale Social Change

Organizing large-scale social change often requires shifting similar but unrelated behaviors of a large number of people (i.e., macrobehavior). Some culturo-behavior scientists have aptly identified policy, and particularly government policy or law (e.g., Todorov, 2005), as one mechanism by which behavior scientists might affect the behavior of many different individuals.³ In Chap. 8, drawing extensively on work done in Brazil, Todorov and Lemos revisit Skinner's (1953) discussion of controlling agencies and take a deeper look at how the concepts like the macrocontingency and metacontingency can support public policy initiatives for large-scale behavior change. Several examples of work that informs, executes, and assesses governmental policies conducted by culturo-behavior scientists are included. The

³ See also Chap. 16, Public Policy Advocacy in Culturo-Behavior Science.

authors also highlight the utility of this work in promoting evidence-based policy development, implementation, and evaluation.

Ethics

Applications of behavior science to large-scale social change require working across disciplines and with multiple stakeholders to analyze and develop interventions that strengthen organizations and communities. These conditions pose numerous ethical considerations for culturo-behavior scientists that are not encompassed in current ethical codes for behavior scientists. For example, the Professional and Ethical Compliance Code for Behavior Analysts developed by the Behavior Analysis Certification Board is largely concerned with behavior analysts working with individual behavior change and does not readily translate to work in organizations, communities, and systems. As cultural- and community-level applications of behavior science continue to gain momentum so too will the need for contingencies to support ethical research and practice in culturo-behavior science. In bringing together stakeholders from multiple backgrounds and disciplines, the culturo-behavior scientist must learn to carefully and skillfully navigate situations such that *all* stakeholders' perspectives provide equal influence to the problem solving process.

The focus of Chap. 9 is on ethics for culturo-behavior scientists, particularly for those working in cultural- and community-based applications of behavior science. Cihon, Walker, Kazaoka, and Pritchett discuss the sometimes unique and occasionally overlapping ethical considerations for behavior scientists working in cultural- and community-based research and application. They propose that behavior scientists adopt social justice and creative altruism as aspirational values such that we might establish ethical cultural practices and the contingencies that create a culture of ethical cultural- and community-based research and practice.

Climate Change

Climate change likely poses the greatest threat facing humanity today (cf., IPCC, 2018; Seniuk et al., 2019). If we cannot get ahead of climate change—either slowing it or adapting to the already changing conditions, the work many behavior scientists are doing to produce socially significant behavior change with individuals or to understand basic processes that select cooperation in experimental microcultures for example, will be futile. It is now well known that human behavior has been one of the driving forces in climate change and it is becoming increasingly apparent that widespread behavior change is necessary to mitigate the effects. A number of culturo-behavior scientists have increasingly focused on ways to shift cultural practices to mitigate the effects of climate change (e.g., Lemos, Favacho, Favilla, &

Baia, 2019; Malott & Glenn, 2019; Seniuk et al., 2019; Tagliabue & Sandaker, 2019) and to develop community resilience (e.g., Ardila Sánchez et al., 2019). Chapters 10, 11, and 12 in this volume are dedicated to the most contemporary work in these areas, each from a different but complementary perspective.

Taking the broad view in Chap. 10, Alavosius and Houmanfar describe how both individual practices and organizational practices are contributing to global warming. They explain the role of relational responding as a driver for consumer behavior and how analyses and interventions targeting relational responding may affect large-scale behavior change. Offering suggestions for how behavior science might inform and stimulate more sustainable organizational practices, the authors emphasize the potential benefits of partnering with policy science to affect such change. Next, Gelino and colleagues (Chap. 11) review the wealth of existing behavior analytic literature focused on establishing sustainable behavior and practices. They accentuate the importance of using behavior scientific principles to develop interventions that support more eco-friendly cultural practices, and further describe how culturo-behavior science can bolster efforts to bring such interventions to scale. Lastly, and taking a slightly different perspective, Grant and Forrest (Chap. 12) provide an eloquent analysis as to how stories about sustainability could be constructed in ways that enhance or enable different behavioral processes (e.g., motivating operations, stimulus relations) that serve to promote sustainable behavior in minimally aversive and maximally reinforcing ways—perhaps one of our most promising approaches. Collectively, these three chapters suggest unique and cutting-edge opportunities for culturo-behavior scientists interested in creating an environmentally-just and sustainable world.

Strengthening Communities

Another particularly destructive cultural practice humans engage in is violence. Roose and Mattaini (Chap. 13) suggest that interpersonal, collective, and structural violence work in tandem, producing an ecology of violence. They argue that applications of behavioral systems science can facilitate the construction of an ecology of social and environmental justice instead. Taking lessons from Gandhi's "Constructive Programme," Roose and Mattaini recommend ways to disrupt the interdependencies across institutional and community sectors and their respective controlling variables that support the ecology of violence in order to affect change and reduce violence and oppression. The authors also discuss how this approach can be instrumental in addressing other super wicked problems.

Behavioral community psychologists have a longstanding and successful history of working with community members to develop policies, systems, and cultural practices that strengthen communities. Working from the framework of participatory models and the value of social justice, the work of behavioral community psychologists embodies the seven core dimensions of applied behavior analysis (Baer et al., 1968; Critchfield & Reed, 2017). In Chap. 14, Watson-Thompson, Francisco,

and Anderson-Carpenter summarize the history of behavioral community psychology and its relationship with behavior analysis. They describe examples of their work which has produced significant improvements in community health, development, and longevity connecting their readers with multiple resources such as the Community Tool Box that can support applications of behavior science to strengthen communities.

Behavioral analyses of historical phenomena can uncover systems and contingencies that influenced important social and political movements. Malott (Chap. 15) expands her recent research on the Mexican Muralist Movement (Malott, 2019) and draws her readers' attention to relevant contextual variables that led to the emergence, continuation, and finally the decline of the Mexican Muralist Movement. Malott also describes how such analyses can inform additional culturo-behavior scientific work examining important social movements.

Advancing Through Cultural Systems Change

Skinner (1971) indicated that "there are many reasons why people should now be concerned for the good of all mankind" (p. 137). Public policy practice at many levels (local community, city, state, federal, global) potentially provides opportunities for promoting widespread behavior change "for the good of" cultures and communities in the challenging areas covered in the chapters outlined above. Decisions to engage in this work require significant social and ethical responsibility, cultural humility, and analyses of likely consequences, both intended and unintended, of potential interventions. Current and aspiring culturo-behavior scientists are confronted with a plethora of opportunities to advance our understanding of the ways in which our behavior affects our social environments and how our social environments in turn affect our behavior.

A barrier behavior scientists often face, however, is how to promote the widespread *adoption* of behavioral and cultural-behavioral technologies that research suggests will be helpful. Knowledge of effective interventions is useful to society only if those interventions are accepted, implemented, and sustained. In Chap. 16, Mattaini, Esquiedo-Leal, Ardila Sánchez, Richling, and Ethridge outline important foundational ethics, values, and empirically supported repertoires for culturo-behavior scientists acting to advance public policy consistent with community well-being. They describe the often fluid and conflicted policy process, examine the growing but still limited research conducted thus far on the practice of policy advocacy, and provide recommendations for further advancing culturo-behavioral research in this area.

Many of us were drawn to behaviorism because it affords the rigor and precision of a natural science while upholding the characteristics of a social science in its applications to problems of social significance. In many ways, behavior scientists are constantly engaged in social action, particularly when they come together and join others to promote social change. Ardila Sánchez, Richling, Benson, and Rakos

(Chap. 17) conclude this volume with a detailed analysis of activism, advocacy, and accompaniment, essential repertoires for social action at both street and policy levels. These three repertoires align with behavior scientists' commitment to social responsibility "to act to expand applications of behavior analysis and cultural analysis addressing social issues, particularly those with social justice, human rights, and environmental implications" (What is BFSR?, n.d.). The authors provide specific strategies, analytic tools, and recommendations that can guide and increase the impact of culturo-behavior scientists' efforts to affect systemic change and lessen the scope, breadth, and impact of social and global challenges.

We're All in This Together

Readers are invited to join the collaborative efforts of the contributors to this volume and behavior scientists around the globe who are committed to a progressive culturo-behavior science focused on strengthening cultures and communities. The strong foundation and advances in culturo-behavior science presented in this volume offer numerous pathways for further research and applications of culturo-behavior science that challenge the social and global issues facing humanity today and in the future. Whether your contributions are in the exploration of conceptual and theoretical issues, the experimental analysis of basic culturo-behavior scientific processes, or in interdisciplinarily and collaborative partnerships with community members, how we move forward depends on the networks of contingencies (and metacontingencies) our individual and interlocked behaviors create and sustain.

Holland (1978) argued that in the late 1970s behavior scientists had shifted their focus to maladaptive behaviors and were ignoring the role of larger, systems-level contingencies that were likely key in establishing and maintaining these patterns of behavior. Holland wrote:

Our contingencies are largely programmed in our social institutions and it is these systems of contingencies that determine our behavior. If the people of a society are unhappy, if they are poor, if they are deprived, then it is the contingencies embodied in institutions, in the economic system, and in the government which must change. It takes changed contingencies to change behavior. If social equality is a goal, then all the institutional forms that maintain stratification must be replaced with forms that assure equality of power and equality of status. If exploitation is to cease, institutional forms that assure cooperation must be developed. Thus, experimental analysis provides a supporting rationale for the reformer who sets out to change systems. (p. 170)

Holland's challenge to behavior scientists is also that of current and aspiring culturo-behavior scientists—to interrupt the systems- and cultural- contingencies that sustain exploitative and oppressive practices and to instead arrange the networks of contingencies (and metacontingencies) that promote cooperation and select individual behaviors and cultural practices that benefit society at large. How we move forward as a science, as a specialization within behavior science, in our own communities of practice, and as individuals will be guided, shaped, and directed by the

responses of those who read this text. It is our hope that our path forward will include fewer references as to why behavior scientists are not acting to save the world and more references to how behavior scientists helped to create a world that no longer needs saving. “We should be able either to introduce variations (rather than wait for them to occur by chance) or to change the contingencies of selection” (Skinner, 1987, p. 8). The future of culturo-behavior science and where we go from here is up to you.

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Chapter 2

Toward Consistent Terminology in a Behaviorist Approach to Cultural Analysis



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In April, 2015, a group of 12 behaviorists was convened in São Paulo by João Claudio Todorov to resolve differences in terminology used in behavioral publications on cultural-level phenomena. The meeting was held in conjunction with a conference sponsored by the University of São Paulo (Todorov et al., 2015). Although meeting participants had a broad range of interests—including experimental research, applications to business and other organizations, and applications to large scale social phenomena—they had in common a conviction that the behaviorist world view promulgated by B. F. Skinner could be used and extended to understand and change the cultural phenomena in which the behavior of individuals is embedded.

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Todorov's goal in convening the meeting was that participants arrive at a consensus regarding definitions of concepts viewed as important to the work of participants. Of particular interest at the outset were definitions for the concepts of *metacontingency*, *macrocontingency*, and *macrobehavior*. A preliminary point on which there was general agreement was that the concepts planned for discussion were *not* assumed by participants as being the *only* concepts needed in the analysis of cultural phenomena. Rather, they were prioritized because they had been found useful conceptual tools both in guiding experimental analysis (e.g., Costa, Nogueira, & Vasconcelos, 2012; Marques & Tourinho, 2015; Saconatto & Andery, 2013; Smith, Houmanfar, & Louis, 2011; Todorov & Vasconcelos, 2015; Velasco, Benvenuti, & Tomanari, 2012; Vichi, Andery, & Glenn, 2009) and in understanding and changing everyday cultural-level phenomena (e.g., Houmanfar, Alavosius, Morford, Reimer, & Herbst, 2015; Machado & Todorov, 2008; Malott, 2003; Naves & Vasconcelos, 2008; Sandaker, 2009, 2010; Todorov, 2009, 2013).

Throughout the meeting the group found it necessary to clarify what they meant by terms that appeared in their proposed definitions or to address related issues that arose in the context of their discussions. This wandering of the task, from the initially targeted quasi-technical terms to words used to explicate their meanings, was to be expected because scientific terms not expressed mathematically are expressed in ordinary language, and thus introduce their own confusions. In short, participants found themselves immersed in the kind of thorny philosophy-of-science problems often dealt with at great length by scholars grappling with evolutionary biology's key concepts. As Keller and Lloyd (1992, p. 3) succinctly stated in their introduction to *Keywords in Evolutionary Biology*:

Although it may not be possible, or even wholly desirable, to achieve a fixed meaning for scientific terms, the effort to “control and curtail the power of language” remains a significant feature of scientific activity. The very extent to which scientists ... aim at a language of fixed and unambiguous meanings constitutes, in itself, one of the most distinctive features of their enterprise. And even though never quite realizable, this effort to control the vicissitudes of language, like the commitment to objectivity, reaps distinctive ... benefits.

Despite the vicissitudes of ordinary language and the varying scientific and practical interests of the participants, the group managed to end the 2-day session with a product comprising two pages of working “definitions.” In the following paragraphs, we report the content of that product and discuss some of the issues the group dealt with in attempting to come to a consensus.

Metacontingency

During its nearly 30-year history, the concept of *metacontingency* had been undergoing more or less continuous development. Given the variations in definition, the group agreed to seek consensus on a definition having the minimum number of terms possible. Without denying that metacontingencies could be expanded to three or more terms (e.g., Houmanfar, Rodrigues, & Ward, 2010; Vieira, Andery,

& Pessoa, 2016), the group agreed that the minimum number of metacontingency terms was two—comparable to response/consequence contingencies first investigated by Skinner (1938). The first term in a metacontingency relation is interlocking behavioral contingencies (IBC) measured by their aggregate product (AP). This term was viewed as analogous to movements of a laboratory animal measured by the switch closure they produced. The second term in a metacontingency relation is the consequences contingent on IBC/AP (analogous to the delivery of food contingent on movements producing switch closure in an operant experiment). The following definition specifies the contingent relation between these two elements.

Metacontingency: A contingent relation between 1) recurring interlocking behavioral contingencies having an aggregate product and 2) selecting environmental events or conditions.

The contingent relation, then, in a metacontingency is between a culturant (IBC + AP) and its selecting consequences. The IBCs themselves are made up of interlocking contingencies of reinforcement in which the local behavior of participants is directly reinforced. That IBCs can be maintained eventually by culturant consequences (in the absence of direct reinforcement for participant behavior) was demonstrated by Saconatto and Andery (2013), Tadaiesky and Tourinho (2012) and Vichi et al. (2009).

Figure 2.1 is a schematic of a metacontingency that depicts recurring IBCs in which five people produce an aggregate product. Each person's activity and/or its effects functions as environment in the operant contingencies maintaining the behavior of others. For example, packing depends on the presence of materials to pack, which depends on the conveying behavior of another person, and so on. The

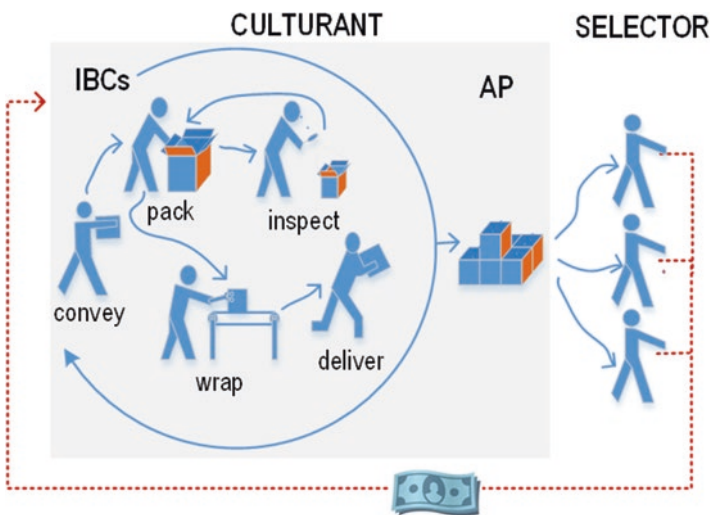


Fig. 2.1 Metacontingency depicting selection of a shipping company culturant by an external selector

orderly arrangement of these interlocking contingencies results in the aggregate product of a shipment of packed items. The IBC/AP unit is identified as a culturant (named by Hunter, 2012) and it is shown as being selected by an external environment in the form of consumers who pay for the shipped items. The contingent relations between the IBC/AP and the selecting environment constitute the metacontingency. (For other examples of this type of metacontingency, see Malott, 2003; Malott & Glenn, 2006).

The example is designed to distinguish as clearly as possible between the *operant* contingencies participating in the IBCs and the *metacontingencies* in which the IBC/AP recurrences function as cohesive wholes (culturants) susceptible to a selecting environment. Important to note is that the selecting environment cannot reasonably be expected to function as reinforcer for the behavior internal to the IBCs in this example. That behavior is maintained by operant contingencies that remain in existence only because they function together as a unit to generate the product in the metacontingency. Perhaps too obvious to require mention is that most IBCs participating in metacontingencies involve verbal behavior of participants. The verbal behavior of interest in those IBCs is that which supports or undermines a viable aggregate product.

It needs also be noted that the particulars in the example are incidental to the purpose of the example, which is to depict the *kinds* of relations that constitute metacontingencies. That is, the product of IBCs does not have to be objects, and their selection does not require financial transactions. For example, negative political ads produced by IBCs of a campaign staff may be selected by voter choices, and musical products of an amateur band's IBCs may be selected by offers to play at the local pub.

Participants addressed several topics related to the terms in the definition. It was pointed out that the interlocking behavioral contingencies that play a role in metacontingencies are a subset of the more general "interlocking contingencies" that were named by Skinner (1957, p. 432) and that are ubiquitous in human affairs as pointed out by Andery, Micheletto, and Sérgio (2005). Metacontingencies, however, involve only those interlocking contingencies that *recur* in a lineage *because* they have been selected as functional wholes by their environment. The addition of *behavioral* to Skinner's interlocking contingencies serves merely to identify them as operant-level contingencies *in* the IBCs, to be distinguished from metacontingencies that involve relations *between* the IBCs/AP and their selecting environment (Andery & Sérgio, 2003).

Another point of general interest was that variation among recurrences of IBCs is assumed. IBC variation could be the result of variation in operant recurrences in the behavior of individuals participating in the IBCs, or of replacement of one or more of those individuals, or of alterations in the organization of the interlocking contingencies. Any of these variants might be planned or unplanned. If variations in recurrences result in drifting of IBCs sufficient to alter the aggregate product, selection may be affected—either positively or negatively. Further, culturants may change over time as external environmental consequences (or antecedent condi-

tions) change and variants not selected in a given sociocultural environment may remain available for selection at a later time.

The arrangement depicted in Fig. 2.1 was discussed in light of other possible arrangements that might be considered as metacontingencies. For example, Hunter (2012) discussed an experiment conducted by Azrin and Lindsley (1956) as a metacontingency arrangement. In that experiment, candy to be shared by two children was delivered contingent on interlocking contingencies that produced a particular arrangement of pegs (AP) on a board with holes for the pegs. The candy may be considered as reinforcement for each child’s actions and also as selector of the IBCs that produced the required arrangement of pegs. This type of redundancy may characterize many metacontingencies in complex societies. An example is shown in Fig. 2.2.

Figure 2.2 depicts a high school basketball team’s interlocking behavioral contingencies that produce a winning score (AP). Winning scores in a sufficient number of games results in the external delivery of the championship trophy. Implicit in this example, is the likelihood of alternative variations in IBCs resulting in losses of some of the previous games, with resulting alterations in the team’s playbook. The championship trophy selects those IBCs (including playbook adjustments) that produced winning games. The awarding of the trophy following the championship game may have the dual function of reinforcer for the plays made by individuals as well as selector of the playbook IBCs that resulted in winning scores.

In a third kind of metacontingency arrangement, the aggregate product itself may have the dual function of reinforcing the behavior of participating people and of selecting the interlocking contingencies that result in the product. In Fig. 2.3, the completed puzzle (AP) requires that each participant’s behavior occur in relation to

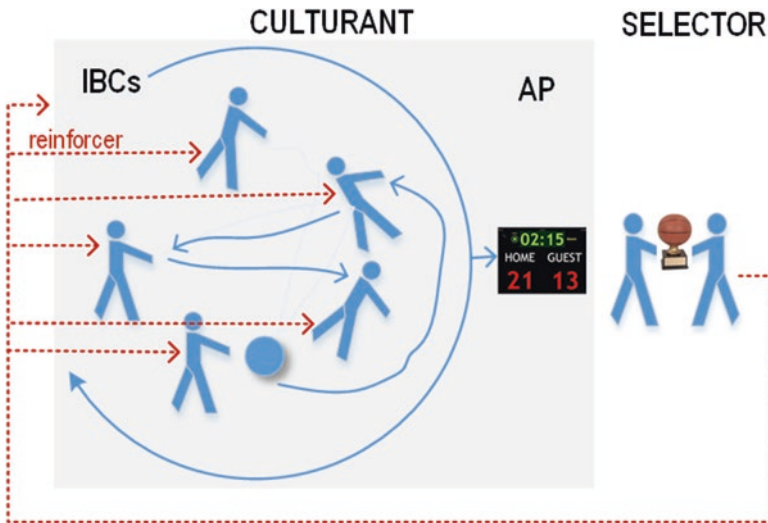


Fig. 2.2 Selection of basketball game culturant by an external selector with dual functions—operant and culturant

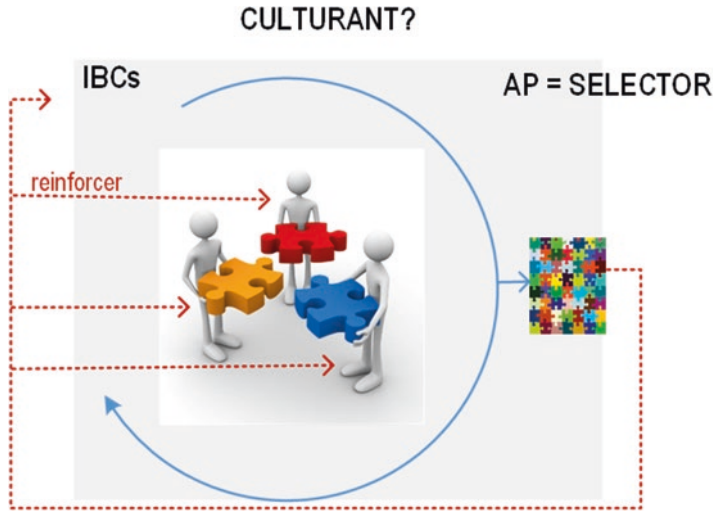


Fig. 2.3 Selections of puzzle assembly by an aggregate product with dual functions—operant and culturant

the behavior of the others. Recurrences of their assembling suggest that the aggregate product functions as selector of IBCs, and it also likely functions as reinforcer for the cooperating behavior of the puzzlers.

This type of simple arrangement in which the aggregate product itself has dual functions of operant and cultural selector may typify the historical emergence of recurring IBCs in social environments. Because complex organizations surely did not materialize fully formed, their evolution in historical social environments must have involved some “mixed” arrangements of operant and cultural selection processes. Skinner suggested similar “mixed” arrangements between operant reinforcement and natural selection: “When the selecting consequences [in operant and natural selection] are the same, operant conditioning and natural selection work together redundantly” (Skinner, 1981, p. 501).

Because the operant/culturant distinction can be seen most clearly when the environment that selects IBCs producing a particular product cannot function to reinforce the operant behavior participating in the IBCs, several laboratories have developed preparations that clearly delineate between operant and culturant contingencies, and even pit the two kinds of consequences against one another (Baia, Azevedo, Segantini, Macedo, & Vasconcelos, 2014; Cavalcanti, Leite, & Tourinho, 2014; de Toledo et al., 2015; Ortu, Becker, Woelz, & Glenn, 2012; Pavanelli, Leite, & Tourinho, 2014; Saconatto & Andery, 2013). A review of much of the experimental research on metacontingencies was recently published (Tourinho, 2013).

Culturo-Behavioral Lineage and Cultural Transmission

Most human behavior is acquired as a result of learning from other humans—by observation or via explicit instruction. The behavior of both parties in these learning episodes, usually designated as “social behavior,” is the foundational phenomenon of human cultures. The specific behavior acquired by learners depends, of course, on the repertoires of the particular humans whose behaviors (or products) function in the learner’s operant contingencies. Norwegian speakers teach Norwegian speech and Portuguese speakers teach Portuguese speech to new members of their communities. (See Andery, 2011, for review of behavior analytic publications on social behavior/interactions.)

The prototypical relations of cultural transmission are those between behavior of parents and teachers, on the one hand, and children on the other. But children (and adults) also learn from peers, neighbors, religious and lay leaders, books, art, music, and the internet. When a socially acquired behavior is replicated in the repertoire(s) of other individuals, a new type of lineage emerges. It was named a *culturo-behavioral lineage* and suggested as a type of phenomenon that emerged historically in the transition between operant and cultural selection processes (Glenn, 2003).

Culturo-behavioral lineages are “behavioral” because they comprise recurring *behavior*. Although the behavior is operant, the lineage is not. That is because an operant lineage is grounded in the existence of an individual organism. Culturo-behavioral lineages are “cultural” because the lineages extend beyond any specific operant lineage and even beyond the lives of organisms whose behavior contributes to the lineage. The meeting participants defined them as follows:

Culturo-behavioral lineage: The transmission of operant behavior across individual repertoires.

Behavior transmitted in a culturo-behavioral lineage is of most cultural interest when it is reinforced and becomes established as an operant in new repertoires. Its recurrences are then in a position to serve as antecedents for further transmission to yet other repertoires (providing the supporting physical and social environments are present). In this way each repertoire altered by social learning can function as a node in an evolutionary “bush” of ongoing transmissions.

Although transmission of operant behavior often occurs across individuals in one-to-one interactions, culturo-behavioral lineages are also embedded in the recurring IBCs of organizations. For example, when a retiring volunteer teaches a new volunteer how to carry out a task embedded in an organization’s IBCs, it is critical that the socially learned behavior fit well enough into the recurring IBCs to contribute to the aggregate product. In IBCs that continue recurring as their participants change over time, culturo-behavioral lineages are like individual threads extending continuously through the larger pattern of a fabric. The culturo-behavioral threads embedded in recurring IBCs are seen in experiments where participants who replace others in recurring IBCs learn to behave like those they replaced (Borba, Silva, et al., 2014; Marques & Tourinho, 2015; Pavanelli et al., 2014; Soares, Cabral, Leite, & Tourinho, 2012).

Macrobehavior

Human societies are characterized by many similarities in the behavior of their constituent populations. These similarities result from similarities in the physical and/or social content of the contingencies supporting the behavior of individuals. The combination of social learning and consistency in particulars of operant contingencies allows observers to distinguish among various “cultures” and “subcultures,” including those of corporations, churches, extended families, ethnic communities, and entire nations. That which is being depicted has been called *macrobehavior* (Glenn, 2004). Think Tank participants agreed on the following definition of macrobehavior.

Macrobehavior: Socially learned operant behavior observed in the repertoires of several/many members of a cultural system.

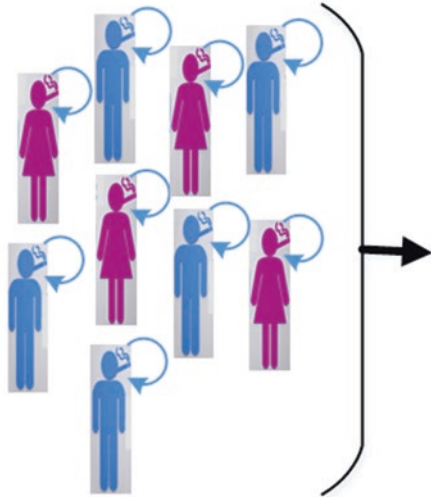
Although the concept of *macrobehavior* may seem somewhat redundant with the concept of a *cultural practice*, the latter term has been defined in many ways, and often includes “beliefs” and “attitudes.” The concept of *macrobehavior* is limited to observable operant behavior. It is the subject of much descriptive social science research, where population characteristics are the object of investigation. For present purposes, we will discuss the role of macrobehavior in macrocontingencies.

Macrocontingency

As people go about their daily activities, their behavior is constantly undergoing selection by consequences. For example, cigarette smoking may be reinforced by nicotine consumption, excuse to take a work break, or opportunity to socialize. Another possible outcome is lung cancer or heart disease, but these consequences are both delayed and probabilistic, therefore no match for the immediacy and certainty of the abatement of nicotine withdrawal or the no-work period. Even more poorly correlated with smoking by an individual is the cost of smoking to society. This is because the contribution of any one smoker to that cost is negligible, but the cumulative effect of the macrobehavior of smoking can be huge. The relation between the macrobehavior of smoking and its cumulative effect on disease in the United States is depicted in Fig. 2.4. These diseases, in turn, contribute to health care costs and air pollution, which may be considered additional effects of the macrobehavior of smoking.

People behaving individually are not, of course, the only contributors to health care costs and air pollution. Organizations of many different kinds also contribute to those effects. As in the case of individual behavior, the IBCs/AP that contribute to air pollution, for example, are selected for other attributes. The contribution to air pollution is a side effect of the metacontingencies maintaining the IBCs. Figure 2.5 shows cumulative effects resulting from the combined effects of individual behavior and IBCs of organizations.

INDIVIDUAL OPERANTS



CUMULATIVE EFFECT

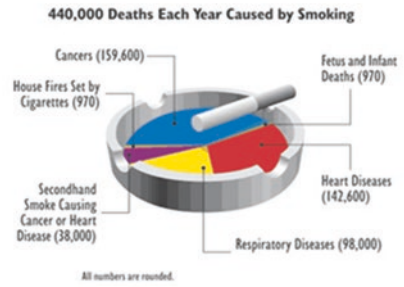
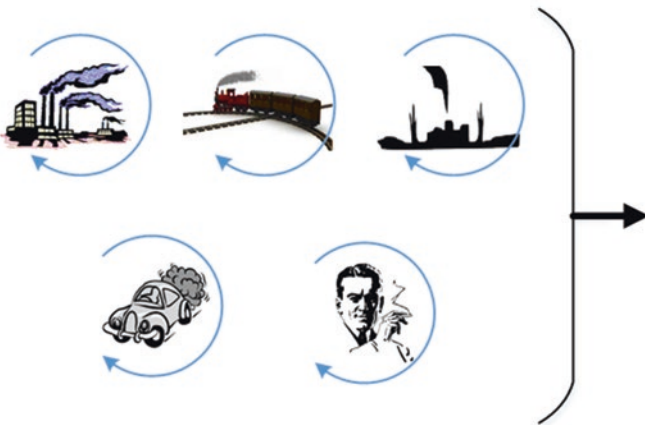


Fig. 2.4 Deaths as a cumulative effect of smoking of many people under individual operant contingencies

IBCs + INDIVIDUAL OPERANTS



CUMULATIVE EFFECT



Fig. 2.5 CO₂ as a cumulative effect of independent culturants and operants

Societal “problems,” then, may often be the negative cumulative side effects of behavior selected for other properties at individual and organizational levels. Thus, participants agreed on the following working definition for *macrocontingency*.¹

Macrocontingency—Relation between 1) operant behavior governed by individual contingencies and/or IBCs governed by metacontingencies and 2) a cumulative effect of social significance.

Societal attempts to alter behavior of many individuals having undesired cumulative effects often involve imposition of costs on the operant behavior contributing to those effects. For example, increasing taxes on cigarettes is reported to decrease the macrobehavior of smoking (Chaloupka, Stralf, & Leon, 2010; Hu & Mao, 2002). Further, decreases in macrobehavior of smoking have been associated with reduced per capita health care expenditures (Lightwood, Dinno, & Glantz, 2008). In this case, contingent response cost for behavior of many individuals results in positive cumulative effects at the societal level (and presumably prevention of health problems for many people at the individual level.)

As in the case of altering individual behavior, it is also possible to alter macrobehavior to produce positive cumulative effect (or reduce negative cumulative effect) in less aversive ways. For example, guests at hotel buffets who use smaller plates choose foods more carefully. Their aggregate choices result in less waste, with obvious benefits to the environment (Kallbekken & Saelen, 2013). Similarly, placing healthy food items within easy reach and requiring a stretch to reach less healthy alternatives can improve food choices in school cafeterias (Hanks, Just, Smith, & Wansink, 2012) with the cumulative effect of better public health.

Participants agreed that the term macrocontingency, as defined here, is problematic for several reasons. First, the cumulative effect in a macrocontingency is not actually in a *contingent* relation with the practices (individual or organizational). That is, the cumulative effect automatically results from the practices and is not independently manipulable. This problem is analogous to scratching an itch at the operant level, and thus could be rationalized as not posing a conceptual problem.

A problem less easily dispensed with is that the effect of the scratching behavior (reducing the itch) appears to have an automatic selective function; but the cumulative effect of the individual and organizational practices of a macrocontingency has no such automatic selective function. This is for two reasons. First, even if altering the cumulative effect could function as a reinforcer for personal behavior, or a cultural selector for organizational IBCs, no individual human or organization alone can significantly alter a cumulative effect. Second, and more important, is that the

¹Jerome Ulman (2006) has used the term macrocontingency in a way that includes some of the features of metacontingencies, some of the features of what we call here macrocontingencies, and some of the features of what we will discuss later as a cultural cusp. Examples of macrocontingencies he offered included the four-term contingencies involved in a verbal episode involving two people (“a minimal macrocontingency,” p. 99), the (evolving) English language, a two-week march of landless workers in Brazil, the Movement of Landless Workers in Brazil as well as the Police Department of Brasilia. What the present analysis has in common with Ulman’s is that observable events at the cultural level are the focus of analysis.

sources of the cumulative effect are unrelated individual behaviors and IBCs of unrelated organizations. So they cannot function as a unit that can undergo selection. Rather, the many recurring behaviors contributing to the cumulative effect are individually selected and/or the IBCs of many different organizations contributing to the cumulative effect are selected each by their own consequences. In a macrocontingency, then, the selection contingencies are all *within* the first term in the macrocontingency relation, and not in the relation *between* the terms in the definition. Experimental analysis of culturo-behavioral lineages in macrocontingencies was reported by Borba, Tourinho, and Glenn (2014).

To alter behavior participating in macrocontingencies, it is necessary to establish a connection between the individual behavior and its effect, or else it is necessary to interlock both terms (Sampaio & Andery, 2010). This is frequently done in our societies through verbal contingencies. Campaigns to “educate” or “raise awareness” of individuals in a population can work if they succeed in establishing a “link” between behavior and its cumulative effect and result in new, positive or negative, social consequences for individual behavior. Verbal descriptions of such “links” can also participate as a controlling variable over the desirable behavior. The recently observed decrease in smoking of entire populations is partially explained by such changes: the frequently announced links between smoking and disease, smoking and pollution, smoking and social cost has allowed the emergence of social frowning upon the actual smoking behavior and also for the many forms of self-control developed by smokers who quit.

Cultural Cusp

As mentioned earlier, not all interlocking behavioral contingencies function as cohesive wholes with recurring aggregate products that meet (or fail to meet) selection criteria of their environment. Interlocking contingencies are, in fact, ubiquitous in human societies, evident in the thousands of daily interactions among people who will never see each other again. Other interlocking contingencies may recur but still not constitute cohesive wholes selected by an environment external to any reinforcers embedded in the interlocking contingencies. Examples of the latter are seen in regularly occurring interlocking contingencies shared by shoppers and a cashier at a grocery store, or by a desk employee and members of a gym, or by repetitions of a bedtime story told to a child by her father.

Most of these unique or recurring interlocking contingencies simply represent the warp and woof of societies. Sometimes, however, they coalesce uniquely in such a way as to produce an aggregate product that results in massive alterations of the behavior and maintaining contingencies constituting the fabric of a sociocultural system. Participants in the meeting suggested identifying such coalescence of interlocking contingencies as a *cultural cusp* and agreed on the following definition

Cultural cusp: The coalescence of unique and nonrecurring interlocking and/or individual behavioral contingencies that results in a product that leads to significant socio-cultural change.

An example of a cultural cusp is depicted in Fig. 2.6. The Declaration of Independence was the aggregate product of a Continental Congress, whose members were appointed by the governments of 13 British colonies on the east coast of what is now the United States. The appointments are shown in the figure as the products of recurring IBCs within each colony. These representatives debated extensively, offering a variety of reasons for remaining loyal to or declaring independence from Britain. Eventually, a draft of the Declaration was written by Thomas Jefferson and edited by the drafting committee. Its adoption was far from certain and extensive debate resulted in further changes to satisfy representatives of the slave states. The coalescence of all of these novel operants and IBCs resulted in a document signed, not without anguish and trepidation, by a majority of each colony's representatives. The distribution of copies of the Declaration throughout the American colonies led to a host of immediate and long-term changes in operant contingencies and metacontingencies of American society.

Some of the lasting cultural changes emanating from the Declaration are shown in the figure, and include the long war for independence; acquisition of western lands via the Treaty that ended the war, and increased pace in westward migration; the U.S. Constitution (which itself contained language that led in time to the U.S. Civil War); industrial growth and expanded commerce; resettlement of Indian tribes (usually without their consent) in the west, and the emergence of political parties. All of these outcomes represented massive changes in the operant and cultural contingencies for people in the new confederation. (See Wood, 1992, for description of social and economic changes attendant to American independence.) Not represented in the figure are changes in other parts of the world that the Declaration likely contributed to (e.g., French Revolution, constitutional governments in European and South American countries, etc.).

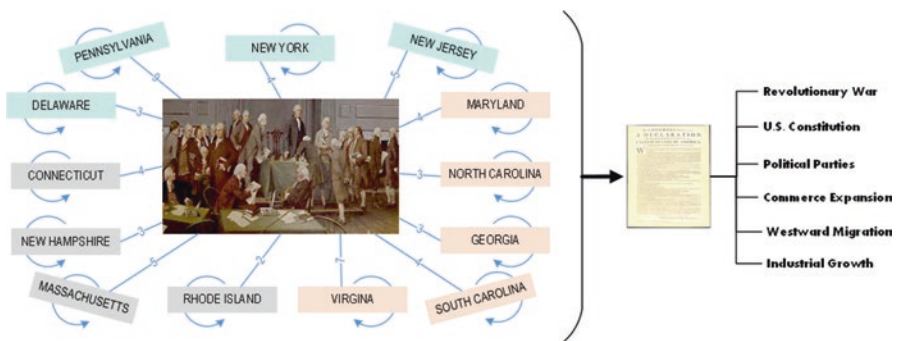


Fig. 2.6 The Declaration of Independence as a cultural cusp resulting from the coalescence of novel IBCs

The Declaration of Independence is viewed here as a product of uniquely occurring interlocking contingencies and as a catalyst for resulting socially significant changes. A cultural cusp, then, is defined by its origin in unique and nonrecurring interlocking contingencies, an ensuing result or product, and socially significant cultural changes that emanate from that product. Other uniquely occurring contingencies and metacontingencies that appear to have resulted in massive cultural changes have been described by Malott (2015); and her interest in this type of cultural phenomenon was what generated discussion that led to a name for it.

Distinctions of Process, Content and Procedure

One of the most vexing problems in process sciences is the conceptual interplay between the content-free terms of scientific principles or laws and the empirical content constituting the phenomena to be investigated, explained, or changed. David Hull (1975) has addressed this problem in the philosophy of biology and it has also been discussed in behavior analysis (Glenn & Malagodi, 1991; Lee, 1988). In this section, our goal is to distinguish between *process* and *content* in behavioral and cultural selection and to consider the role of *procedures* as actions of scientists and practitioners that link content to process.

We begin by pointing out that none of the italicized definitions in the above sections specifies empirical particulars. The terms in the definitions refer to spatiotemporally unrestricted classes that play a role in lawful processes that apply to a great range of particulars. On the other hand, the figures, as well as other examples offered in the text, specify particulars that exemplify the kinds of phenomena involved in the processes. Participants discussed these distinctions as they apply to both operant contingencies and metacontingencies.

Process, Content, and Procedure in Operant Contingencies

In a prototypical operant experiment, a rat presses a lever and food is delivered contingent on some feature of the pressing (e.g., one or more switch closures, or time between switch closures). The experiment is not, of course, “about” rats, lever presses, switch closures or food deliveries; these are simply the particulars the experimenter arranges. They are the *empirical content* the experimenter has chosen in order to learn about something else. The “something else” is the *process* of operant conditioning. Although a resulting change in our rat’s behavior may provide evidence that operant conditioning has occurred, the conditioning *process* itself must be described in generic (content-free) terms, not by the particulars of empirical content.

Thus the process of operant conditioning can be described as *change over time in operants as a function of response/consequence contingencies*. Note that the

terms that describe the process are content-free and spatiotemporally unrestricted, as they must be for the process to be considered “lawful” (Hull, 1977/1989). The more particulars a process accounts for, the greater the generality of the principle describing the process. For this reason, basic research in any field is almost always conducted with an eye to discovering processes that account for the broadest range of empirical content. Having available some principles that describe fundamental processes, such as operant conditioning or natural selection, researchers can explore the limits of those principles as well as extend their domain.

For real-world interventionists the specifics of behavioral *content* are vitally important. After all, their goals are to alter the observable particulars causing problems: Johnny can’t read; Samantha’s head banging is injurious; children with autism do not display joint attention. Knowing something about the specific behavior/environment relations that constitute reading or joint attention is critical. Knowing the particulars of the environment that maintain Samantha’s head banging or the particulars of Johnny’s current repertoire is also important. But the world is very large, comprising innumerable particulars, so how does the interventionist know where to start? This is where knowledge of process becomes critical. The better the interventionist understands operant conditioning and other behavioral processes, the more likely the interventionist is to identify the critical content and alter specific events to reach a desirable outcome.

But knowledge of how operant conditioning works and of the particular content important to the problem at hand is still not enough for solving the problems faced by interventionists. The interventionist must *do* something, which brings us to *procedure*.

Procedure constitutes the operations conducted by both basic researchers and interventionists in accomplishing their goals. In behavior analysis, procedures involve manipulation of the environment in relation to behavior. The basic researcher manipulates the particulars of contingencies to understand behavioral processes. Thus, content is always present in experimental research but it remains in the background—a means to an end. Conversely, the interventionist manipulates the particulars of contingencies to bring about a particular change in behavioral content. The content is front and center for interventionists while process is a means to the end. Thus process and content are the yin and yang in the circle of science.²

Process, Content, and Procedure in Metacontingencies

Having discussed these terms with respect to operant contingencies, participants next turned to analogous usage in the analysis of metacontingencies. Several laboratories conducting metacontingency experiments had developed procedures

²Applied research often combines the interests of basic researchers and interventionists. Although it typically begins by identifying a particular problem, experimental analyses are sometimes conducted to better understand processes contributing to the problem.

designed to systematically manipulate relations between IBCs having specified AP and an independent variable contingent on IBCs having that AP. In some cases, the experiments manipulated *operant* contingencies *within* the IBCs as well as the *metacontingencies* *between* the IBCs/AP and their external environment. The behaviors involved in the various preparations differed as did the nature of the consequences in the metacontingencies. To the extent that these experiments demonstrated selection of IBCs/AP by external consequences, they exemplified a cultural process analogous to the process of operant conditioning. To the extent that the experiments empirically distinguished between operant selection (for behavior *within* IBCs) and cultural selection (for IBCs/AP), those experiments demonstrated concurrent and sometimes conflicting selection processes at behavioral and cultural levels.

That the content of IBCs and consequences in the above mentioned experiments differed from laboratory to laboratory and from experiment to experiment is not relevant to the nature of the processes under investigation any more than it is in operant experiments. However, and also as in the case of operant contingencies, the content becomes the focus of investigation in applied work. A case in point pertains to the 7-Step Disaster Reduction Plan formulated at the 3rd World Conference on Disaster Risk Reduction (Vasconcelos, 2015). The project is overseen by a committee of delegates from 188 countries, the UN's Office of Disaster Reduction and the UN's Scientific and Advisory Group. A complete analysis of metacontingencies, macrocontingencies and operant contingencies involved in this vast undertaking is well beyond the scope of this chapter, so we will focus on one item in one of the project's targets.

The first-stated global target is to *reduce disaster mortality* between 2020 and 2030 compared to the period between 2005 and 2015. For our purposes, we will consider the kind of metacontingencies likely involved in obtaining the annual data needed to assess global progress in achieving this target. Those data are the aggregate products of recurring IBCs of various organizations around the world and the value of each organization's data is directly related to the adequacy of the IBCs in generating those products. Perhaps it is obvious that the body making use of the collected data will benefit from specifying what is (and is not) to be included in the data contributing to the aggregate product. That is, what counts as "mortality resulting from a disaster"? For example, should a heart attack occurring during an earthquake be counted? Should starvation of people who were starving before a tsunami occurred be counted? The reliability and validity of the global data will depend on the aggregate products of the data-collecting agencies representing the same types of empirical events.

Although it would be possible to drill down even further in analysis of metacontingencies involved in global disaster risk reduction, we will instead consider what could happen to the aggregate products of the independently operating organizations involved in data collection. In brief, they become the inputs to another organization (perhaps a committee tasked to collect global data for the project). The IBCs of that organization produce the annual reports used to determine whether the targeted reduction in disaster mortality has been met. Thus, the project itself is a

pyramid of IBCs ... a system in which lower level elements (lower meaning closer to empirical events being measured) generate products (data) that contribute to the performance of higher level elements (committees who make use of the data in recurring IBCs of their own). Similar pyramids of IBC lineages would be involved in other elements of the program, for example those dedicated to prevention, mitigation, preparedness, response, recovery, and rehabilitation.

Returning to the distinction between cultural process and content, the foregoing is a conceptual analysis of cultural-level phenomena roughly akin to the analysis of “self-control” offered by Rachlin (2000). Although the experimental basis for Rachlin’s analysis is far greater than in the present case, the global importance of reducing disaster mortality would seem to make it worthwhile to point to the specific content that must be considered in meeting the goals of a huge organization. Such contingency analyses as offered by Vasconcelos (2015) offer interventionists a road map of sorts in identifying real-world events likely to be playing a role in behavioral and cultural processes.

Conclusion

Given the varying histories of the meeting participants, as well as their different interests with respect to relations between behavioral and cultural-level phenomena, the culmination of the meeting in a document spelling out definitions of terms was a happy result. As the goal of the convener of the meeting was to establish a common understanding among participants as to definitions of key terms, it is hoped that those spelled out herein will be useful in that regard.

Because scientific concepts are subject to revision over time as they garner more attention and scrutiny, the authors expect to see continuing refinement and utility of the concepts discussed herein. We hope that behavior analysts interested in integrating principles of operant and cultural selection will take up the challenge of improving upon this and previous work directed toward a functional approach to the analysis of cultural-level phenomena.

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Chapter 3

Cultural Systems Analysis: An Emerging Science



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In the chapters which follow, we shall turn to certain complex processes. Interlocking systems of responses will be traced to complex arrangements of variables

(B. F. Skinner, *Science and Human Behavior*, 1953, p. 201).

Although B. F. Skinner outlined processes of cultural selection in his 1981 paper “Selection by Consequences,” he began discussing behavioral systems from a cultural perspective as early as 1948 (*Walden Two*; Glenn, 1986). In his 1953 *Science and Human Behavior* he was clearly thinking in systems terms, using the term “social systems” 15 times. Even that early, Skinner’s work was highly consistent with contemporary approaches to cultural systems analysis (CSA), for example in one case indicating that cultural practices within a social system can become “reasonably self-sustaining” (Skinner, 1953, p. 419). Andery (1990) indicates that Skinner viewed psychology in those early years not as a “science of the isolated individual, but of the individual as part of a group, of society as an indissoluble collection of individuals, of the group as a whole” (p. 174).

This chapter explores how systemic approaches to science enable behaviorists and those of other disciplines with whom we collaborate to understand and intervene in larger social and cultural processes. There are very few cultural and community issues in which behavior science does not need to act in concert with specialists in other areas—and with members of, and cooperating and competing organizations within, the community systems involved. Such community systems

¹Metacontingency: A contingent relation between (1) recurring interlocking behavioral contingencies having an aggregate product and (2) selecting environmental events or conditions (Glenn et al., 2016).

²Self-organization and autopoiesis are commonly used interchangeably in contemporary systems science, although autopoietic systems were originally defined to require self-generation (Mobus & Kalton, 2015).

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offer unique expertise in the variables and ecological conditions that are most involved in community issues—and solutions. The need to pay attention to interlocking disciplinary systems, community systems, and their connections—behavioral and cultural systems dynamics—is clear. Before moving into such analyses, however, it is important to clarify cultural and systems terms, and the conceptual frameworks—sometimes contested—on which behavior science relies when working at collective levels.

Such contestation is not surprising, as cultural analytic science is a relatively young field, and as such should welcome a range of possible perspectives and scientific options. Some in the field see an immediate need to reach consensus on terminology, conceptual frameworks, and methodologies (Glenn et al., 2016, reprinted here as Chap. 2). It can be argued, however, that given the limited data and research thus far available to contemporary culturo-behavior science, it is important to explore multiple possibilities (Mattaini, 2019). As with other sciences (think, for example, about physics), the most important conceptual and practical advances are likely to emerge from broad exploration and extensive data collection. This was the case in the development of operant theory (e.g., Ferster & Skinner, 1957; Skinner, 1938); ultimately only data can be trusted to guide us. Our challenge in going to scale is that the ecological nature of social, cultural, and systems research is innately and deeply complex, and therefore so are and so will be the data we pursue. Systems theories are one route that many sciences have relied on to explore such complexity, and are discussed in some detail below. First, however, some attention to cultural-level terminology is required.

Terminology and Methods

Behavior analytic discussions of community and cultural variables and processes generally begin with the terms “cultural practices” and “culture” as elaborated by B. F. Skinner (Mattaini, 1996; Skinner, 1953). In recent years terms like *culturant* and *metacontingency* have been incorporated into this work (see Chap. 2 of this volume). As noted, the science of operants emerged inductively from data discovered in laboratory experiments (e.g., Ferster & Skinner, 1957). Cultural-level science is beginning with many fewer data, however. There is not yet agreement even on what data to collect, or how to collect it. This situation is very challenging, but also makes developing this new area of study quite exciting.

Skinner generally discussed culture as a network of contingencies that persists over time within a specific, dynamically changing group. Note that, for behavior scientists, the *people* are not the culture; the *contingencies* are. While not always entirely clear in his discussions of cultural processes, if read carefully, Skinner was largely consistent about this definition. Over time behavior scientists have in some cases instead focused on groups of people who relate in some way. In a seminal paper in 1988, Sigrid Glenn suggested the value of studying “cultural entities.” An *entity* is defined by Oxford Living Dictionaries (Entity, 2018) as “a thing with

distinct and independent existence.” Cultural entities, however, are best viewed as networks of contingencies supporting or modifying cultural practices, rather than aggregates of people.

Most of Skinner’s writing about culture (e.g., Skinner, 1953, 1981, 1984; also his responses in Catania & Harnad, 1988) emphasized *cultural practices*—operants that are shaped and maintained within groups. The concept of cultural practices is enormously valuable for community and other large system work, including societal and global efforts related to social issues and goals. In addition, a focus on practices is relatively easy for community and collaborating partners to integrate into their efforts. As an example, Anthony Biglan (1995) wrote an extremely valuable book, *Changing Cultural Practices*, analyzing a number of societal challenges and practices that could be embedded in communities to support human satisfaction, safety, and sustainability (for example, related to child rearing, sexist behavior, and global warming)—work that he has expanded in his more recent *The Nurture Effect* (Biglan, 2015) and in multiple other publications.

Although use of the term *cultural practices* seems relatively straightforward, the term *culture* can be more challenging. It is important to be aware of and respect the ways the term is used in larger scientific, professional, and popular literatures, while being specific about our own usage in behavior science. Anthropologists have not settled on a single definition; those they use include “the ideas, customs and social behavior of a particular people or society,” “the attitudes and behavior characteristic of a particular social group,” and “the arts and other manifestations of human intellectual achievement regarded collectively” (Culture, 2018). Some have recommended that behavior science avoid the use of the term altogether, given possible confusions, for example, related to cultural diversity efforts supporting social justice for particular racial, ethnic, sexual minority, and other groups, or concerns about cultural appropriation (the adoption of practices of one culture by members of another, particularly when members of a dominant group appropriate practices from disadvantaged minority groups).

As behavior scientists extend their work into a broad range of settings, culture has been understood as potentially including referents as broad as an ethnic culture defined in anthropological terms, as persistent as the operating dynamics within the IBM corporation, or as ephemeral as a group of three persons together in an experimental lab for only 1 h (a “micro-culture”). More specificity is likely to emerge as data are collected in our research.

Skinner discussed cultural selection as a process in which “new cultural practices, however they arise, contribute to the survival of the group and are perpetuated because they do so” (Skinner, 1984, p. 221). He had earlier noted: “there is still a third kind of selection which applies to cultural practices ... the resulting behavior may affect the success of the group in competition with other groups or with the nonsocial environment” (Skinner, 1953, p. 430; see also Diamond (2011) and Harris (2001) for similar analyses). Nonetheless, Skinner (1953) was skeptical about “the proposition that there are social units, forces, and laws which require scientific methods of a fundamentally different sort” from operant analysis (p. 312),

indicating rather that the selection of cultural practices, and the internal shaping of culture, are at root operant processes involving contingencies of social reinforcement:

A culture may be defined as the contingencies of social reinforcement maintained by a group. As such it evolves in its own way, as new cultural practices, however they arise, contribute to the survival of the group and are perpetuated because they do so. The evolution of cultures is of no further relevance here because no new behavioral processes are involved. (Skinner, 1984, p. 221).

These questions are explored in more depth in the next section, as contemporary behavior scientists are not in complete agreement here. What is clear, however, is that cultural systems analysis (CSA) can provide tools that can help sustain a focus on the dynamics within and between groups, and “the contingencies of social reinforcement” maintained by those dynamics. One example is introduced in Box 3.1; readers are encouraged to explore the project discussed, both for what can be learned from its systemic analyses, and as a model for engaging natural communities in shaping and sustaining truly meaningful system change.

Box 3.1 Neighborhood-Wide Systemic Interventions (Swenson, Henggeler, Taylor, & Addison, 2005)

Swenson and colleagues provide an accessible example of a multidisciplinary community-level intervention that integrated evidence-based behavior science (including contingency management) into work with multiple systems within a single urban neighborhood, including a voluntary neighborhood organization, families and extended families, schools, a network of prevention activities, local health resources, and law enforcement, in a vulnerable neighborhood in North Charleston, South Carolina. This book gives a sense of the balance and beauty that well implemented science can offer to urban life. In 1993, this neighborhood was identified as among the highest crime areas in the state, and therefore was named as an Enterprise Community, requiring intensive policing. As problems continued, beginning in 1999, possible behavioral systems intervention was explored and initiated as the Neighborhood Solutions Project. The neighborhood association decided, in partnership with the researchers, that high-risk young people of school age were the primary local concern, and the project was organized around this group. Among specific community changes, both young people in the school and criminal behavior groups, and a comparison group of healthy youth reported large drops in experiencing and involvement in drug sales, violence, and weapons use. Crime statistics dropped to the extent that the community was no longer classified as high risk. School success among the clinical sample was almost universally achieved, and a high level of prosocial neighborhood activity was shaped and sustained. The underlying service model was explicitly systemic, grounded in the principle that “interventions target sequences of behavior

within and between multiple systems that maintain the identified problems” (Swenson et al., 2005, p. 44), and the community was conceptualized as the central client although intervention occurred at individual, family, small group, and full neighborhood levels, deeply engaged with ecological realities of poverty, racism, marginal schools and difficult police–community relations. The problems of young people were viewed as emerging from links, both positive and negative, among family, peer, school, health, legal, and broader systems—multiple contingencies that were graphically and tabularly traced. Both individual and common contingencies could then be targeted for change, and tested—and these are areas in which behavior analysts can make unique contributions. This exceptional project calls out for replication.

A Third Level of Selection?

Skinner’s “Selection by Consequences” (Skinner, 1981) described three levels of selection, biological (natural), behavioral (operant), and cultural. Behavioral selection was seen as emergent from natural selection, while producing new phenomena that could not be explained by natural selection alone—a widely accepted view, and one supported by and emerging from extensive data. Given that background, Skinner’s paper, and related behavior science research, behavioral investigators expected that new phenomena would similarly emerge at a higher cultural level, phenomena that could not be explained by behavioral (operant) selection. A large body of supporting data has not yet been collected at the cultural level however, and it is not yet clear what may emerge from such data. It is also unclear whether genuine emergence of conditions and events that cannot be explained at the operant level has yet been observed. It may be possible, for example, that events that have been described in terms of *metacontingencies* may be more simply explained through careful analysis of multiple contingency interlocks at the operant level (Krispin, 2016, 2019; Zilio, 2019).¹

Whether or not the metacontingency model involves a new level of emergence, it has proven useful within organizational behavior management (Houmanfar, Alavosius, Morford, Herbst, & Reimer, 2015; Houmanfar, Rodrigues, & Ward, 2010), and offers working tools that can contribute to larger analytic strategies (Krispin, 2016). Laboratory experiments should help clarify these questions going forward; ecologically grounded cultural research and experimental intervention in situ will clearly be crucial in this process, producing data that can guide conceptualization in the way that data have defined and refined the operant model.

Perhaps the best existing analysis of cultural processes capturing Skinner’s third level has been that of Couto and Sandaker (2016; see also commentary on this work in Krispin, 2017). Both selection of cultures (some surviving and doing well, others

not) and the selection of practices within cultures appear in Skinner's work. Couto and Sandaker offer a clear and convincing argument for making distinctions between, while allowing for the reciprocal influence of, these models. The first, they label the "selection of cultures" (cultural-social environments—essentially selection *among* cultures); think here survival-driven changes in the cultural practices of an indigenous group when they first experience contact with contemporary (over?) developed societies. The second model outlines "cultural selection," in which practices *within* a culture are shaped and maintained. Think here about the impact of the #MeToo movement in the United States, which resulted in changes in the behavior of both women and (to some extent) men, but was not primarily the result of contact with other societies, climate change, or other external variables.

Analysis within Couto and Sandaker's (2016) cultural-selection model relies on patterns of interlocking and recursive operant contingencies within cultures. Because these processes are complex and dynamic, analysis in fact requires systemic science as discussed later in this paper, but may well not produce evidence of emergence beyond what complex contingency analysis can explain. Clarification of the processes involved in Couto and Sandaker's selection of cultures has yet to be fully developed; it may in fact discover emergence of new phenomena and principles, or may not. It is of course important in science to remain open to revising current thinking, rather than to defend existing understandings regardless of new data.

Important limitations to the framework of selection by consequences have parallels at the biological, behavioral, and collective levels (Killeen, 2019; Killeen & Jacobs, 2017; Mattaini, 2019). Biological features selected are not necessarily optimal for survival; they are often simply good enough. Many biological changes in fact are the results of largely random variations (from which better options may, but need not, emerge). Operant behaviors that persist may be maintained by surrounding antecedents and consequences but likewise are not necessarily optimal, often in fact far from it (think here about smoking or other addictive behaviors).

Similarly, at the cultural level, many practices (memes, musical forms) have no particular survival value for the culture, and in fact detrimental practices (within-group aggression or sexual assault, for example) may accelerate in ways that are culturally detrimental, as in the case of white supremacy in the United States. In addition, some biological, behavioral, and cultural changes are not the result of selection as we typically understand it at all—much of behavior appears to be largely responsive to contextual factors, motivational states, errors in attention, and signaling processes, rather than simple reinforcement (Baum, 2012; Killeen, 2019). Cultural analytic scientists carry heavy ethical responsibilities to elaborate, encourage, and support both personally and culturally beneficial practices, but doing so requires achieving clarity under ecologically complex conditions. Inadequate analysis may, for example, suggest apparently simple interventions upon which key actors and communities may come to rely, while allowing the real issues to escalate, simultaneously increasing dependency on the intervenor (the "shifting the burden" systems archetype (Braun, 2002), one form of "critical disturbance" that may

produce unpredictable instability (Mobus & Kalton, 2015, p. 242)). This is one reason why analyses of ecological complexity are crucial to cultural systems analysis.

Ecological Complexity

Although there is a place for laboratory investigations, nearly all cultural analytic research and intervention will involve work within complex human, organizational, and interdisciplinary arrangements. Complexity studies have both advanced and challenged all contemporary sciences. Beckage, Kauffman, Gross, Zia, and Koliba (2013) noted hopefully that the scientific limits imposed by inherent complexities result in “a loss of predictability as one moves from physical to biological to human social systems, but also creates a rich and enchanting range of dynamics” (p. 79)—a range that can be truly energizing for behavior science. As in the example in Box 3.1, think about the complex realities within which a behavior scientist is immersed in work to assist a marginalized population, homeless young people struggling with interlocking issues of substance abuse, crime, poverty, racial and sexual minority biases, intergenerational trauma, and public health challenges largely emerging from surrounding external systems (financial, educational, and housing disadvantage) at local, state, and national levels (Rylko-Bauer & Farmer, 2016; Wilson, 2016). If that behaviorist is specifically attempting to be of assistance to homeless young people who have aged out of the foster care system, the interdisciplinary complexity and limitations of service systems are highly relevant (Holtschneider, 2015). Given these realities, behavior scientists have much to learn from scholars and professionals in public health, urban planning, prevention science, social work, and human ecology. Skills of interdisciplinary work are crucial; most of the examples throughout this book are consistent with this requirement.

One of the key challenges arising in such work is determining what variables to track, and how to analyze them in their complexity. In 1974, Edwin P. Willems indicated in the *Journal of Applied Behavior Analysis*, that due to the “system-like interdependencies among environment, organism and behavior” there is an “immediate and pervasive need for an expansion of perspective” (p. 8) in applied settings—a need that cultural science is beginning (finally) to take seriously. As noted in Mattaini (2019):

The science required to have a meaningful impact on major social issues will largely be, for behavior analysis, “a new kind of science” (apologies to Wolfram) constructed within the ecological fields where the issues about which we are concerned are embedded. (p. 718).

There is a large and growing set of methodological approaches to organizational and community-based research on which culturo-behavior scientists can draw in deciding on which variables to focus, which data to collect on those variables, and how to analyze those data (Jason & Glenwick, 2016) in ecological CSA, as illustrated in Box 3.2.

Box 3.2 Beyond the Metacontingency

Formal organizations are necessarily systemic in nature, and much of the literature on CSA originated in business, service, and educational settings. *Metacontingency* analysis, which is discussed in depth in several chapters of this volume, offers a useful framework for examining organizational functioning, exploring possible improvements, and identifying challenges requiring change. The *elaborated metacontingency* (Houmanfar et al., 2010) is depicted in Fig. 3.1. Key features of the figure are (a) the boundary clarifying the processes that constitute the organization itself; (b) maintenance of those processes across generations of persons and subsystems within the organization; (c) the outputs (e.g., products, trained graduates); (d) the receiving systems (e.g., customers, employers); (e) the feedback loop from receiving systems back to the organization, and, crucially, (f) an analytic process within the organization (but perhaps with outside participation) to determine changes in the rules shaping behavior within the organization.

There is recognition in the elaborated model of the place of “context” in the figure, and this is an area that is increasingly being explored (e.g., Baker et al., 2015). Consistent with the recognition in this chapter of the real complexities in ecological realities, however, there is even more complexity involved in understanding organizational realities. Two important dimensions are the inevitable development of self-organization (Mobus & Kalton, 2015) and events in the broader contextual environment. Many self-organizing systems are autopoietic, meaning to at least some extent they self-generate—create something new—in addition to self-organizing. This is true of many community systems and essentially all cultural systems; neighborhood associations often emerge—“create themselves”—through the interaction of interested residents, but also can be supported by contact with contextual events.² Autopoietic processes may occur in one department (see the heavy black circle in Fig. 3.2). Imagine for example that the social work department in a hospital becomes deeply dissatisfied with their working conditions due to experiences of disrespect and sexual harassment from physicians. That dissatisfaction may lead to independent organizing, affecting both services and record-keeping, and therefore overall hospital income. Autopoietic processes can often produce innovation, and in some fields are therefore highly valued.

In addition to autopoietic processes, events in the broader environment can also have profound impact on the productivity and even survival of organizations in ways that are not obvious in the standard metacontingency diagram (and therefore often in metacontingency analyses). In Fig. 3.3, the larger circle in the center is the organization of primary interest (the hospital), and the three smaller gray circles are receiving systems (e.g., families, care settings). Some members of the social work staff are members of a union (the solid black circle), an outside, but partially overlapping system. Exchanges between hospital social workers and the union may lead to walkouts, strikes, or efforts to achieve protective legislation (through other outside government

systems)—or to additional opportunities for the hospital to offer recognition to the social work department. Efforts by administration to improve productivity and quality optimally require attention to both autopoietic processes and shared membership by staff in the organization and outside systems. And realities in fact can be much more contextually extensive, taking into account government and legal systems, competitors, suppliers, and others.

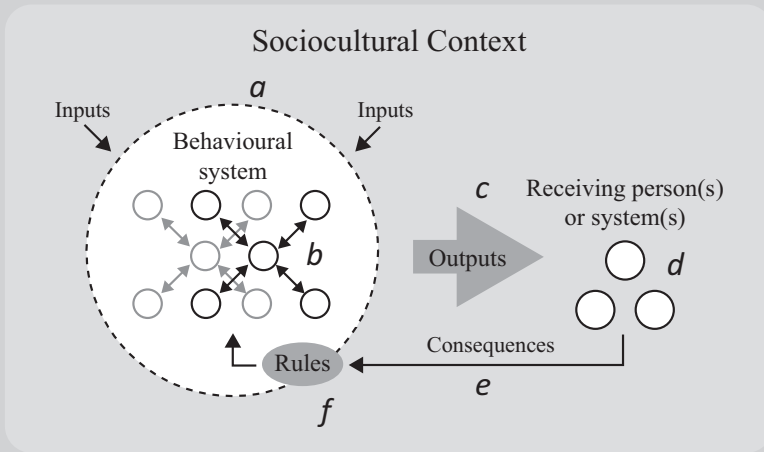


Fig. 3.1 The elaborated metacontingency. © Mark A. Mattaini (2013). (Adapted with permission)

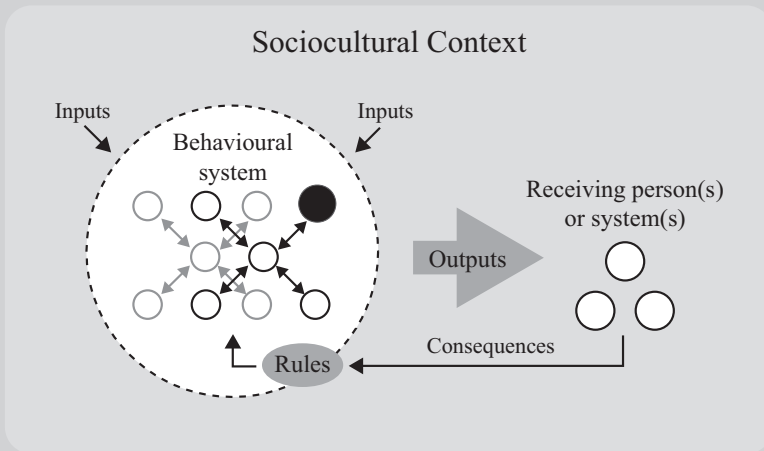
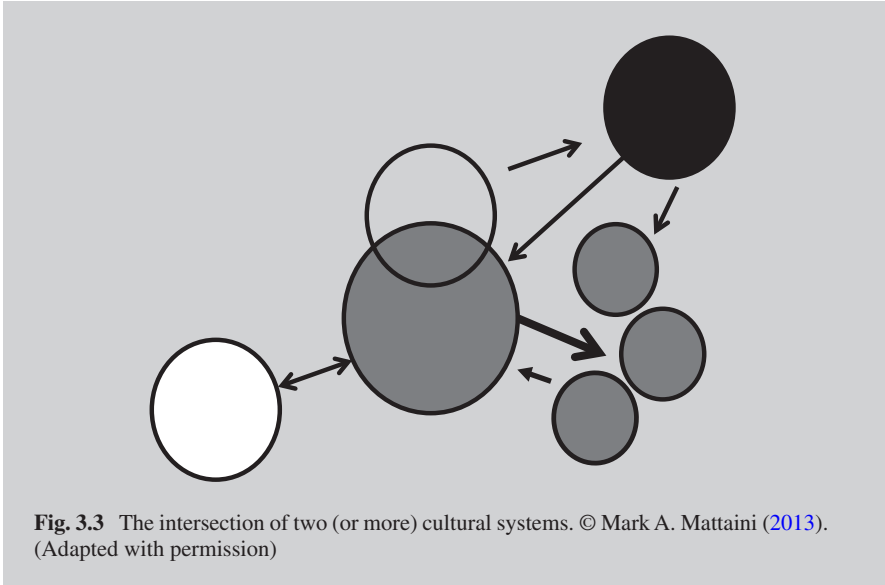


Fig. 3.2 Self-organization (Autopoiesis). © Mark A. Mattaini (2013). (Adapted with permission)

(continued)



Scientific Systems Theories for Capturing and Influencing Complex Realities

Important scientific theorists in the early and middle twentieth century contributed to the development and integration of systemic analyses in most sciences and many professions. Ludwig von Bertalanffy developed *general system theory* (now generally called *general systems theory*) beginning in the 1920s, with a breathtakingly ambitious goal: the “unity of science” (von Bertalanffy, 1968, p. 86). Other early leaders in the development of systems orientations included Talcott Parsons and Smelser (1956), Odum and Odum (1953), and Bogdanov (1980). Von Bertalanffy’s (1968) expectation has largely proven true: systems analyses have become crucial in developing common understanding among most contemporary basic and applied sciences, including all of the STEM disciplines, biology, ecology, environmental studies, chemistry, sociology, economics, mechanics, and military and weapons sciences. Systems theories (including ecosystems theory, Mattaini & Huffman-Gottschling, 2012) have for several decades been central to the practice of major human service professions, including social work and public health.

Consistent with Beckage et al.’s (2013) quote above, the content of systems theories, and their related analyses, differ in important ways among physical systems, biological systems, and human social systems. In this book the authors refer primarily to Beckage et al.’s (and Skinner’s) “social systems,”—cultural systems here—but the others also have their place in cultural and community work. Physical systems analyses generally emphasize positive and negative feedback loops (as in a home heating system, where control of the system relies on feedback from a thermostat). Such loops also occur, for example, in business organizations, where the outputs of

individual departments often reciprocally affect others. Interlocks among individuals and systems are characteristic of all systemic arrangements; in cultural systems interlocking exchanges are the primary constituents. Current work in human ecology (Dyball & Newell, 2015), “unified ecology” (Allen & Hoekstra, 2015), and general ecology (Hörl & Burton, 2017) heavily emphasizes such interlocks, and cultural systems analysis is emerging as a subdiscipline of ecology (Mattaini, 2019).

Concepts and language used in systems analysis can initially seem abstract. They are genuinely valuable however, because they provide crucial tools for understanding and making change at cultural and community levels. Advocating for and supporting social justice, human rights, and collective sustainability requires analyses that are as complex as the social and cultural realities that structure contemporary challenges. There is considerable variation (and sometimes conflict) in choice and definition of systems terms across disciplines and as disciplines evolve. Table 3.1

Table 3.1 Cultural systems concepts

| Systems concept | Use in CSA |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Systems levels: systems, subsystems, and suprasystems | Systems are almost universally nested; a system (e.g., a college department) may be a subsystem of another (e.g., a university), and a suprasystem of another (e.g., a class). The same system may at times be all three, depending on which level one focuses. |
| Transactional interconnectedness and reciprocity | Behavioral systems are defined and constituted by the interlocking and often reciprocal interactions among the elements/members of the system (contingencies), and not by the elements/members viewed as individuals. |
| Boundaries | Systems boundaries are determined by density of interactions: which elements/members are, and which are not, included within those boundaries (family systems, for example, may include members that are not legally or biologically linked). Membership may change as interactions do. |
| Coupling | To survive, living systems must import resources, and eliminate waste, so boundaries must be to some extent permeable, allowing individual exchanges or extended coupling with the external context, primarily other systems. Coupling may range from very tight (e.g., a company transacting with a single supplier of essential parts) to quite loose (e.g., the connections of a network of homeless young people to service agencies). |
| Balance: steady state, homeostasis | Cultural systems need to maintain some level of balance. The term “steady state” is often used to describe a system that maintains a healthy balance that is flexible enough to adapt successfully to internal and external changes. The term “homeostasis” is used in variable ways, sometimes as a healthy balance, other times as overly rigid stability. |
| Differentiation and specialization | As systems grow larger, members typically differentiate and specialize functionally, which in turn may lead to further growth, as well as the emergence of entirely new internal patterns (self-organization). |
| Autopoiesis (self-generation and self-organization) | “A type of emergence that involves the apparently spontaneous development of structure in complex systems in response not so much to external conflicts or the struggle for survival but to the internal logic of the interacting systems” (Hudson, 2000, p. 554). |

lists several widely used terms from ecologically grounded systems theories with particular relevance to cultural systems analysis.

In most cases, systems of interest are nested within higher level systems (suprasystems), and include subsystems. This is particularly important in cultural and community research and intervention, because events happening at higher or lower levels can have significant impact on the system of primary interest. In business and service organizations, for example, issues in one critical component or levels of resources flowing from an environmental suprasystem can sabotage organizational goals, or contribute to achievement in surprising ways. Assessment at multiple levels is therefore often critical in completing an analysis.

One of the most difficult but most important systems principles is that systems are not defined as aggregations of individual members, but rather as temporally extended patterns of dynamic interactive events or transactions occurring within and between members (note the similarity to networks of behavioral contingencies). For example, a coalition of advocacy groups exists only as and in the patterns of events that occur among member organizations—and between those organizations, those they are advocating for (e.g., homeless youth), and those toward whom the advocacy may be directed (e.g., foundations, government funding agencies). Similarly, a nonviolent protest movement or an environmental advocacy group exists only in the coordinated actions being taken (see examples below). Iterative feedback loops—both positive (also known as *amplifying* feedback loops) and negative (also known as *balancing* feedback loops) are central to most systems models (Hudson, 2000; Krispin, 2017; Mobus & Kalton, 2015).

All systems have boundaries that can be identified by the density of interactions among members within the system. The boundary of a particular school class includes those who are typically present and interacting, and is generally relatively stable over the course of a school term. Members of a community of queer street youth may be more fluid—the boundary of that community is more permeable, and yet still can typically be determined (at least by those who are members of that community). Similarly, the membership of a legislative body or a police department is generally stable, with a less permeable boundary than is true for a police violence protest coalition, or a green economy lobbying group.

Understanding these groups as dynamic (or sometimes “dynamical,” if changes over time can be precisely traced and analyzed mathematically) and clarifying their boundaries is important in analysis. Systems generally couple with others; research institutes, for example may couple relatively intensively but loosely over time with multiple funding sources. Analysis of such coupling contributes to determining possibilities for and limits of possible interventions. Similarly, analysis of the extent to which a system exists as a stable state can be important as options for change are explored; a flexible system in healthy steady state may be much more responsive and open to new possibilities than one operating in a more rigid homeostasis. Subsystems (say, a behavior analysis department in a university) may develop their own patterns, activities, and events (autopoiesis) without attending to guidance from university-level administrators. This may be advantageous or problematic for the discipline and department, and independently advantageous or problematic for the university.

Effective systems work is by its nature very complex. Yet, as suggested by Wolfram (2002), a strong argument can be made that complexity emerges (in the technical sense) from patterns of very simple elements. Behavior science provides a great deal of knowledge about those simple elements (antecedents, behavior, consequences, stimulus equivalence patterns, schedules of reinforcement, and others). CSA is the process of studying how those simple elements produce the complex patterns of which sustainable, just, and satisfying communities and cultures are constituted. For examples of work in other disciplines consistent, and potentially in partnership with behavior science, refer to Kohl, Crampin, Quinn, and Noble (2010, systems biology); Grossmann and Haase (2016, neighborhood change, urban planning, and sustainability); Moroni (2015, self-organizing cities); Folke, Biggs, Norström, Reyers, and Rockström (2016, social-ecological resilience and biosphere-based sustainability science) (Box 3.3).

Box 3.3 Supporting alternatives to “gang” participation?

A recent dissertation completed with young men (generally from 18 to 30) actively involved in street violence on the South Side of Chicago (Aspholm, 2020; Aspholm & Mattaini, 2017) offers valuable examples of participatory CSA. Through intensive interviewing guided by both ethnographic and behavioral analytic designs, the study found that the participants almost universally had histories of poverty, racial denigration, economic exclusion, and physical insecurity, both within their families and in their communities. Figure 3.4 indicates the general quality of the contingent and motivative

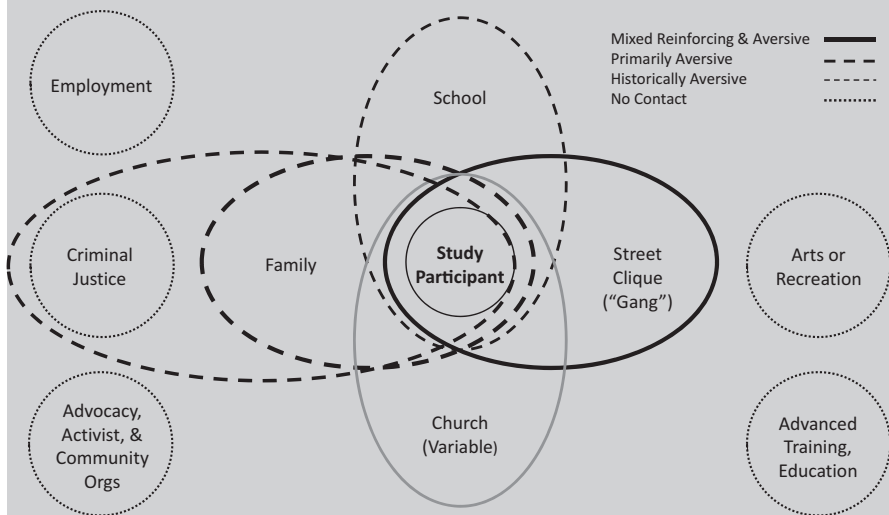


Fig. 3.4 Systems with which young men are or are not commonly connected

connections of study participants with systems they currently or previously were included in, as well as community systems with which they typically were not connected.

Just this simple diagram gives some sense of the ecological conditions within which the research participants (some of whom also participated in the analysis) were embedded; conditions from which some had the available repertoires to leave behind, but many did not, resulting in further involvement with the criminal justice system, poverty, injury, and sometimes death. At the same time, the diagram suggests that there are untapped resources that might be engaged, and perhaps that exchanges between and among a young man and his ecological surroundings, which after all consists of behavior, contingencies, and motivative variables, might be modified. In other work, we and others have discussed evidence for the potential to engage young people in vulnerable communities (including those involved in gang activities) in activism that concurrently could contribute to community improvement, build reinforcing exchanges with supportive community systems, and shape prosocial active participation while reducing personally and socially damaging behavior (Aspholm & Mattaini, 2017; Biglan, 1995; Mattaini, 2013; Roose & Mattaini, 2020). We have also outlined (see Table 3.2) practices that could be increased or reduced among existing, concerned, or potentially supportive community systems to encourage prosocial activism for young people and other community members. Importantly, if multiple sectors within these systems participated in a unified campaign to support youth activism (which is known to be potentially both powerful at a community level and beneficial to participants, Stephan & Thompson, 2018), the potential for synergism is high. News media, for example, could discuss the efforts of law enforcement to partner with youth for change; foundations could support the work of churches to connect youth with existing activist groups—many collaborative efforts at a community level are possible. Refer also to Chap. 13 that traces additional “constructive program elements” that may be critical to supporting healthy communities. The approach outlined here begins to take full advantage of the power of CSA; similar analyses could be developed to support human rights and sustainability campaigns.

Modeling Cultural Systems

This final section outlines approaches for (a) exploring, (b) modeling, and (c) comparing interlocking contingencies present in interconnected behavioral systems. The first example is one that is common in advocacy situations, in which either laws and regulations providing protection and funding are desired, or courts are petitioned to provide protection to a vulnerable class or environmental condition.

Table 3.2 Sample practices, in key community sectors, that support or oppose youth activism

| Sector | Practices supporting activism | Practices opposing activism | Incentives, disincentives, and facilitating conditions |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| News media | Locate and provide coverage of positive youth actions and activism; portray youth as powerful community resources | Portray youth primarily as “predators” or as incompetent and lacking good judgment (adulthood) | Community response to news stories; advertising dollars; access to positive stories |
| Schools | Staff act as mentors, models, and allies in youth activism within and outside school; youth voice respected; issues of social justice and history of nonviolent action integrated into curriculum | Suppress youth voice related to curriculum, policies, issues, and solutions | Encouragement from school administration and parents; partnerships with activist organizations |
| Local Government | Shape, support, and respond to actions taken by youth councils; include youth in planning of youth programming and community development efforts | Create youth programming that views youth as a problem to be managed and controlled | Voter responses, legal limitations, and incentives related to access to and use of funds |
| Entertainment media | Portray youth as courageous contributors to community life and justice; offer alternative social narratives emphasizing social justice (i.e., create new equivalences and rules) | Portray youth in dangerous, incompetent, or violent roles; emphasize models of self-indulgent overconsumption and violence in programming | Viewer response; advertising dollars; regulation of portrayal of violence; community encouragement of portraying and advocating for sustainable lifestyles |
| Churches | Offer youth opportunities to explore moral and spiritual implications of and potential responses to social issues; provide opportunities to partner with adult activists and allies | Focus exclusively on interior spiritual life without significant attention to social injustices | Guidance of church hierarchies and elders; response of church members |

(continued)

Table 3.2 (continued)

| Sector | Practices supporting activism | Practices opposing activism | Incentives, disincentives, and facilitating conditions |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Local business | Partner with and provide resources for youth-led projects; partner in economic development projects involving youth | Treat youth as neighborhood threat to be managed primarily through exclusion, security monitoring, and law enforcement | Media attention; actions of respected models within business community |
| Civic organizations | Support youth-led grants programs for community improvement and justice | Focus primarily on working with law enforcement to exercise social control | Media attention; awareness of models in other communities |
| Nongovernmental organizations (NGOs) | Facilitate connections among youth-led organizing efforts locally and globally; offer training in strategic options including nonviolent resistance and peacemaking | Establish youth programs that treat youth primarily as service recipients, problems to be contained, or clients to be treated | Available funding; examples of other NGOs; partnerships with activist organizations |
| Police | Reach out to youth to develop common projects, circles of understanding, and visible contributions to communities | Contact youth primarily for surveillance and enforcement; practice unjustified “stop-question-and-frisk” | Policies established and monitored; supervisory practices; respected models within and outside departments; governmental and activist organization monitoring |
| Universities | Offer access to courses, activities, and faculty engaged in community activism; expand emphasis on active engagement with social justice and rights issues in the curriculum; encourage community engagement among students and staff | Maintain academic distance from local and global community activism; discourage active involvement in social issues in favor of primary emphasis on finding a place within corporate capitalism | Faculty activism and leadership privileging attention to social justice and human rights issues; funding sources; courageous and visionary administration |

(continued)

Table 3.2 (continued)

| Sector | Practices supporting activism | Practices opposing activism | Incentives, disincentives, and facilitating conditions |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Arts community | Actively reach out to youth and serve as mentors and allies in arts projects directly or indirectly related to social justice and human rights issues (including murals, photovoice, music, theater, dance) | Maintain distance from youth; regard youth as “difficult to work with” or unprepared to make genuine artistic contributions | Availability of funding; inspirational artist models; support from arts venues (galleries, theaters, local business communities) and local government |
| Political parties | Engage youth in political campaigns emphasizing social justice rather than “broken” status quo political agendas; offer youth genuine voice in platform decisions | Exclude youth from active participation except to support maintenance of status quo | Demands of party members; respected models of activism within parties; availability of alternative political parties with primary emphasis on social justice and sustainability |

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Examples may include, for example, individual people or families at risk (refugees or sex workers), other species (gray wolves or redwoods), or natural environments and conditions (public lands or carbon emissions). Advocacy patterns across all of these situations are often similar, and in fact advocates for one can often learn both strategic options and tactics from groups concerned about different issues. In such cases, it is crucial to identify what single action (e.g., passage of a law) or ongoing practice (repeatedly committing funding or approving environmental protection laws) is the central target of the campaign. Cultural systems modeling can integrate multiple strategic actions among multiple concerned systems. Figure 3.5 provides a relatively simple initial model, with the goal of passing laws protecting wildlife and public lands (two closely related goals). I draw here from my own extended experience with two existing organizations that will not be named here. Both have strong histories of success, and extensive data to demonstrate it.

In the case of a wildlife conservation bill in the US Senate, of course many organizations will often work to achieve the desired vote; a full systems diagram could show many of them and their interactions. Simplified models like that shown in Fig. 3.5 can provide a useful beginning for analysis. Note that the two organizations approach the overall cause in two overlapping but distinct ways. The wildlife advocacy organization operates primarily at a distance from their contributors, soliciting funds and signatures on petitions which are then used to lobby the senator. (This organization also uses many of their resources for court challenges.) The



Fig. 3.5 Two organizational approaches to lobbying for a senate vote

sportsmen’s organization on the right is much more interactive with members, with local chapters in nearly every US state and every province north of the Canadian border, an annual Rendezvous drawing several thousand members, regular pint-nights with integral chapter meetings in local sites, a very well-designed quarterly magazine emphasizing local successes and issues, and frequently and creatively develops new ways to construct a community of commitment around conservation, public lands and waters, and related issues. They arrange for local chapters to meet with local, state, and federal legislatures regularly, and solicit funds through a broad range of reinforcing campaigns. Members and staff have extensive mutual contact, often in person. Note one difference in comparing the diagrams of the two organizations: many of the reinforcers for staff in the sportsmen’s organization involve direct contacts with members, and many of the reinforcers for members in that group come from mutual face-to-face contacts (see the reciprocal arrows at the very bottom right of the diagram). In systems terms, the staff and leadership subsystems are much more tightly coupled with the members, and members are more organized into additional local subsystems.

A second promising approach to complex systems analysis draws on a process that has been called Systems Dynamics Exploratory Modeling and Analysis (SDEMA) developed by Kwakkel and Pruyt (2015). They indicate that it can be used:

in order to address grand societal challenges, which are almost without exception characterized by dynamic complexity and deep uncertainty. Addressing such issues requires the systematic exploration of different hypotheses related to model formulation and model parametrization and their effect on the kinds of behavioral dynamics that can occur. ... exploratory system dynamics modeling represents a promising approach for addressing deeply uncertain dynamically complex societal challenges. (p. 372).

Such models can be constructed in diagrams of contingencies like Fig. 3.5, which can be prepared to include multiple interlocking systems, initially selected for their apparent relevance to the issue of concern. Wolfram (2002) notes that “Any model is ultimately an idealization in which only certain aspects of a system are captured, and others are ignored” (p. 364). He also notes that “the best first step in analyzing a model is not to look at numbers or other details, but rather just to use one’s eyes, and to compare overall pictures of a system with pictures from the model” and “it is usually a good sign ... if a model is simple, yet still manages to reproduce, even quite roughly, a large number of features of a particular system” (p. 365).

When there is disagreement about how to model complexity, the SDEMA approach is to develop more than one model, and depending on how the predictions of each play out, to select the best, or to integrate the better parts of more than one. One caution: while, as Wolfram (2002) emphasizes, great complexity can result from patterns of simple elements, it is questionable whether very brief, excessively simple laboratory experiments are adequate for producing outcomes that generalize to ongoing, complex settings in which behavior and contingencies are as deeply contextual as those we are examining here (again, see Willems, 1974). Much of our work therefore needs to be done in real-world settings, or close approximations.

Behavioral Contingencies Within Cultural Systems

Looking at the models developed in this chapter, it is clear that cultural and behavioral systems are largely constituted of complex and sometimes competing sets of behavioral contingencies, motivative operations, along with relational responding, rule governance, and all of the other dimensions of behavior science—and that producing systemic changes relies on shifting those elements. Everything learned in behavior analysis education and practice therefore remains central even as behavior science moves to the cultural level. Reinforcers and aversive conditions affect the behavior of individuals; contingencies experienced in common within a group or culture can shape practices collectively. Rule governance, communication, and mutuality are present in all organizations, and although often more loosely organized, in community settings as well. The reinforcers and motivative operations in Fig. 3.5 are actually relatively complex. Why, for example, do the dollars and

petitions sent by members in the left-hand organization serve as reinforcers for staff? In part, no doubt, because accumulated dollars and petitions are factors in personnel evaluations, but probably also because of the place of those items in equivalence relations involving values to which staff individually and collectively have committed. Similarly, why are shared group experiences in the sportsmen's organization reciprocally reinforcing among the members? Probably in part because of a set of similar reinforcing experiences for each that are recalled within shared conversations occurring at gatherings, and because of the reinforcement members receive from each other when describing similar fishing, hunting, camping, and even survival experiences. The organization as well as individual members in those ways become relationally connected in meaningfully reinforcing ways.

All aspects of behavior science, ranging from relational responding to delay discounting, from complex schedules to emerging ecological alternatives to the matching law, are in fact potentially valuable, and often crucial, for behavioral and cultural systems analyses. The literatures in organizational behavior management and community practice can be particularly relevant in such analyses, and can often be mined for new lessons to inform work at cultural levels. One example is the literature on the use of collective leadership and circle processes, work that was originally developed in justice and community planning research, but has been reexamined within our literature on organizational and cultural systems for its potential for improving communication, decision-making, and accountability (Mattaini & Holtschneider, 2017).

The Work to Be Done

There are many serious societal challenges where there is disagreement about the nature of the problem, or the best ways to approach agreed upon issues. As interest and commitment to these issues is increasing in the behavior science and behavior analysis communities, organized programs of basic and exploratory community and cultural-level research conducted within transdisciplinary arrangements are becoming an urgent and promising priority. Applied research, particularly relying on the modeling techniques, to develop and test alternative options has the potential for developing promising interventions over relatively short timeframes.

One valuable educational technique to prepare students would be to select one or two serious challenges, and have small groups begin to model the issue, identifying the cultural and behavioral systems involved, how they interact, and at what points intervention might be most effective—grounding the analysis in existing literature and research. The models produced by multiple student groups can then be compared, contrasted, and possibly integrated, with the result either of one model on which most agree, or with a small number of models that could be evaluated over time based on ongoing and emerging data. In all of this work, a certain level of free creativity should be incorporated, along with a commitment at the end to follow the data. It is likely that such systems analyses will suggest policy level changes (within

organizations, or local, state, or national government levels). In this way, we can begin to “save the world” (see Dixon, Belisle, Rehfeldt, & Root, 2018 for more guidance in this direction; the final two chapters of this volume may also be helpful in constructing effective advocacy campaigns supporting such policy changes).

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Chapter 4

Complex Systems and Social Behavior: Bridging Social Networks and Behavior Analysis



Fabio Bento, Marco Tagliabue, and Ingunn Sandaker

Introduction: Complexity and Behavior Analysis—A Joint Scientific Enterprise?

Complexity is an interdisciplinary approach in science that draws from the recognition of networks of interactions from which new patterns of behavior may emerge. It would be beyond the scope of this chapter to fully describe how complexity is approached in various areas such as computer science, management, and evolutionary biology (e.g., see Mobus & Kalton, 2015). However, there is a common understanding of complex systems as sets of interactions among agents (Axelrod & Cohen, 2001). These interactions comprise the arrangement of contingencies of reinforcement and may be explored through a functional analysis of social phenomena. Hence, complexity science and behavior analysis (BA) are concerned with similar objects of analysis, although they are based on different premises. The purpose of this work is to explore the differences between BA and social network analysis (SNA) and suggest a space for communication between them.

The branch of complexity sciences that studies the structure of interactions in complex systems is called network science. In 2005, the researcher Albert-László Barabási observed an increasing interest in the science of networks. However, he also claimed that much needed to be done in order to develop an interdisciplinary approach toward complexity. As different attempts to bridge different areas of knowledge have brought promising contributions, the relation between network theory and complexity formulated by Barabási (2005) is still valid:

As it stands, network theory is not a proxy for theory of complexity—it only addresses the emergence and structural evolution of the skeleton of a complex system. The overall behavior of a complex system, which we ultimately need to understand and quantify, is as much

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rooted in its architecture as it is in the nature of the dynamical processes taking place on these networks. (p. 70)

Complex systems have an emergent character that is often difficult to predict. SNA focuses on emergent phenomena that belong to the past or that have already happened as compared to the time of observation (i.e., a posteriori). Conversely, experimental and applied BA rely on rigorous control and are concerned with the prediction of behavior (i.e., a priori), relying on established methods. The central argument developed throughout this chapter is that there is valuable space for communication between BA and SNA.

There are different attempts to bring a system perspective to BA. Behavioral systems analysis represents the subdiscipline of applied BA informed by systems theory and concerned with the maintenance and improvement of processes and interactions of a system (Brethower, 2004). For example, specific applications include emphasizing the role of selection in organizational change Sandaker (2009); the interaction and evolution among systems of genes, immunology, and behavior (Hull, Langman, & Glenn, 2001), and the analysis and maintenance of cultural phenomena (e.g., Glenn & Malott, 2004). The relational perspective that permeates complexity science and its applications to the study of systems of human organizations, such as organizations or societies, raises questions that are relevant for the analysis of behavior. For instance, one may investigate how behavior spreads in social groups or how the position of individuals in a certain network may explain behavior. Human behavior usually takes place in the context of dynamic processes of interactions that need be seen from a time perspective. This has been highlighted by Skinner (1953) in the following terms:

Behavior is a difficult matter, not because it is inaccessible, but because it is extremely complex. Since it is a process, rather than a thing, it cannot easily be held still for observation. It is changing, fluid and evanescent, and for this reason it makes great technical demands upon the ingenuity and energy of the scientist. But there is nothing essentially insoluble about the problems, which arise from this fact. (p. 15)

The *Ratio* of a Mutually Informed Framework

The main assumption that permeates the analysis herein put forward is that social structures *matter* when we aim at explaining behavior (Sandaker, Couto, & de Carvalho, 2019). Thus, behavior analysts may enrich their approaches by understanding the main developments in SNA. Conversely, recent work in network analysis highlights the importance of *social reinforcement* in the processes of how behavior and complex information spreads (Centola, 2018). According to SNA, social reinforcement is defined as “the situation in which an individual requires multiple prompts from neighbors before adopting an opinion or behavior” (Zheng, Lü, & Zhao, 2013, p. 2). From a behavioral standpoint, we define social reinforcement as an increase in the likelihood of future behavior as a function of the interaction with other individuals or groups. For example, we may observe the effects of

social reinforcement as the conversation between two agents develops: the verbal behavior emitted by one may be reinforcing for the other to continue conversing. However, social reinforcement need not necessarily correspond to verbal behavior. For example, in a classic study analyzing stress and relationships, Birchler, Weiss, and Vincent (1975) distinguished between positive social reinforcement (SR+) and negative social reinforcement (SR-). Positive social reinforcement includes verbal (e.g., agreement, approval) and nonverbal (e.g., assent, smile) behavior; similarly, negative social reinforcement also includes verbal (e.g., complain, interrupt) and nonverbal (e.g., no-response turn off) behavior. Nevertheless, their reinforcing (or punishing) effect is variable over time, environment, deprivation, and experience.

The social aspect highlighted here refers to behaviors taking place in the context of interactions. Hence, network analysis can in turn be informed by BA. Figure 4.1 summarizes the rationale of the chapter by illustrating the space for communication between the two disciplines.

Network theory and network analysis are used to study the interactions in complex systems to help understand, change, or disseminate cultural practices. We explore some of the frequently used concepts and give examples of how network analysis may add value to a behavioral perspective on cultural change and vice-versa. Moreover, we provide examples of how the growing body of scientific knowledge of networks may add value to understanding cultural systems. The discussion concerns bridging SNA and BA in explaining behavior change in social settings. More than promoting an integration between the two perspectives, we shed light on how SNA and BA may enhance their contributions by acknowledging and reinterpreting their respective central concepts. We illustrate how some characteristics of a

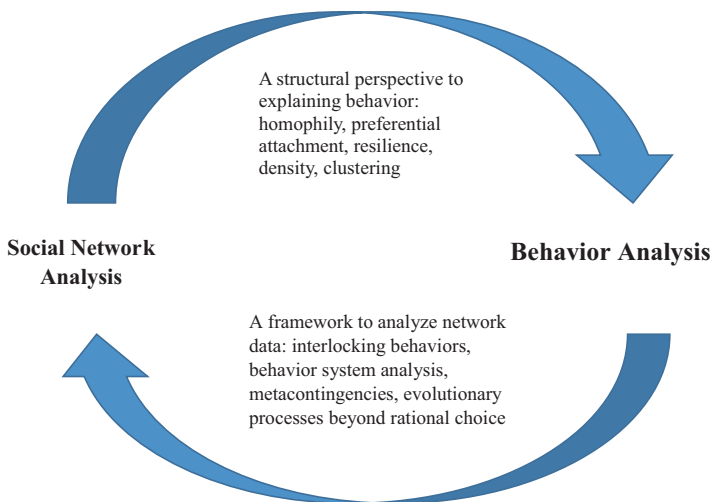


Fig. 4.1 A space for mutual communication between social network analysis and behavior analysis

network, elective homophily and preferential attachment, are susceptible to explanatory forces of BA.

In the first part of this chapter, we discuss the relational perspective in BA. In the second part, we start from some historical remarks on network analysis and describe possible conceptual frameworks commonly applied to analyze network data and possible limitations. Furthermore, we explore the distinction between Being and Becoming, and how these may be representative of instances of network theory and BA, respectively. Lastly, we turn our attention to the behavior analytic efforts to understanding systems and present real-life examples of social contagion.

A Relational Perspective in Behavior Analysis

In BA, the relation between individual behavior and the frequency, magnitude, and immediacy of reinforcement is at the core of understanding behavioral processes. When focusing on the interaction between two or more individuals, it seems appropriate to address this as interlocking behavioral contingencies (IBCs) of social behavior. Skinner (1953) defined social behavior as “the behavior of two or more people with respect to one another or in concert with respect to a common environment” (p. 297). This concept was adopted and further elaborated by Sigrid Glenn (2004) and others (Houmanfar & Rodrigues, 2006) and is a component of the conceptual tool (Todorov, 2006) called *metacontingency*, which plays an important role in the analysis of cultural phenomena. Thus, IBCs refer to the interdependent social contingencies between organisms (de Carvalho & Sandaker, 2016), and comprise the fundamental blocks of any cultural practice (Glenn, 1988). In logic terms, IBCs comprise a necessary but insufficient element of a metacontingency, which describes the functional relationship between the product of IBCs (i.e., the aggregate product) and its receiving environment (Glenn et al., 2016). The elements making up the metacontingency are iterative. IBCs are the result of previous events and processes, such as two cooks’ interrelated (operant) behavior resulting in a meal that neither of them could have produced by themselves (Glenn, 2004). Table 4.1 includes a definition of terms pertaining to this unit of analysis.

IBCs and behavioral systems analysis describe cohesive sets of operant contingencies wherein the behavior of two or more individuals function as environmental events for the behavior of other individuals (Glenn, 2004; see also Houmanfar, Rodrigues, & Smith, 2009). Hence, IBCs resonate with the relational perspective toward social phenomena that permeates SNA. Understanding this perspective involves an analysis of relational responding in terms of discriminating important data to which to attend. Thus, interlocking relationships between agents involve bidirectional linear relationships in dyads, which comprise the smallest unit of analysis. Here, “each organism’s behavior serves as stimulus for the behavior of others” (de Carvalho & Sandaker, 2016, p. 19). As a result of scaling up the number of relationships to the agents in a system, behavioral processes are not only interlocking but interdependent. For example, agents and nodes are the units of

Table 4.1 Central concepts of behavior analysis to be further explored from a social networks perspective

| Concept | Definition |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Behavior Systems Analysis | “[B]ased on general system theory, organizations are behavioral systems formed by individuals’ interactions (IBCs) toward a common goal” (Houmanfar et al., 2009, p. 258). |
| Metacontingency | “A contingent relation between (1) recurring interlocking behavioral contingencies having an aggregate product and (2) selecting environmental events or conditions” (Glenn et al., 2016, p. 13). |
| Interlocking behaviors | “The behavior and behavioral products of each participant function as environmental events with which the behavior of other individuals interacts. This is the behavioral view of a cultural practice” (Glenn, 1988, p. 167). |
| Social reinforcement | The increase in the likelihood of future behavior, as a function of the interaction with other individuals or groups, or, according to social network analysis, “the situation in which an individual requires multiple prompts from neighbors before adopting an opinion or behavior” (Zheng et al., 2013, p. 2). |

interdependency respectively in BA and SNA. In the first case, they may elicit or strengthen (or weaken) mutual exchanges; in the second, they serve as emitters and receivers of communication signals. In both cases, they are influenced by feedback loops that receive or select the product or outcome of their interdependency. Thus, the concept of *interlocking*, is herein interpreted as a description of social antecedent contingencies (i.e., interlocking as interdependency). As is the case in complex systems, the metaphor of the living system is an illustrative one. Rather than a mechanical fit, however, the relations in a system are captured by the term interdependency between actors and the complexity that arises organically from these interactions.

Although behavior analysts have had an increasing interest in cultural phenomena and large scale behaviors (e.g., Zilio, 2019), the tradition to a great extent has been based on experiments and practices derived from single subject cases. When approaching a system’s behavior, both scale and scope change. The phenomenon of interest is, however, still behavior. It is important to recognize that the very idea there is behavior at the systems level can be a matter of dispute in complex sciences. For instance, Stacey (2009) claims that while we can observe learning in processes of interdependence, it may be misleading to assume that a system *behaves*. Notwithstanding, research in network analysis has shown how networks’ structures change in adaptive ways, either facilitating or restricting information flow (Centola, 2018; Naug, 2009). From this perspective, we can observe behavior at a systems level. This also highlights the need to recognize that not every behavior change is related to changes in network structures. Furthermore, complex systems have emergent properties, meaning the whole is not simply a sum of its parts, but arises from processes of interactions. We do not understand a complex system by only looking at its parts in isolation. It is important to look at behavior at different levels of organized complexity. When studying complex challenges like climate change,

sustainable behavior, obesity, juvenile delinquency, or drop out from school, solutions call for multidisciplinary approaches.

The structure matters; it may either facilitate or restrain the spread of new cultural practices. However, it is interesting to notice that the recognition of the relation between cultural analysis and behavioral systems has not always been a straightforward one. In *Selection by Consequences*, Skinner (1981) assumed a critical perspective toward structuralism by stating that principles of organization do not determine behavior. Conversely, the effects of principles of organization may be tracked down to their respective contingencies of selection. In a later moment, he addressed the “problem of structure” by stating that although structures may have several properties, these are “simply networks of contingencies. Structure, therefore, cannot have a role in behavior separate from that of contingencies” (Catania & Harnad, 1988, p. 481).

A possible alternative is to adopt a structural perspective to explaining behavioral phenomena. Here we acknowledge the importance of structures comprising behaviors at different levels. The structure evolves to a certain extent together with the function of an organ, an individual, and a group.

The idea of systems is not as developed in behavioral sciences, as it is in systems science. For example, Mobus and Kalton (2015) analyzed the principles of a science of complex systems in depth, specifically pertaining to function, structure, and modeling. On their third principle of systems science, the authors maintained that “systems are themselves and can be represented abstractly as networks of relations. In order to understand the nature of systems in terms of structure, organization, and function (dynamics), we need to understand networks” (Mobus & Kalton, 2015, p. 137). Conversely, systems are described and analyzed in rather metaphorical terms in BA and this represents the topic of the next section.

Behavior Analysis as a Matter of Complexity: The Space for Interdisciplinary Communication

One problem addressed by biologist Edward Wilson (1998), is that social sciences, such as sociology, political science, social anthropology, and psychology, do not share a common conceptual framework based on a cumulative research tradition. Unlike natural sciences, the different social science disciplines represent all different languages, based on different research methods and often represented in antagonistic terms. Conversely, behavior analysts have typically presented behavior science as a natural science (e.g., Johnston & Pennypacker, 1993), thus as free as possible from internal teleological and terminological inconsistencies. As chemistry, physics, and biology may represent complementary perspectives, the social sciences seem not only to represent different conceptual frameworks, but even different dialects within the same discipline that may be in opposition to each other (Sandaker, 2006). Wilson blames the lack of applied societal success for these disciplines to the

antagonistic approaches and thus the lack of consilience. Consilience, as Wilson describes it, is the ultimate criterion that separates pseudoscience from science. A prerequisite for consilience, or the unity of knowledge, is a common shared scientific basis that enables disciplines to communicate and hence enables scientists to share challenges and efforts to meet them.

The complexity perspective represents an approach with much in common with BA:

1. It is a generic conceptual framework, based on an empirical approach. However, both complexity sciences and BA recognize the importance of contexts.
2. Both approaches are basically evolutionary and represent a selectionist perspective. As in BA, the complexity approach is concerned with the units of establishing, maintaining, changing, and extinguishing behavioral phenomena.
3. Skinner (1953) describes “the self as an organized system of responses” (p. 285). The self is maintained by its functional relation to the environment and shaped by its consequences. The organization is, however, context-dependent. A system is maintained by its functional relation to the environment and shaped by its consequences. The organization, or the structure of the interactions, is of great interest in systems thinking.

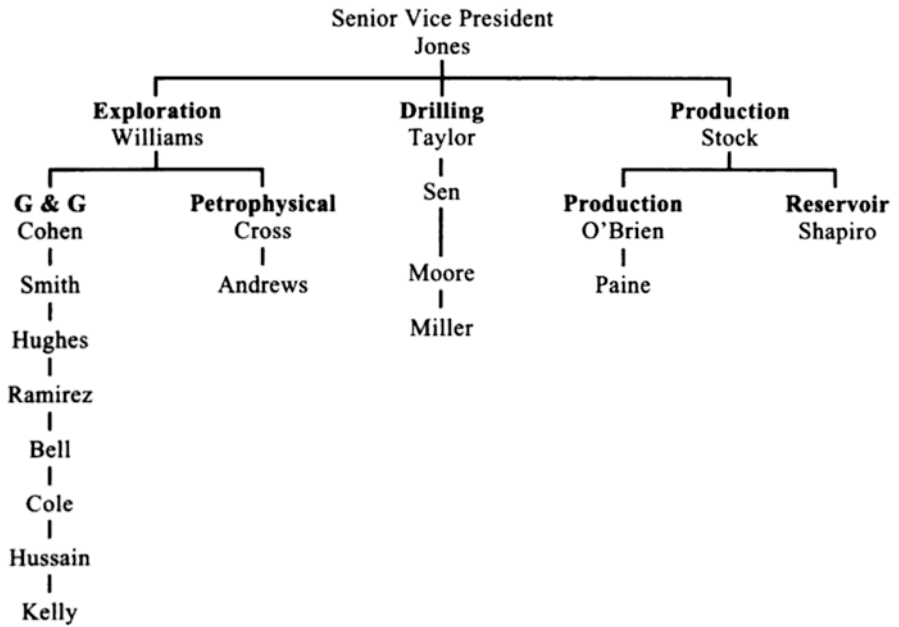
Complexity and Network Structure

Networks are the underlying structure of what we call complex systems (Caldarelli & Catanzaro, 2012; Zweg, 2016). Figure 4.2 illustrates an example of a formal organizational chart and a graphic representation of the actual web of interactions in the same company. Although dependent on the purpose, size, and other characteristics typical of each organization, it may help map how the communication flow and chains of command are intended. It does not necessarily indicate how they manifest themselves, as formal and observed structures of communication need not necessarily concur.

However, complex systems need be understood beyond their underlying structures, specifically in relation to their functions and processes (Sandaker, 2009). The need to grasp the temporal dimension of processes and the self-organizing nature of complex systems highlights the current limitations of network analysis in explaining change. Concepts such as *homophily* and *preferential attachment* have enlightened processes of network growth (Caldarelli & Catanzaro, 2012). Homophily indicates that nodes tend to connect with similar ones. Preferential attachment is a mechanism of network growth that indicates that new nodes tend to connect with old ones that already have a high number of connections (Caldarelli & Catanzaro, 2012).

Beyond understanding network structure, it is important to look at the content of the information flow in networks. Rather than only simple information, the flow often consists of complex information in the form of shared norms and beliefs. For

Formal Organizational Structure of Exploration and Production Division



Informal Organizational Structure of Exploration and Production Division

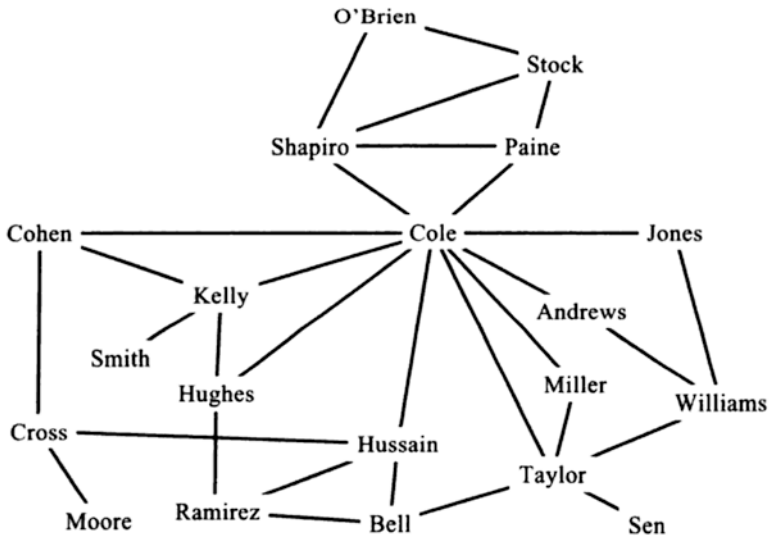


Fig. 4.2 “Formal versus informal structure in a petroleum organization. Note. Names have been disguised at the request of the company” (Reprinted with permission from Cross, Parker, and Sasson (2003), p. 6)

instance, network analysis has been applied to map the context of innovation and cultural change (Parise, 2007). Studies of metacontingencies may therefore be enlightened by concepts of network analysis to discuss changes in organizational culture. Attributed to Peter Drucker, an often-cited phrase is, that “culture eats strategy for breakfast.” This implies that even a strongly elaborated strategy may fail to be implemented if it is not in accordance with the organizational culture. Behavior change based on good intentions represents a clear parallel, insofar as the contingencies of reinforcement are not arranged in accordance with the probability of behavioral change. Sandaker (2009) defines a culture as a complex adaptive system with certain observable characteristics selected by the environment. According to Sandaker (2009), a system is relatively stable even though the agents in the system may be changed over time. To implement a strategy or to change a culture we need to understand how the interaction among people or members of the system or organization respectively supports or contrasts the intended changes. The interaction is expressed not only by intentions, but rather by a functional analysis of actual contingencies.

Network Analysis and Theory: The State of the Art

SNA derives from initial developments in structural investigations in the 1930s using the metaphors of the web of social life that permeates efforts to understand social relations (Scott, 2013). SNA evolved from rather nontechnical structural concerns with network structures and has developed mathematical tools used to model relations between different agents (Scott, 2011, 2013). Graphs are constructed using sets of lines to trace the connections that provide the visual representation of a network. The network is then analyzed with mathematical formulations that explain the patterns of interconnections (Scott, 2013). Different network measures, such as clustering and density give important indications of information flow, communication bottlenecks, degree of collaboration, and knowledge distribution in groups (Parise, 2007). Table 4.2 presents concepts deriving from network analysis that may be of interest to BAs researching behavioral systems.

The most common criticism toward SNA is the claim that it provides little in terms of theoretical foundations, and is therefore regarded as purely descriptive (Borgatti, Brass, & Halgin, 2014). Byrne and Callaghan (2014) express the same argument, claiming that tools and representations of network analysis have important potential in generating useful descriptions of connections, but offer little in terms of predictive potential. Therefore, most recent studies have combined SNA with concepts originating from other areas. For instance, sociological concepts such as social capital and communities of practice have been linked to SNA. We argue here that such concepts may bring important descriptive contributions, but have limits in terms of providing a predictive potential. Thus, a framework that is able to bridge network analysis with BA may provide interesting directions

Table 4.2 Central concepts of network analysis to be further explored from a behavior analytic perspective

| Concept | Definition |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Homophily | “Network researchers frequently investigate selection process such as homophily where actors form a tie because they share one or more individual attributes (sometimes described by the old adage ‘birds of a feather flock together’)” (Robins, 2015, p. 33). |
| Preferential Attachment | “Popular actors often tend to become more popular because they have high visibility to begin with. In other words, the rich get richer. So degree distributions are often positively skewed. With a small number of actors with very high degree, and many actors with lower degrees” (Robins, 2015, p. 28). |
| Resilience | “A system is resilient if it can adapt to internal and external errors by changing its mode of operation, without losing its ability to function. Hence, resilience is dynamical property that requires a shift in the system’s core activities” (Barabási, 2016, p. 303). |
| Density | “Density is the most basic network measure. It is simply the number of ties in the network as a proportion of the total number of possible ties” (Robins, 2015, p. 23) |
| Clustering | “A common property of social networks is that cliques form, representing circles of friends or acquaintances in which every member knows every other member” (Albert & Barabási, 2002, p. 3). |

Transactional Approach, Social Capital, and Communities of Practice: Frameworks of Being

As Scott (2013) points out, initial attempts to understand network data were based upon different forms of what he called a *transactional approach*. This approach is based on the assumption that social ties emerge and disappear due to the rational decisions by agents according to their own self-interest. Although this approach may enlighten some processes of resource exchange, it oversimplifies social relations in many ways. Humans do not always behave rationally and even if and when they do, it is often not in the form of self-interest. For instance, a transactional approach would not be able to explain the formation of different forms of cooperation. In organizational settings, many applications of SNA focus on identifying and nurturing communities of practice that are defined as groups of people who share a craft or profession and learn in processes of interdependence (Cross, Laseter, Parker, & Velasquez, 2006; Wenger, McDermott, & Snyder, 2002). These are densely connected webs of dyadic interactions that often transcend formal organizational charts.

The concept of communities of practice emerged in the early 1990s as a social theory of learning in practical contexts. However, the most commonly used framework to analyze network data is the social capital theory, which was systematically presented by Putnam (2002). According to Lin (2017), the networks that individuals possess are a form of social capital that gives access to different kinds of resources. When the concept is applied at the group level, it refers to factors facilitating a successful flow of resources such as shared norms, trust, and reciprocity (Putnam,

2002). The potential of the network structure in either restricting or facilitating the flow of resources is analyzed in terms of collective social capital.

It would be beyond the scope of this chapter to present a thorough discussion of the strengths and weaknesses of these sociological concepts when applied to analyze network data. However, as we understand such important concepts of SNA, they seem to be based on an assumption of system stability; therefore, they are not theories of adaptation. For instance, it is fair to assume that communities of practice have emergent and adaptive properties in a temporal perspective. However, applications of the concept of communities of practice toward interpreting network data have often missed this temporal dimension.

Network Adaptation and Diffusing: The Importance of Social Reinforcements

The definition of network resilience implies a temporal dimension and a focus on *Becoming* rather than *Being*. As defined by Barabási (2016), a resilient system “can adapt to internal and external errors by changing its mode of operation without losing its ability to function. Hence, resilience is a dynamic property that requires a shift in the system’s core activities” (p. 330). Resilience is a concept that derives from the study of socio-ecological systems and is commonly regarded as a central property of systems that successfully interact with ever-changing environments. We do not have at this point one particular measure of network resilience, but most studies assume that the adaptive capacity of a system is highly dependent on its capacity to generate and disseminate new knowledge in response to internal failures or environmental changes. Mobus and Kalton (2015) defined resilience as “the capacity for an active system to rebound to normal function after a disturbance or, if need be, to adapt to a modified function should the disturbance prove to be long-lived. [...] Capacity for such resilience and complexity go hand in hand” (p. 244). The authors provide pedagogically sound examples of resilience in a manufacturing system, illustrated as the capacity to continue to function after disturbance. For example, when analyzing performance and fitness of athletes, there is a difference between endurance and resilience. While endurance is measured by for how long an athlete can continue an exercise, resilience is measured by the length of the interval between fatigue and recovery.

Building resilience at the system level grants the possibility of establishing new behavior on an intermittent schedule, and, thus, more adaptive. This is different from establishing behavior on a continuous schedule, for example as in systems characterized by robustness. Research on socio-ecological systems describes how networks demonstrate resilience by opening and maintaining channels of communication. For instance, ant colonies exhibit resilience as remaining nodes spontaneously create new social relations when another node dies (Naug, 2009). In this example, network resilience is related to an increase in connectivity in response to

an internal failure. We need to define resilience as an interesting variable for behavior; this is something that has already been attempted in the domain of performance management (e.g., Cooper, Liu, & Tarba, 2014).

In respect to system resilience, the work of Centola (2018) on social contagion provides interesting directions and indicates areas in which a behavior analytic approach can give important contributions. His main message is that complex information and behavior do not spread in the same ways as simple information or viruses do. In the case of the diffusion of simple information, the existence of relatively weak ties may be enough. Weak ties refer to connections between nodes that do not possess other common acquaintances. They often perform structural roles as bridges across independent networks. However, the spread of complex information is related to the existence of both wide network bridges and local processes of social reinforcement. Centola's comparison of three organizational network models with varying degrees of connections shows that a highly connected network with little clustering facilitates the spread of simple information. However, it misses the local mechanism of social reinforcement, which stems from the variability that has evolved in the behavior of complex organisms (Skinner, 1953). For example, innovative ideas may emerge and possibly evolve as a measure or product of this mechanism. A network that is highly divided in clusters with few connections among each other may have the local reinforcement processes but miss the wide bridges through which complex information spreads. Thus, an adaptive organization network has a balanced character: it has both clusters with overlapping patterns of spatial interaction, and wide bridges through which new ideas are disseminated. Before widespread integration occurs, local integration needs to take place: "while the viral model suggests that radiating networks of weak ties would lead to successful dissemination, it was instead overlapping patterns of spatial interaction that were the key to widespread adoption" (Centola, 2018, p. 2). Although the importance of social reinforcement is highlighted by Centola, it is not further articulated in network analysis.

There are many implications of network models of social contagion that either resonate with or may be further explored from a behavior analytic perspective. The adoption of new behavior in such models is explained by the position of individuals in their network structures rather than their personal characteristics. The adoption and spread of behavior do not involve rational and conscious choices; rather, they involve normative and informational signals from social reinforcement. Furthermore, interventions deriving from network analysis do not necessarily involve coercion or peer sanctioning. Instead, they involve altering the network structure to facilitate communication and the spread of innovative ideas. As Centola (2018) points out, there is a parallel here with interventions derived from behavioral economics aimed at changing the architecture of individual choices (e.g., Benartzi, Peleg, & Thaler, 2013). However, in network analysis there is a need for a better understanding of the social reinforcement and motivative events not usually considered in SNA: pairing the environmental stimuli serving as behavioral prompts (i.e., the antecedents in a three-term contingency), with social and shared consequences following the target behavior. For example, in the spread of prophylactic measures for HIV included in

the study of Centola, measures preceding risk behavior may include information campaigns, education, timely messages and availability of countermeasures, verbal prompts and reminders by family members and health care professionals, and many others. The understanding of the individual's network is key to optimize efficacy of the intervention, retaining precision, and containing costs. Social reinforcement is able to upscale the prophylaxis to an enduring social and cultural practice. It sustains the behavior thanks to the positive consequences delivered by others in the milieu, contingent on safe behavior (e.g., public approval, private praise, community recognition, etc.).

Networks: From Being to Becoming

A sociogram is a “frozen picture” of an interaction system, and it is unable to capture its plasticity unless plotted on a timescale. The sociogram represented in Fig. 4.3 includes the patterns of interaction in one Norwegian state directorate after formal restructuration processes. The figure represents the state of the network in one point in time (Being), but does not account for its future, with respect to prediction or control (Becoming).

A system of interaction “becomes” when selection mechanisms are perpetuated both internally, among members of the network, and externally, in relation to the receiving environment. For these reasons, this distinction is particularly relevant for network theory. *Being* is explicit to the descriptive character of network analysis,



Fig. 4.3 An example of a sociogram depicting interaction channels in one Norwegian public directorate. The lines and arrows represent the direction of communication. The nodes represent people in the system. The colors represent the formal organizational units that they belong to. The letters and numbers are used to code and anonymize participants

whereas *becoming* may be derived and explained by social capital theory (Siisiäinen, 2000).

Prigogine (1980) argued that understanding complex systems demands overcoming what he saw as a dualistic perspective of Being and Becoming. This is particularly challenging for network analysis since its origins in the 1930 were permeated by explicit intention of modeling social systems by identifying physical laws of social gravitation (Scott, 2013). The interest on laws of social gravitation is also embedded by an assumption of system stability as in physical metaphors (Borgatti, Mehra, Brass, & Labianca, 2009). Prior to that, classical writings in social sciences also aimed at founding a new field of social physics, which was aimed at understanding the interaction of atoms in socially structured networks (Borgatti et al., 2009). Table 4.3 summarizes seven main dichotomous characteristics that depict the two disciplines.

The table is not meant to be exhaustive and may represent a categorical oversimplification. Nonetheless, it provides the most relevant characteristics to the contents of this conceptual work, in contrast with one another. We submit to reducing the current distance between the two, starting with their philosophical underpinnings, and finishing with their experimental scope. We use the distinction between Being and Becoming as an illustration for the distinction between structure and process in network analysis. In order to understand changes in network structures, it is important to identify mechanisms of creation and retention of new relationships. Hence, variability represents a dynamic and intrinsic property of both organisms and organizations, and may be depicted and measured through network analysis: in this sense network analysis represents the output of the degree of variation within a specific group or population and represents a requisite for survival.

The mediating role of the environment on the degree of interactions among organizational agents is central, not only according to this approach but in BA altogether. Thus, we suggest a way forward meant to bridge conceptually, and through appropriate tools, the traditionally separate areas of networks and behavioral systems analysis, beyond the original formulation of Brethower (1972). For example, subsequent work includes an integrated approach toward improving employee performance (Abernathy, 2008), conducting performance improvement interventions

Table 4.3 Complimentary characteristics of classification of main characteristics of network theory and behavior analysis

| | Network theory | Behavior analysis |
|-----------------------------|----------------------------|------------------------|
| Philosophical underpinnings | Being | Becoming |
| Properties | Robustness | Resilience |
| Level of analysis | Topography | Function |
| Survival mechanisms | Exploitation | Exploration |
| Analytical focus | Structure | Process |
| Conceptual dimension | Space | Time |
| Space | Contiguity | Ubiquity |
| Measure of diversity | Homogeneity, heterogeneity | Variation, variability |

in behavioral systems analysis (Diener, McGee, & Miguel, 2009), and on the role of communication networks (Houmanfar et al., 2009).

Whereas networks are traditionally addressed as instances of Being, the selectionist perspective we submit to endorses the evolutionary aspect of Becoming. From a complex system perspective, distinguishing between theories of Being and Becoming opens many questions. For instance, we may look for the network characteristics of systems that have the capacity to change and adapt over time. Adaptation in human networks have emergent properties that cannot be explained by single individual actions or mental processes. Furthermore, it is always important to understand that networks do not have intentions per se. Networks evolve, for good or bad, due to the reinforcing power of (re-)distribution of social and material attractiveness, which is not explained by mental processes, but merely by strengthening (reinforcing) or weakening (extinguishing) loops (Krispin, 2017).

Networks Mechanism of Becoming: Homophily and Preferential Attachment

There are at least two mechanisms of network evolution that can be further explored from a behavior analytic perspective: homophily and preferential attachment. From a behavior analytic perspective, homophily and preferential attachment can be seen as behaviors in themselves, but also as dynamics of consolidation of structural contingencies that can either facilitate or restrain cooperation and the spread of new forms of behavior in social groups. Homophily is defined by Borgatti, Everett, and Johnson (2018) as the tendency of people to establish connections with other individuals with whom they identify similar socially significant attributes. This tendency may be the result of a learning history shaped by the superior availability of reinforcement from peers, rather than more socially or psychologically distant people. In network analytic terms, homophily refers to perceived shared attributes that may facilitate interaction among individuals. If the allocation of reinforcers is distributed unevenly, or if they are distributed under competing and concurrent schedules of reinforcement, the agent must choose with whom it wants to establish or strengthen relations.

The concept of metacontingency (Glenn, 1988, 2004; Glenn et al., 2016; Glenn & Malott, 2004; Houmanfar & Rodrigues, 2006) might be useful toward understanding the retention and maintenance of a cultural practice and cooperation. A metacontingency depicts a relationship between the product of interdependent social behavior (i.e., a culturant) and its environment. Operationally speaking, the behavior of one individual sets the occasion for the behavior of another individual, and “The relations are interlocking because one element of the behavioral contingency of one individual (i.e., antecedent, behavior, or consequence) or its product also constitutes an element of the behavioral contingency or product of another individual” (Malott, 2016, p. 107). This pattern is repeated for as many times as

there are individuals contributing to the creation of the group's product, be it an artifact, a service, or a cultural trait. We may say that the metacontingency is a behavioral approach to understanding complex systems. A system always has a function, processes maintaining the function, and a structure. It may be intentionally designed as in man-made systems like businesses or organizations, or the system evolves as a result of both self-organization and interaction with its environment. The environment in the metacontingency is the receiving system. The function parallels the aggregate product. The processes maintaining the function are the interlocking behavioral contingencies. However, the concept of metacontingency does not originally include a parallel to structure. Sandaker et al. (2019) proposed that nested IBCs (nIBSs) be added to the concept of metacontingencies. This indicates that the way in which two or more IBCs are interdependent influences the overall function or the aggregate product of the metacontingency. The tools of network analysis are particularly useful when these interdependencies are analyzed and described. Nevertheless, a functional analysis of both the system's interaction with the environment and the internal practices is necessary to make predictions and possibly influence the coevolving structures, processes, and function.

Networking with someone similar or related to oneself assumes reinforcing value to the extent that it increases the likelihood to engage in more of that behavior. Thus, homophily may be interpreted as a signaled availability of reinforcement due to relational similarities. The "similar" other serves as a discriminative stimulus leading to more interaction and IBCs.

Preferential attachment is a mechanism of social network growth that indicates that new nodes are more likely to connect with old nodes that are highly connected, rather than old nodes that have fewer links (Albert & Barabási, 2002). In other words, the more connected a node is, the more likely it is to receive new connections. Preferential attachment leads to the emergence of scale-free networks characterized by an uneven distribution of connections. This is the case of most, if not all social groups. Networking with someone with more connections is more attractive than networking with someone with fewer connections, due to a higher expected utility in the consequences of the interaction.

Networks may be interpreted as the product of past choice behavior and may evolve over time as an effort of maximizing utility in social transactions. The term *utility* may refer both to the agent's satisfaction (i.e., utilitarianism), and a functional aspect that is consistent with the neoclassical economics of the consumer's choice and preference. The structure of a network may provide cues as to whether and with whom to engage within the system, possibly as a function of (a) the social reinforcement that may be derived from the interaction, and (b) the interdependency within the same organization or social group. For example, according to this perspective, preferential attachment is similar to functional analysis in BA, inasmuch as it represents a structural perspective insofar as freezing the network reveals its underlying structure. However, network structures may facilitate or hinder change at the systems level, which calls for an evolutionary perspective to be interpreted. Thus, this perspective is consistent with a view of Becoming, and may be visually illustrated by an experiment's cumulative record.

BA may help better inform our understanding of preferential attachment by quantifying the relationship between current and potential connections, according to the matching law. According to Herrnstein (1961, 1990), the matching law represents the relationship between relative rate of responses and reinforcement in concurrent schedules. Whereas the basic principles were originally tested in a laboratory setting with pigeons, which displayed linear-like ratios, the matching law needed to be generalized (Baum, 1974) and adjusted to a context of social fitness: the more connections, the higher probability of survival among others. These adjustments include the consideration for rules and verbal behavior. For example, the higher likelihood of reinforcement given the same relative rate of behavior from a multi-connected node as compared to a node with fewer connections may be negatively mediated by prohibitions to interact with a certain part of the network (be it teacher, spiritual community, or in-laws).

However, some limitations of the predictive and descriptive value of the matching law need be acknowledged. In a recent experiment, three predictions concerning the rate of concurrent behavioral responding relative to reinforcement were falsified and comprised further evidence for supporting the alternatively proposed evolutionary theory of behavior dynamics (McDowell, Calvin, Hackett, & Klapes, 2017). Nevertheless, the matching law still remains a reasonable approximation in many applied settings.

The concepts of homophily and preferential attachment play an important role in explaining both the formation of network clusters and the consolidation of bridges among different clusters in a network. They are important in explaining the emergence of spaces of social reinforcement and channels through which behavioral changes may spread. As demonstrated by Centola (2018), clusters are important in providing the local spaces of social reinforcement. This resonates with the classic study by Rogers (2003) that recognized the stronger influence potential of closer relationships as an antecedent for the adoption of new technologies than that of weak network ties. However, it may be argued whether the term *social* refers to being delivered from more than one individual in the network or whether the effects of reinforcement reaches beyond the single individual.

Operants comprise classes of learned responses and reinforcement increases the likelihood that the behavior on which the consequence is contingent increases in frequency. Similarly, *culturants* (Hunter, 2012; see also Glenn et al., 2016) refer to the unit including both IBCs and their aggregate product; social reinforcement increases the likelihood of the agents' interdependency, although a metacontingency is programmed on the selection of the aggregate product of this interdependency.

Magnitude of contingencies of reinforcement, indicating the intensity of behavior in relation to its environment, may help explain preferential attachment and frequency: the more connections, the more frequent is the distribution of reinforcement. This is a display of a lawfulness relation typical of BA. The architecture and the communication of the systems, as well as the relationship with the environment, are fundamental attributes of network theory. These attributes are said to be adaptive,

insofar as they interact with the evolutionary logic that seems to be missing in the domain of network analysis.

Social Contagion: Spread of Behavior in Networks

The central idea developed throughout this chapter is that there is an important space for collaboration between SNA and BA. In the remaining part of this chapter, we provide two examples representing a case of emergent changes in the form of the spread of behavior in two different social groups.

The first example is a seminal study by Moreno (1978) about the epidemic of runaways at the Hudson School for Girls in New York. This example comprises one of the first graphical representations of social networks. The school was home for girls between 12 and 16 years old, who were convicted for various forms of juvenile delinquency. In 1932, it recorded 14 cases of student runaways in only 2 weeks' time. Moreno's study demonstrated that this behavior could not be explained by personal attributes or motivations of the girls who ran away from the school but by their positions in their social network. The early SNA conducted by Moreno and Jennings identified channels of influence and information sharing among the girls. Figure 4.4 shows interrelation among the 14 runaway girls identified by initials. The direct and indirect lines show one-way and mutual lines of attraction, respectively.

According to the unit of analysis of social behavior, this example represents a form of social contagion through transmission of a behavioral repertoire; there are not enough interrelated elements to rightfully interpret this scenario as a spreading cultural practice. In fact, even though old members of this organization are eventually replaced by new ones, the example chosen cannot be interpreted detached from its unique point in time and space. This underlines how the structural representation of dynamic processes may hinder more comprehensive analyses. Social pressure and imitation may therefore reinforce the newly established behavior of escaping, as well as facilitating its transmission through nodes in the network of relations. The mutual lines of attraction may be interpreted as rule-governed behavior, modeling, or a form of relational responding, given the girls never experienced the reinforcer before they emitted the behavior. Namely, the escaping behavior of one girl set the occasion for replicating the behavior of another girl, thus serving as a discriminative stimulus, inasmuch as the sociogram was concerned.

Sociometry is "a technique for eliciting and graphically representing individuals' subjective feelings toward one another" (Borgatti et al., 2009, p. 892). Although it stems from different historical and conceptual roots than behavior analysis does, Moreno's (1978) network of runaways presents a functional analysis of the contingencies of reinforcement sustaining escaping behavior, or their verbal description, based on the girls' location in the social network. Tentatively overlooking the claim that the girls may not have been as *conscious* of their behavior as they were about their affection toward one another, the representation of social structures are compatible with the molar view of contingency (e.g., Skinner, 1938), although it is

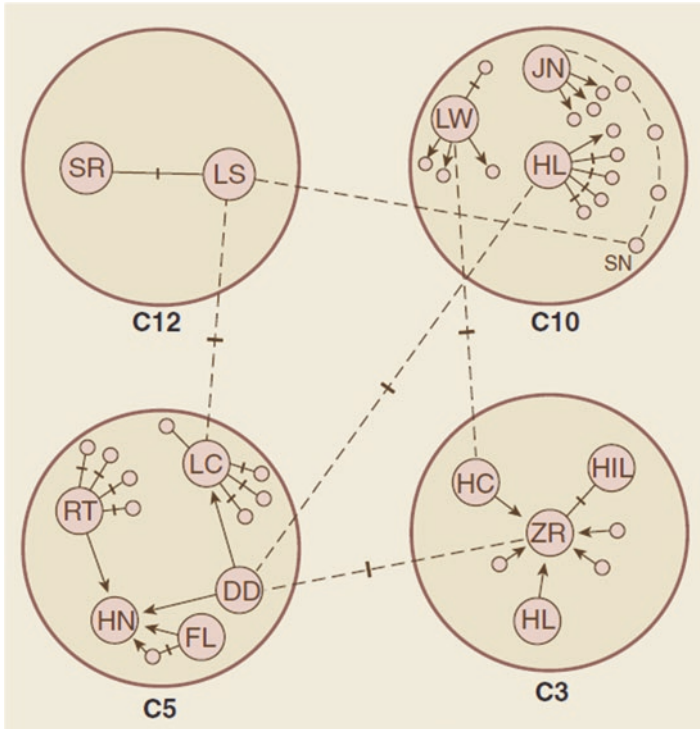


Fig. 4.4 Runaway chain at Hudson School for girls, depicting the force of the structure of relationships among individuals. The larger circles represent the cottages in which the girls lived. The smaller circles contain the initials of each girl. The direct lines represent one-way attraction. The indirect lines show mutual lines of attraction. Reprinted with permission from Borgatti et al. (2009, p. 892) and originally published by Moreno (1978, p. 422). License number 4762990250426, American Association for the Advancement of Science

difficult to empirically separate from the molecular view (Lattal, 1995). This is similar to saying that the social structure of Hudson School for girls' network set the occasion for runaway behavior, but did not cause or elicit it. This structural representation lacks a time frame, and it is not possible to understand who originated the behavioral chain and how it spread from the figure itself. Conversely, according to the unit of analysis of individual contingencies of reinforcement, the focus is on the explanation and description of functional relationships and their properties in the contingency. We submit to a synthesis of both approaches that is able to capture both the Being and the Becoming of the establishment and spread of escaping behavior among the girls. The network analysis could lend itself to prediction of the likelihood of different scenarios of future escape behavior.

Much of the work in network analysis focuses on identifying characteristics of social networks that make them suited for the spread of healthy behavior (Centola, 2018). In this respect, the second chosen example illustrates a contraceptive policy in rural areas in Korea in the 1960s and shows how local webs of interaction may

provide channels for behavior change. Most policies aiming at promoting family planning in the same period focused on mass media awareness campaigns focusing on personal accountability. The Korean policy followed a different approach by focusing on the diffusion of the use contraceptive methods through social networks (Kohler, 1997). The government provided information about contraceptive methods to local mothers' clubs and surveyed their implementation in 25 rural areas. The clubs became spaces of peer-to-peer social diffusion successfully increasing the number of adopters (Rogers & Kincaid, 1981). Different contraceptive methods were preferred in different villages, probably indicating the behavior of early adopters. This policy reached better results than other policies in the same historical period by focusing on local social networks as channels for the diffusion of a new social norm.

This example illustrates how cultural practices spread, focusing on the structure as a unit of analysis. In other words, the structure of Being anticipated the Becoming represented by the spread of the contraceptive policy submitted by the government. The study of social norms encompasses the tradition of BA per se and it has been recently addressed to an extensive degree by behavioral insights, among others (e.g., Sunstein, Reisch, & Rauber, 2017). Behavioral insights are concerned with the simplification of decision-making in a given and *better* direction at the policymaking level. In the example above, social norms provide the positive consequence from a meaningful and trustworthy source to engage in the appropriate behavior. Whereas the function of establishing the contraceptive practice needs no further clarification, it should be noted that no interdependency of behavior is strictly necessary for its spread within each given rural area. Each community served as an area of local adaptation.

The relationship resembles a macrocontingency, which identifies a result of the addition of multiple independent behaviors, rather than the product of IBCs depicting a metacontingency. Although the level of complexity may appear higher than illustrated above and the difference may not be immediately evident, representing the differences in the structures of a macrocontingency and a metacontingency may contribute to achieving better clarity. Systemic connections may be found between the government programs setting up informational arrangements and how they are received by each community. If contraceptive choices tended to be different depending on how the communities responded to their exposure (e.g., barrier methods in community A and fertility awareness in community B), it is likely that apparently separate "contraceptive cultures" would emerge in different communities. Furthermore, it may have been possible to upscale these cultures to the village- and region level, thus, reaching (effectively) beyond the contractive choices of each individual within a community. Hence, it is appropriate to invoke the metacontingency concept, insofar as the cultural practice is socially situated as a product of recurrent choice and interaction, and selected, for it emerges and evolves within the encompassing social network. However appropriate for the interpretation of cultural practices, the metacontingency tool needs not necessarily be involved nor called for

the interpretation of all group and social phenomena. It is worthwhile emphasizing that everything that is not a metacontingency does not necessarily comprise a macrocontingency. Whenever the latter is adopted as the unit of analysis, selection operates on the unit of behavioral contingencies of independent agents who need not necessarily interact (i.e., their behavior is regarded as a *sum*, rather than a *product*).¹

In the example illustrated above, the main differences may concern the absence of reciprocal relations and a lower level of (interdependent) complexity between community and environment; yet, transmission of the cultural practice in the network and beyond is possible. For behavior analysts, this is an interesting case of behavior transmission that is different from most cases of selection of cultural practices. Although the government diffused information regarding contraception in local communities, there was not any significant process of adaptation to environmental changes that explained the adoption of new behavior but a process of transmission taking place in the context of local interactions in each village.

The two examples discussed here represent classical cases of social contagion. In both cases, mechanisms of homophily and preferential attachment contributed to form network structures that facilitated the spread of complex information and behavior change. In more recent years, SNA has become a broad field of study covering a wide array of topics. In organizational settings, SNA has been applied to map the web of interactions thereby informing practices related to organizational change (Cross, Parise, & Weiss, 2007), knowledge management (Parise, 2007) and employee turnover (Parise, Cross, & Davenport, 2006). Various social phenomena beyond organizational settings are commonly addressed from a network perspective. Some examples include social determinants of depression (Rosenquist, Fowler, & Christakis, 2011), corruption behavior (Ribeiro, Alves, Martins, Lenzi, & Perc, 2018), and the online spread of fake news (Vosoughi, Roy, & Aral, 2018).

The reader may relate to additional and more recent examples, ranging from organizational studies to social phenomena and cultural anthropology. The starting point consists of listing the three main characteristics of a system, in terms of function, process, and structure. The first two are the elective result of a contingency analysis: that is, through environmental contingencies and schedules of reinforcement. In contrast, structures can be inquired through a network analysis. An analysis of cultural evolution and lineages informs the extension from individual to group, and from present to future occurrences.

¹*Macrobehavior*, as Glenn et al. (2016) used the term, is different from macrocontingency insofar as it results from large-scale individual behavioral change that is the aggregate product and not the sum of behaviors. This may be tangible as in the case of donation to charity or intangible as for political or other preferences. Although it has not been specified what is meant by *large scale*, the main point is that macrobehavior has some societal or cultural consequences.

Conclusion

BA and a complex systems approach share an evolutionary perspective on behavior. While a network, as the architecture of a complex system, gives information of interaction at a given moment in time, BA is able to explain why patterns of behavior emerge and evolve.

Concepts in network theory are generic in the sense that they may be applied whether the context is an ecosystem, dissemination of cultural practices, or spread of diseases. By better understanding system properties like clustering, preferential attachment, and homophily, the joint scientific enterprise between complexity theory, BA, and other behavioral sciences at large can contribute to the development of tools to solve multilevel societal challenges.

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Chapter 5

Multiple Perspectives on Establishing a Research Lab in Culturo-Behavior Science



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Multiple Perspectives on Establishing a Research Lab for Culturo-Behavior Science

Culturo-behavior science brings together principles and techniques from Behavior Analysis (e.g., Skinner, 1953), Behavioral Systems Analysis (BSA; e.g., Brethower, 2008) and Cultural Analysis (e.g., Glenn et al., 2016).¹ Culturo-behavior scientists typically work within a selectionist perspective to advance our understanding of how cultural phenomena develop and change over time, and how to design more effective behavioral systems. The work of culturo-behavior scientists has led to the formulation of new concepts and principles (e.g., Glenn, 1988; Glenn & Malott, 2004; Houmanfar et al., 2010; Sandaker, 2009) that have been applied to improve our understanding of social issues (e.g., Mattaini, 2013; Todorov, 2005).

Yet, few behavior analysts have had the opportunity to study culturo-behavior science with formal coursework or mentored experiences. Research labs and practical experiences have been available in only a few universities where pioneers in culturo-behavior science created the foundation upon which it could emerge as a specialty area. Unless one has been fortunate enough to study at one of these universities or to work alongside one of these scholars, behavior analysts may have found it difficult to nurture an interest in culturo-behavior science. More research labs are needed if culturo-behavior science is to advance an understanding of culturo-behavioral phenomena and address significant social issues. More research labs will

¹See also Chap. 1 of this volume.

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increase the likelihood that aspiring behavior analysts come into contact with culturo-behavior science and that those who are eager to contribute have opportunities to gain mentored experiences.

In this chapter, we share our experiences in developing and maintaining a lab in culturo-behavior science. We are not suggesting it as the only way to approach the subject matter or as the only way to develop a lab. Indeed, earlier labs in BSA have adopted culturo-behavior science concepts thus demonstrating an alternative route to the subject matter (e.g., Houmanfar et al., 2009; Sandaker, 2009). Still others began by applying cultural selection concepts to the solution of practical problems (e.g., Todorov, 2005) or by applying behavioral principles directly to understanding and altering social problems (e.g., Mattaini, 1995; Nevin, 2005). Although we believe such variation is vital to a developing research area, we necessarily approach the topic from the perspective of our own experience.

The authors of this chapter have been fortunate to have participated in two labs focused on establishing and advancing our understanding of culturo-behavior science—the Behavior and Culture Lab (Glenn, 2006–2012) and the Cultural Design & Systems Lab (Cihon, Ortu, & Becker, 2018 to present).² Collectively, we share perspectives from different vantage points including early, mid, and late-career; students, research or tenure-track faculty; secondary and interdisciplinary specialists, pioneers, or transitioning specialists. The purpose of this chapter is to share our experiences and to provide guidance for others who are interested in establishing, transitioning to, or otherwise pursuing an active research agenda in culturo-behavior science.

Anytime you're trying to deal in some new area, you're going to find a lot of holes in your own work and in other peoples' work.

—Glenn, *First meeting of the Behavior and Culture Lab in 2006*

As scientists, our perspectives and commitments have been shaped by specific research communities. A danger for masters of any particular realm of knowledge or skill is to assume that mastery automatically generalizes to other subjects. As culturo-behavior scientists, we have tried to avoid this pitfall by approaching culturo-behavior science as a new frontier rather than a straightforward extension of behavior analysis. We do not assume that this new area will, or will not, be fully accounted for via known behavioral processes. Such a question is for nature to answer, and is reason to expand and diversify empirical work in this area. We assume that any scientific idea needs to be tested by its usefulness in prediction and control.

Behavior analysts have held that their science can save the world from social problems (Skinner, 1953, 1981), but such results have not been forthcoming (Mattaini, 2019). Although this may be due to a simple lack of large-scale application, it is more likely due to a lack of requisite understanding of the principles required for the control of cultural-level phenomena. The behavior analyst in this field is therefore an explorer, not a messenger.

²Prof. Dr. Aécio de Borba Vasconcelos Neto has also been instrumental in the reestablishment of the Cultural Design & Systems Lab at UNT, serving as a visiting scholar from the Universidade Federal do Pará from the fall of 2018 to the summer of 2020.

As researchers wishing to open their science to a new area of application or subject matter, we do not take existing approaches as authoritative. However, any field that has already taken cultural phenomena as their focus deserves at least some consideration, which means that culturo-behavior scientists can be served by learning what they have to offer. The risk of such honey-dipping is that recognition of interesting insights may trap the researcher prematurely in a fatally limited practice or perspective. It is prudent not only for a culturo-behavior scientist to self-educate in related fields, but to apply a filter to this effort in order to avoid misdirection by ineffective scholarship. Behavior analysts have often referred to observability, parsimony, practical testability, and pragmatic utility as fundamental features of a scientific approach (e.g., Budd & Stokes, 2003) and these same values can be applied as standards for culturo-behavior science when reaching out to researchers and working in other fields. Such standards are unlikely to lead to the complete rejection of related fields such as anthropology or sociology, but may help in identifying what is useful. In some cases, only the raw data may survive scrutiny. Even where such litmus tests are not fulfilled, these other fields can provide a large volume of content that may spark ideas about topics compatible with what is known about behavioral principles.

Perhaps more importantly, attempts to gain direct contingency-shaped experience with the subject matter using an inductive approach and the fewest possible assumptions can serve the effort to alight upon a productive interdisciplinary starting point. It can also be useful to consult with those with direct experience no matter their philosophical approach.

Finally, as a colleague has emphasized to us (S. Ala'i, personal communication, November 20, 2018), the pragmatic nature of behavior analysis harmonizes with a highly goal-oriented approach to the integration of culturo-behavior science with other fields. When the ultimate goal is a practical one, and when that practical goal represents a point of shared values with scholars from other disciplines, it renders secondary any necessity to arrive at a common theoretical framework or worldview so long as effective solutions to social problems are produced. Where we share common values and agree about how those values are measured, culturo-behavioral progress can be made without theoretical integration.

Culturo-Behavior Science at the University of North Texas

The Behavior and Culture Lab at the University of North Texas (2006–2012)

In 2006, Glenn held the first meeting of the Behavior and Culture Lab at the University of North Texas (UNT).³ Later, Glenn recounted the events that led up to this meeting,

³A portion of that first lab meeting was captured on film (uploaded by Ortu, 2012; filmed and produced by Culture Lab Members) and can be viewed at <https://www.youtube.com/watch?v=bD4gEv6KRg4>.

During this period [1994–2004], I developed the concept of *metacontingencies*, which first occurred to me in the late 1980s. In a series of papers, beginning in 1986 (Glenn, 1986) and ending in 2004 (Glenn, 2004), I worked with the concept until it became clear enough to consider experimental analysis. My work with Maria Malott (Glenn & Malott, 2004) probably contributed to the formulation that allowed experimentation to begin. An increasing interest in the analogy of reinforcement and natural selection led to collaboration with a philosopher of biology and a conceptual immunologist (Hull et al., 2001). Following the lead of Maria Amalia Andery and her student Christian Vichi in conducting an experimental analog of cultural metacontingencies (Vichi et al., 2009) I established a “behavior and culture lab” at UNT. Having the benefit of a fantastic group of students, several research lines resulted in experimental publications (History of Behavior Analysis, n.d.; Hunter, 2012; Ortu et al., 2012; Sinay Neves et al., 2012)

Although this period in the history of the Behavior and Culture Lab proved empirically fruitful, it was not a lab that exclusively focused on experiments. Experiments arose naturally out of a social environment that included diverse readings, discussions, and debate. Lab members synthesized facts and ideas from highly disparate, unconnected sources including cultural materialism, general selection theory, game theory, social psychology, evolutionary biology, emergence, complexity science, organizational behavior management (OBM), and behavior analysis. This environment and the information considered from various sources produced more questions and mystery than insight; it also, pivotally, provided clarity for the questions that members wanted to pose in experiments. Purported ideas about cultural functions were refined so that pinpointed questions, rather than vague ideas about relationships, could be posed.

The quality of empirical research depends on the quality and clarity of the questions involved. We found it fruitful to establish a scholarly environment where ideas could be refined and challenged, where concepts and data from related fields could be presented for consideration from a behavioral perspective, and where synthesis and integration of the cultural puzzle could lead to fruitful interrogation thereof. We do not claim that these aims were realized perfectly in the Behavior and Culture Lab; however, we did discover their utility against our own baseline.

One example that may illustrate the concepts above is Ortu et al. (2012). Ortu joined the Behavior and Culture Lab in 2006 after finishing his Master’s Degree in Italy, at AILUN. The AILUN program was based on the idea of using the principles of behavior analysis as a basic vocabulary to integrate the social sciences. An important component of the program was interpreting organizational structure and development from a behavior analytic perspective, with the goal of forming an enlightened group of managers, who would then go on to excel in their careers. When progressing through the course from basic behavioral principles to social interactions, Game Theory was prominent in several modules. It was presented not only as a branch of theoretical, mathematical, and experimental economics, but also as an overall tool that can cut across social sciences with a great degree of explanatory power. When Ortu joined the Behavior and Culture Lab, he proposed a variation of some Game Theory experiments that had been conducted by Rachlin (Yi & Rachlin, 2004). Ortu saw the preparation, if modified to involve more than one participant, as a potential candidate to investigate the interlocking behavioral contingencies (IBCs) intrinsic

to the Prisoner's Dilemma Game within the broader context of a selecting agent/market that would select either IBCs producing cooperative or noncooperative aggregate products (APs).

Overall, in the early days of the Behavior and Culture Lab, reading from a variety of sources (behavioral economics, cultural transmission, cultural materialism, etc.) helped prompt the necessary variability in the behavior of experimenters, who were in more than one way starting from scratch. That variability would have been insufficient, however, without the selecting role of Glenn who kept reminding lab members that they needed to find the cultural equivalent of response measurement, akin to the switch closure in a Skinner box, in order to understand how to carry out experiments about cultural selection *processes*. The common abstract nature of our apparatuses became evident overtime, as we all had a way to measure either IBCs or APs, with some sort of cultural consequence overlaid. Glenn's oversight pushed us to prioritize process over content—something that is probably extremely important in the early stages of a field. Only after an apparatus has been validated as capable of showing meaningful functional relations (e.g., the selection of APs and IBCs over time) does it become possible to ask questions that are more directly related to specific topographies or content.

The Cultural Design & Systems Lab at the University of North Texas (2018 to Present)

A number of things have changed since the first research labs were established in culturo-behavior science. Perhaps most importantly, the pioneers in this area have given us a model, removing some of the preexisting barriers for behavior analysts aspiring, transitioning to, or establishing a line of research in culturo-behavior science. As Cihon, Ortu and Becker began to discuss resuming the work in cultural analysis Glenn had started at UNT, many of the pieces that were needed to set up a lab in culturo-behavior science were already coming into place, including the initial cultivation of student interests, the inclusion of cultural concepts into existing courses, the positioning of interested faculty, and the progress of the wider culturo-behavioral research environment. The Department of Behavior Analysis was launching a concentration in Behavior Analysis in an interdisciplinary PhD program, which would help recruit doctoral students with an interest in understanding cultural phenomena, and the fifth Think Tank on Cultural Analysis was coming to Denton the following spring. Ultimately, this particular combination of variables, fueled by a sense of urgency related to growing concerns for society's well-being, allowed Becker, Cihon, and Ortu to re-establish the Cultural Design & Systems Lab at UNT in January 2018.

The initial stages of the Cultural Design & Systems Lab have been shaped by the disparate foci and backgrounds of its leaders. Ortu's history in social organization, Cihon's history in educational and family systems, and Becker's history in the

biological sciences, together with their shared history as culturo-behavior scientists, collectively produced a lab with similar diversity and tendencies toward exploration as were embodied in Glenn's Culture and Behavior Lab.

Starting a Research Lab in Culturo-Behavior Science

One could argue that, perhaps, Becker, Cihon, and Ortu were uniquely poised to start a lab in culturo-behavior science. They were co-employed at an institution and in a department that had a history with the subject matter. Their individual histories involved past and current mentorship from active scholars in the area like Glenn and Mattaini. They had the continued accessibility, support, and encouragement of these mentors. However, they still faced a number of choices and barriers. What should the students read to prepare? What research questions were best to ask? How would the research be funded? How should the programs for experimental work be written? Who would be a partner in the community? What is the best way to balance running more than one lab?

In order not to belabor our own individual struggles, we turn now to a more general discussion of some of the challenges other faculty members and researchers who are considering starting a research lab in culturo-behavior science might face. We attempt to describe the conditions and variables that might oppose and support others setting up a research lab in culturo-behavior science at their universities.

Program Considerations

Faculty members may face barriers to starting a lab that are present at the program level. They may teach in programs that do not offer courses that prepare students to participate in such a lab or they may be housed in a department that focuses on other specialty areas in behavior analysis (e.g., autism, education, etc.). Although a lab in culturo-behavior science can be established in the absence of formal coursework, having such coursework provides a foundation that allows students to concentrate lab time on the research itself. Absent such coursework, lab time almost necessarily will be divided between in-depth discussions of the literature and experimental or applied work. Faculty members and researchers wishing to pursue work in this area are now fortunate to have some guidance from the Association for Behavior Analysis International (ABAI). In 2018, ABAI established an international task force to develop a higher education concentration in cultural studies. Out of this work came a proposal for a subspecialty in culturo-behavior science that requires at least two courses covering several specific competencies and an internship or field experience involving an interdisciplinary component. In addition, ABAI will recognize a department offering this subspecialty. The proposal was subsequently accepted and now appears on the ABAI website as a subspecialty in culturo-behavior science.

Faculty members and researchers interested in establishing a lab even in the absence of formal coursework may make use of the initial set of readings recommended by the Task Force. They may also find it possible to offer an occasional course in this subspecialty, or to teach the competencies to students individually or in small groups in a “special problems” or similar course. As interest in the area grows, the possibility increases that institutions will offer all of the coursework needed for a student to achieve a certificate in the subspecialty, for which the department can be recognized by ABAI.

The college or department in which faculty members and researchers are employed may foster or suppress efforts to start a lab in culturo-behavior science. Existing culturo-behavior science labs are offered in departments of behavior analysis, behavior science, or psychology, housed in colleges of arts, science, health, public service, etc. However, faculty members and researchers interested in culturo-behavior science may be in different colleges (e.g., colleges of education) or departments (e.g., social work, education) and may struggle with how to incorporate culturo-behavior science content with other program requirements (e.g., Council for the Accreditation of Educator Preparation, Behavior Analysis Certification Board).

Faculty members and researchers who work in programs that must meet other competencies or accreditation standards might look at their courses and course sequences for opportunities to introduce their students to the organizing framework and principles of culturo-behavior science alongside this other content. For example, students who are preparing to work in the education system could benefit from learning about systems dynamics (e.g., von Bertalanffy, 1968), the contingencies that select and maintain the behaviors of the individuals working in education systems, how the behavior of multiple individuals interlock (e.g., Malott, 2003), and how these patterns of interlocked behaviors result in APs that may be selected by cultural consequences (e.g., Ellis & Magee, 2007). Many teacher preparation programs offer courses that prepare students to collaborate with families and other professionals. The classroom itself could be conceptualized as a system composed of numerous operants, IBCs, and APs. Introducing students to culturo-behavior science concepts and principles might spur students’ interest in conducting projects and research related to culturo-behavior science in education.⁴

Faculty members and researchers who are working in ABAI verified course sequences can incorporate culturo-behavior science content into their courses as Cihon, Ortu, and Becker do at UNT. Each has found ways to integrate these concepts into their Introduction to Behavior Analysis, Ethics, Verbal Behavior, and Observation & Measurement courses. The Behaviorists for Social Responsibility Special Interest Group (BFSR SIG) of ABAI has been creating resources for faculty who might be interested in introducing students to behavior analysis and culturo-behavior science as it relates to various social issues. A complete bibliography of papers published in *Behavior and Social Issues* and its predecessor journals is now

⁴Dr. Bryant Silbaugh’s lab, Silbaugh Behavior Research Group with the Autism Research Center at the University of Texas-San Antonio, is just one example of how culturo-behavior science can be embedded in a teacher preparation program.

available as well as several course units, some of which are tied to the BACB 5th Edition Task List. These resources might provide guidance, serve as models, or even be adopted with little effort (see also Seniuk et al., 2019).⁵

Faculty members and researchers developing an interest in culturo-behavior science may also need to consider the degree(s) offered (e.g., bachelors, masters, doctoral) at their institutions. Those who work in programs with graduate degrees or with thesis and dissertation requirements may find it easier to establish a line of research in culturo-behavior science than those who teach in programs without student research requirements. Oftentimes, faculty-advised student research projects can turn into publications that help faculty members meet tenure and promotion criteria or serve as the onset of a line of research (e.g., Machado & Todorov, 2017). Faculty members who teach in programs that offer only undergraduate degrees, or do not have a student research requirement, may find it beneficial to partner with other university-based training programs with a focus in culturo-behavior science, participating in their lab meetings or finding highly motivated students in their respective programs to conduct replication studies. Becker, Cihon, and Ortu will be exploring this option in the coming academic year(s) with two colleagues in Brazil. At each degree level there are also considerations related to the students' repertoires and to culturo-behavior science content; we discuss ways to cultivate students' interests and ways to introduce students to culturo-behavior science in the section below.

Faculty Considerations

Contingencies change for faculty members and researchers over the course of their career, and the current state of culturo-behavior science on a social and professional level does not provide a pipeline to faculty or students. Frontierspersons must forge rather than follow a path, and this state of affairs lays out contingencies for all involved. In this section, we share some of the insights about faculty contingencies that we have garnered from the pursuit of a culturo-behavior science research lab during the early, mid, and late stages of a career as well as from the perspectives of tenure-track and research-track faculty.

Research Faculty

The freedom to operate as a broad selectionist researcher may not be often forthcoming in a job market that typically looks for deep "vertical" expertise, as compared to a broader ability to connect the dots across domains. What we recommend

⁵ <https://docs.google.com/document/d/1EkO8kYef0pc41SqcBg6MvvkXcHIIRBJqpaV3SgMcnMI/edit?usp=sharing>

to individuals interested in pursuing a research career is to acquire a deep “vertical” expertise in a meaningful subject matter that may facilitate being hired, and then over time to slowly broaden, in a logical manner, the scope of one’s research. Taking Ortu’s trajectory as an example, even a research faculty member whose primary line of research involves carrying out neuro-operant experiments and interpretations can find a bit of time in the schedule to pursue secondary interests. In the case of Ortu’s research, because both neural and cultural analyses can be brought (carefully) within the same selectionist umbrella framework, the two areas can be described as conceptually related by the fundamental importance of variation, selection, and retention. A broad question that can be asked is, does selection by consequences operate differently across the phylogenetic, neural, behavioral, and cultural levels of analysis?⁶

This “slowly expanding scope” approach should be pursued carefully. Not all departments may be favorable to it, and its role within relevant missions should be considered. This kind of trajectory is more likely to occur in a department that encourages collaborations among faculty members. Even within such environments, the researcher should build a solid foundation of published work in their primary area of expertise before expanding to adjacent fields. Ortu’s first 6 years of postdoctoral and research faculty experience involved experimental and conceptual work exclusively in neuro-operant relations, before he expanded his scope.

The above considerations may not apply in the case of a research faculty member who is hired specifically to carry out culturo-behavioral research within a selectionist framework—in that case the researcher will not need to slowly change and expand their scope. As more funding opportunities may become available over time for researchers with a horizontal rather than vertical scope, this kind of scenario will hopefully become more frequent.

Tenure-Track Faculty

As is the case in so many fields, the lack of tenure-track faculty positions in behavior analytic programs constitutes perhaps the largest obstacle to culturo-behavior science in the United States. Behavior analysis in general has been changing over the past 3–5 decades, with basic labs closing and infrastructural support shifting, sometimes exclusively, toward developmental disorders. Thus, it may be rare that a new faculty member can be hired to study culturo-behavior science or a related field such as OBM as a primary focus.

Should a new tenure-track professor happen upon one of these rare opportunities, their primary challenge will be to satisfy academic performance career contingencies in this field. Academic environments usually require early career tenure-track faculty to produce quality scholarship, teaching, and service. We have already mentioned how one might incorporate culturo-behavior science content into existing

⁶See also Killeen (2017) and Killeen and Jacobs (2017).

courses or how to adopt a culturo-behavior science course sequence. Service opportunities may include organization and mobilization of the small community as well as scholarly review and dissemination.

Current scholarship contingencies supporting tenure include sustainable research funding and substantial contribution to the research literature. While there are not yet many purely behavior analytic sources of research funding for culturo-behavior science, there are many resources available with more generic descriptors. Much culturo-behavior science work can fit into the funding structure of the National Science Foundation's Directorates for Social, Behavioral, and Economic Sciences or Science of Organizations, for example. A researcher's understanding of adjacent fields studying culturo-behavioral phenomena can be useful in a very practical way here; demonstrating a deep knowledge of multi-field understanding will make it easier to communicate the benefits of funding alternate or modified approaches. In general, presenting a behavioral approach as necessitated by a (very well-understood) hole or deficiency in more established paradigms might increase funding agencies' confidence in risking investment in such effort. Here, the behavior analytic value of pragmatism may prove advantageous given the current interest of many agencies in emphasizing the development of solutions rather than theoretical understanding alone.

Should a new tenure-track professor find themselves interested in exploring culturo-behavior science while maintaining a job description with a different focus, the task becomes more difficult. Depending on the circumstances, such a new professor may be wise to focus nearly exclusively on the topic of their primary job description due to the difficulty of successfully splitting focus at that stage of a career. Should a split approach be chosen, we would recommend a great deal of deliberate planning and strategy in order to increase chances of success. Divergence can be easier once momentum has been established for job-sustaining contingencies. Unsurprisingly, new professors lucky enough to be part of a university with other faculty pursuing culturo-behavior science research may find it easier to become involved earlier in their career. The ability to dabble, to attend to advancements in the field, and to contribute to an ongoing program of research may be an opportunity to keep a door open and to grow the field's numbers in the future. Such intermixing also produces exposure opportunities for students with various backgrounds, which may in turn lead to important interdisciplinary developments.

Contingencies shift for tenured, mid-career professors. With the release from the contingencies required for earning tenure, the Associate Professor might encounter fewer barriers to exploring new areas of interest as the "publish or perish" contingencies are somewhat lessened. This newfound freedom from aversive control, often coupled with some mastery over one's teaching load and experience with how the contingencies of their academic unit function or encouragement from their universities to become involved in interdisciplinary research and teaching, can set the occasion for taking more risks and exploring new areas of interest. Associate Professors might try new experimental methodologies and preparations. They might be more willing to experiment with their course design, introducing students to culturo-behavior science. Associate Professors might also find themselves with

different service responsibilities and expectations. Sometimes the service responsibilities might address issues (e.g., student advising, program coordination, strategic planning, college-level committees) that require a systems-level perspective, or involve more established community-partners who want to improve their organization or system; in both instances one might find the concepts and principles from culturo-behavior science helpful (e.g., Houmanfar & Mattaini, 2017; Mattaini, 2013). Associate Professors might also find themselves in the position to cultivate new mentor relationships. Having established themselves in their academic discipline, they may be more apt to approach more experienced faculty with their ideas and interests regarding collaborations after having contacted the reinforcers associated with peer review of their promotion and tenure packet. They might be eligible for sabbatical, which can be levied to spend time with a mentor in culturo-behavior science or may be allocated to consume the culturo-behavior science literature.⁷ They may be freer to wrap up a previous focus or line of research and begin a new one. They may be able to radically integrate their previous expertise with culturo-behavior science, as Cihon has begun to do, in a manner that need not avoid controversial innovation or even resistance from either field.

Retired Faculty

One possible source of support for researchers establishing a lab in culturo-behavior science is retired faculty members who worked in this area at the same university or at a nearby university. Interest among retirees no doubt varies among individuals, but both faculty and students stand to benefit from formal or informal, frequent or infrequent, interactions with former faculty with experience not only in the research area but also in the ways of the university. They may be willing to contribute to lab meetings, meet with students in reading groups, give talks on the research area, make use of their connections to establish field experience opportunities, or serve as unofficial mentors on an as-needed basis.

Student Considerations

A research lab cannot thrive or sustain without students who form an integral part of the present state and the future of culturo-behavior science. Next, we outline considerations for recruiting students to culturo-behavior science labs, introducing students to culturo-behavior science, and engaging students in culturo-behavior science research.

⁷See Zilio (2019) for a recent bibliography and critical review.

Student Career Paths

With some exceptions including academia or the natural job demands of a Board Certified Behavior Analyst or facility manager, culturo-behavior science will be best applied or investigated outside of typical behavior analytic environments. Thus, behavior analysis faculty cannot provide students with a credential that will enable them to utilize an education in culturo-behavior science as they wish to do or to enter the workforce in their area of interest...yet. Students therefore, at least in the short term, need to consider what credentials may be vital to put them into a position from which they can grow and develop this field as their interest or passion has led them to do. This challenge need not necessarily be a drawback. The logical necessity that it presents is often dual training of some kind, which as we have mentioned can enrich the repertoire in useful ways. Students with a drive toward community interventions or political structure could find an avenue into those areas via political science, law, or policy degrees. Students looking to dive into organizations may need business, nonprofit management, or information degrees. These are only a few examples. In order to best serve students, it is a good idea to make sure that these logistical necessities get onto their radar at an advantageous time, when they are ready to seriously consider their direction but before they leave the fold of their behavior analytic community. The latter recommendation follows from the potential that students may want to start exploring the educational content of the requisite credential early so that they can practice integrating its concepts with a culturo-behavioral framework (if integration is possible). Without this component integration repertoire, students may be in danger of simply learning two independent sets of intellectual and practical skills and, in all probability, defaulting to the credentialed thinking as their new professional community differentially reinforces it. On the other hand, early practice at integration may unify the minimal repertoire in a manner that enables students to better benefit from the culturo-behavioral training provided during their student experience.

Cultivating Students' Interests

Some students may be asking questions such as what contingencies maintain religious beliefs and behavior; what sustains the use of coercive practices in social systems and organizations; how might we alleviate food insecurity, poverty, and other inequities; how can we alleviate sustainability issues such as overpopulation, overuse of common pool resources, and climate change; or how might we take behavior analysis and behavior change to scale. These content-driven, problem-focused questions serve as hints that a student is ready to learn about culturo-behavior science and provide a starting point by which faculty mentors can foster that interest, shaping the students' repertoires to consider the behavioral and cultural processes underlying specific social issues.

Introducing Students to Culturo-Behavior Science

Undergraduate and masters' students come to behavior analysis with a long history of explaining behavior by appealing to inner agency. Their foray into behavior analysis requires them to challenge themselves to seek the causes of behavior in the organism's history of behavior–environment relations and to approach this understanding from a selectionist framework, oftentimes in complete opposition to their own extensive learning histories. As students are coming into contact with behavior analysis for the first time, they are much like students coming to school for the first time. There is a new vocabulary to learn and to adopt. There are new ways to think about and analyze why certain events/behaviors occur. There are new sources from which to obtain reinforcers and new stimuli that can come to function as conditioned reinforcers. However, most of their existing repertoire does not result in reinforcement if emitted in this new environment; many of their past reinforcers are no longer available, and most students require a carefully constructed set of learning opportunities to help them understand and utilize the philosophy of radical behaviorism. Students newly approaching culturo-behavior science may show some of the same structural and essentialistic patterns that are common to students first encountering behavioral concepts more generally. Although many students of behavior analysis are introduced to at least two levels of selection through their coursework or other experiences, it may be less probable that students are introduced to cultural selection. Burdened by a different vocabulary, and in some cases, different units of analysis, etc., we gradually introduce students to culturo-behavior science. We introduce concepts and principles dealing with the patterns of behavior of many individual organisms and their interrelationships. We then introduce contingencies that maintain these behaviors individually or their patterning as a cohesive whole. We provide students with readings inside and outside of behavior analysis and culturo-behavior science spanning theoretical, philosophical, experimental, translational, and applied domains. And, we give them the space and support to discuss, question, revisit, and design experiments to test their questions and ideas.

Readings, Discussions, General Infrastructure Different culturo-behavior scientists will have their own personal style of mentoring students and their preferred lists of materials and readings. Here we offer some suggestions for foundational topics and sample readings one might use in addition to the reading list soon to be available on the ABAI website for approved course sequences in culturo-behavior science to introduce themselves or their students to the subject matter (see Table 5.1). This list is by no means exhaustive; we highly recommend exploration on the part of pioneering scholars to discover existing sources of data and ideas that may be fruitful to the field.

Table 5.1 Suggested topics, subtopics, and readings

| Topic | Subtopics | Papers |
|---------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Component-composite | Emergence | Alessi (1987), Becker (2019), Binder (1996), Houmanfar et al. (2010) |
| | Reduction/Levels of Analysis | Bechtel (2005), Bechtel & Hamilton (2007), Schaal (2003) |
| Systems | General System Theory | Von Bertalanffy (1968) |
| | Self-organizing systems | Moroni (2015) |
| Selection | General Selection Theory | Hull (1987) |
| | Cultural Level Selection | Campbell (1965), Couto & Sandaker (2016), Glenn (2004), Glenn et al. (2016), Krispin (2017, 2019), Skinner (1981) |
| | Group Selection | Wilson et al. (2014) |
| Cultural Materialism | | Harris (1964) |
| Interdisciplinary work | | Abrahamsen (1987), Mattaini (2019), Sandaker (2006) |
| Behavior Systems Analysis (BSA) | | Binder (1998), Brethower (2008), Gilbert (1978), Glenn & Malott (2004), Malott (2003) |
| Social Issues | | Biglan (1995, 2016), Mattaini (2013), Levin et al. (2012), Rittel & Webber (1973) |
| Game Theory | | Camerer & Fehr (2004) |
| Tragedy of the Commons | | Ostrom (1990) |
| Social Psychology | | Guerin (1992, 1994) |

Mentoring Students

In the area of culturo-behavior science, it is more difficult to use systematic replication or specific training as a mentoring tool as this area of inquiry is relatively new. More often than not, the situations students face in culturo-behavior science, and the problems that society is facing in general, do not have a one-to-one correspondence with something that has been investigated before on a culturo-behavioral level except perhaps interpretively. In such a scenario, students must rely on their minimal repertoires to recombine and to produce a response to a novel situation.

Alessi (1987) described generative instruction as realized through explicit instruction of a minimum set of discrete stimulus–response relations. These repertoires are recombinative in nature and produce novel behavior. Skinner (1957) describes minimal response repertoires when he describes those verbal operants that have point-to-point correspondence such as the echoic and textual operants—as when you hear a single speech sound and repeat it or in the case of decoding when you see a letter and say the corresponding sound. Once an individual has acquired a minimal echoic or textual repertoire, these repertoires can recombine into novel response forms such as repeating or decoding novel words in the language in which

you have acquired a minimal echoic or textual repertoire. Throughout the mentoring process, whether to support students in conducting their own experimental analyses, or to introduce them to culturo-behavior science, there is a minimal repertoire that can best serve the students' development. The idea is to push them beyond simply parroting ideas toward synthesis, analysis, and independent exploration of cultural phenomena. We try to organize our instruction to help students to develop a *critical recombinative repertoire*.

First, we give students a strong grounding in the philosophy and assumptions of science, in the philosophy of radical behaviorism more generally, in the concepts and principles of behavior analysis, in its specific approaches to experimental and applied investigation, and in BSA. This strong foundation supports students as they begin to encounter the concepts and principles of culturo-behavior science, conceptualize problems and solutions, and identify appropriate units of analysis.

Next, we help our students to develop a working understanding of IBCs, APs, culturants, cultural contingencies, metacontingencies, macrocontingencies, culturo-behavioral lineages, and cultural cusps. Oftentimes, however, once students are introduced to the metacontingency, they try to use the concept to develop an account for every phenomenon of interest. Not everything cultural must be or can be accounted for or explained by metacontingencies. Not all interlocked or social behavior is selected as a unit at the cultural level. Many social issues are due to the cumulative effect (e.g., macrocontingency) of several people engaging in behaviors with similar effects but without interlocks. These cumulative effects can be amplified via transmission between individuals in culturo-behavioral lineages. As such, an additional important component skill for students to develop is the discrimination of which phenomena are likely to involve behavioral selection across cultural contexts and which are likely to involve selection of cultural-level units as well as behavioral units. Another component skill we encourage the students to develop is how to identify culturo-behavioral lineages or phenomena that recur beyond the individual operant lineage, across individuals, or even, "beyond the lives of organisms whose behavior contributes to the lineage" (Glenn et al., 2016, p. 17). As when students are first coming into contact with the natural science of behavior and tend to focus on a single instance of a response, students of culturo-behavior science may become overly focused on a single instance of a cultural phenomenon that may or may not be representative of a selected unit.

Next (and sometimes earlier), we expose students to the variety of other primary materials that influenced the above-mentioned foundation. We encourage seminar-style synthesis of ideas across these various sources. Then, we encourage students to develop experimental or applied investigations utilizing their new repertoire. Experimental approaches may seek to inductively test, challenge, or refine some of these ideas. Real-world problems such as healthy and effective political organization, social justice, workplace behavior, sustainability, and much more constitute a whetting stone for culturo-behavioral ideas and, much more importantly, a set of problems and challenges in our society that are in desperate need of effective action.

In addition, we try to provide our students with and encourage them to seek varied, in-depth experiences in their courses and other lab-based and clinical

experiences that will assist them in developing the repertoires that will prepare them to explore and advance culturo-behavior science. Sometimes this takes the form of taking classes in another discipline area; doing a practicum, internship, or other applied project in the community; or attending another lab. For example, many students in the Cultural Design & Systems Lab also attended Cihon's Teaching Science Lab, attend weekly reading groups on philosophy or systems, or attend Ortu and/or Becker's neuro lab(s) or Dr. Shahla Ala'i's Social Justice lab.

Advancing Culturo-Behavior Science Through Research

Philosophical, Theoretical, and Conceptual Research

Conceptual work is foundational in science and—when appropriately constrained by logic and previous empirical research—can lead to major breakthroughs. For instance, in physics, the existence of the Higgs Boson was predicted in 1964 in a theoretical paper (Higgs, 1964). Higgs' theoretical analysis about the elusive particle has only been validated in 2012 (CMS Collaboration, 2012). Even though behavior analysis and culturo-behavior science certainly are not in the same stage of advancement as physics, theoretical accounts still play a role when it comes to interpreting phenomena beyond the scope of experimental work (e.g., Palmer, 2009). Glenn started by observing some large-scale phenomena, and analyzed them logically within a selectionist framework, culminating in the most recent set of conceptual definitions regarding culturo-behavior science (Glenn et al., 2016).

The theoretical endeavor in culturo-behavior science research is as important as it is hard to carry out. The difficulties arise because, without the strong constraints of an empirical literature that is still in its early stages, the language of the scientist may progress in a sequence of loosely intraverbally controlled sentences. What can happen then is an unchecked use of terminology borrowed from complexity science, social network analysis, systems analysis, biology, selectionism, behavioral economics, etc. This can lead to confusion and may actually slow down the progress of the field. Figure 5.1 includes a list of suggested rules to follow whenever writing theoretical papers within the culturo-behavior science domain (top panel), particularly when synthesizing ideas from disparate sources. An example of a logical development of a conceptual paper describing the metacontingency is depicted in the bottom panel of Fig. 5.1.

Experimental Research

The operant chamber has been a useful inspiration and analogy in ours and in others' efforts to establish experimental preparations for the investigation of feedback on the repeated production of specific APs. Given that most researchers interested

Suggested Rules

1. The paper starts, and after some introductory statements a content term is introduced. Have I fully defined the term in all of the properties that are relevant to the current paper? Try to simply and exhaustively render the definition within a paragraph, then move on with a smooth transition to the next paragraph.
2. If I am introducing another term, is the new term (and its definition) absolutely necessary? If it is, then proceed as in point (1), then move on.
3. If other content terms are introduced, follow points (1) and (2).
4. When all the main content terms of the paper have been defined, do not go back to refine definitions at later points in the paper.
5. Definitions should build progressively on each other (A is defined, B is defined including A in the definition, C is defined based on A and B, etc.). Definitions based on previous definitions are based on logical relationships. Many kinds of possible logical relations may exist among the defined content terms. For example, B includes A, or C is a function of B and A being present at the same time. Ideally, the relationship between content elements should be understood clearly in an abstract fashion before it is described using non-abstract language.
6. After definitions have been provided, subsequent paragraphs may involve descriptions of possible relations between the core content elements previously described. These relations can, in turn, become content elements to be used in further portions of the paper.

Example of a Logical Development

Touching is an example of a movement. A **movement** is a displacement of some parts of the organism. Movements have an effect on the environment. (definition)

The **environment** is the space measured by the experimenter via some sensors. (definition)

A **sensor** is an object whose properties can be altered by movements. (definition)

The sensor can measure movement A. (relation between two previously defined content terms)

A **consequence** is an environmental event measurable through the experimenter's sensors that has a postcident temporal relationship with a movement (definition)

A **contingency** is an if-then statement. If event A happens, then event B will follow. The experimenter can set up the contingency: If the sensor measures movement A, then a consequence B will occur. (definition)

If the contingency in place increases movement A compared to when the contingency is not in place (if A then not B) then **behavioral selection** has occurred. (definition)

An **interlocking contingency** involves at least two organisms. For example, person X behaviorally selects Person Y's movement A. Also, Person Y can concurrently reinforce Person X's movement B. (definition)

The experimenter can have a sensor measuring when, within 5 seconds, Persons X and Y behaviorally select each other's movements. (relation)

The sensor switch going off is described as an **Aggregate Product (AP)**. (definition)

A **cultural consequence** is an environmental event affecting some or all the individuals' part of the interlocking contingency. (definition)

The experimenter can set up a **metacontingency**. If AP occurs, then a cultural consequence is delivered. (definition)

If the metacontingency in place increases the AP as compared to the metacontingency not being in place (if A then not B) then **cultural selection** has occurred. (definition)

Fig. 5.1 Suggested rules (top panel) to follow whenever writing theoretical papers within the culturo-behavior science domain, particularly when synthesizing ideas from disparate sources and an example of a logical development of a conceptual paper describing the metacontingency (bottom panel)

in culturo-behavior science have a behavior analytic background, culturo-behavior science basic research appears to be naturally progressing in a parametric fashion—e.g., manipulating the schedule in which feedback to the system is provided, manipulating the magnitude of the feedback, etc. (e.g., Borba et al., 2017; Soares et al., 2019; and Chap. 6 in this volume).

One thing that is still lacking from an experimental perspective is a correspondent analysis of possible analogs to the role of discriminative stimuli and/or motivating operations. It is possible that when it comes to metacontingencies, the analogy with the operant applies in relation to the consequence, but not to the antecedent. Another possibility is that researchers have yet to figure out how to characterize a cultural analog of stimulus control, or eschew that in favor of focusing on an analog of motivating operations. Either way, culturo-behavior science basic researchers need to be ready to abandon the familiar operant chamber landscape and to let the data lead them to uncharted territory. The way in which selection by consequences operates as a “meta-process” across levels of analysis leaves open many mechanisms. The mechanisms and processes of variation, selection, and retention vary greatly across the phylogenetic and behavioral levels; it is to be expected that they should also vary when examining cultural phenomena.

An interesting domain that culturo-behavior science researchers may find exciting is an experimental analysis of Harris’ (1979) cultural materialism. Cultural materialism and behavior analysis have historically found some commonalities (e.g., Glenn, 1988; Harris, 2007); yet, it would be useful to assess infrastructural determinism in an experimental setting, specifically how infrastructural variables influence superstructural elements. How does the language of the experimental microculture vary as a function of infrastructural changes? Is the unidirectionality of the process (from infra to super as Harris proposed) validated experimentally or can superstructural variables in turn influence infrastructural elements, leading to a bidirectional revision of Harris’ model? If they can be identified and function as Harris supposed, is the mechanism of their expression related to identified cultural functions? Are relations between superstructural verbalizations and structural practices sometimes components of metacontingency-maintained interlocks? These and many other potential questions remain.⁸

Translational and Applied Research

The importance of translation and application comes from the dire current state of the cultural world. The problems and challenges that face us are not just numerous but literally maximized in importance. On an individual level, the influence of culturally determined individual contingencies can make or devastate the priceless lives

⁸Also see Chap. 6 in this volume for an introduction to, review of, and recommendations for advancing experimental analysis of culturo-behavior science.

of the creatures on this planet, human and nonhuman alike. This is the case particularly for the early periods of human lives, from which behavioral development will send ripples across decades into the future. It is also the case for any population whose social power and countercontrol has been minimized, including women, the poor and violence-ravaged, ethnic or religious minorities, LGBTQIA+ individuals, the elderly, children, livestock and poultry, wild populations on the brink of extinction or undergoing widespread suffering, etc. On a cultural level, much of what affects those individuals is sourced from governmental, economic, and other power structures that create and maintain problems such as environmental decimation and climate change, institutional human and animal abuse and exploitation, widespread poverty, etc. On the level of missed cultural potential, even when effective systems design and cultural selection contingencies have been demonstrated in some corner of the world's educational, political, economic, or public structures, they often go unreplicated in wider or related communities. In short, if most of our problems on this planet are behavioral, most of those behavioral problems are linked to cultural patterning. This is often because the behavioral contingencies that account for the problems must themselves be accounted for at the level of culture.

This scientific and consequential enormity can place a burden on a young field trying to tackle these problems. Here a new pioneer can take a page from other behavior analytic practices that are older, that also held burdens of great consequence (e.g., autism intervention), by remembering that problems and research need to be broken off one piece at a time before a whole can be constructed. Such an approach sharpens the conceptual and social contributions of basic and translational culturo-behavior science. It is unlikely that an all-encompassing leap in this field will come before component problems are repeatedly used to hone and direct our progress; attempting to take such a leap conceptually could lead to highly vague analysis. Moreover, taking that leap experimentally is logistically infeasible and ethically inadvisable (and, in the case of modeling approaches, unlikely to be translatable so early on). Instead, culturo-behavior scientists can tackle problems of organization in one classroom or one organization before taking responsibility for the global culture. Investigating the variables that encourage or discourage behavioral or cultural transmission across several people or communities is within reach, in contrast to controlling global trends. With the right training and the right network between researchers and policymaking entities or business leaders, harmonious metacontingencies that mutually procure previously conflicting cultural products important to opposing organizations or interests may be discovered and applied. Most or all of the problems mentioned in the paragraphs above could be addressed and solutions tested in manageable chunks. Where possible, this kind of work will serve to both guide and test basic work as well as lending immense meaning to the entire endeavor of culturo-behavior science. The harsh edges of reality and efficacy can sort the wheat from the chaff of our basic efforts.

Basic science and applied science exist on a continuum, with "translational" science (i.e., problem-oriented basic science) somewhere in the middle. As in all research, both areas hold tremendous importance in culturo-behavioral investigation. As Baer (2001) so eloquently put, "...'applied' could have an underlying

meaning as well. It could be an acid test of proof” (p. 256). Basic science and theoretical treatment need not justify their existence with early understanding of how they may be acid tested in the course of technological application. But eventually, any theoretical or basic exercise must carry significance beyond the frame of its initial experimental or interpretive cradle if it is to be useful in any profound sense.

Supportive Practices

To this point we have largely discussed the contingencies related to starting a lab in culturo-behavior science. Equally important is how to arrange the contingencies that will sustain the lab. Biglan (1995) and Mattaini (2013) provide a framework for how to identify target practices for a group to engage in and how to identify and subsequently arrange the contingencies that would evoke their occurrence and maintain their recurrence. Engaging in a similar exercise can help the faculty member or researcher starting a lab to identify the environmental variables, idiosyncratic to their respective environments that could support the continuity of their efforts to advance culturo-behavior science. We close by describing some of the practices that we have found helpful in our efforts to continue our work in culturo-behavior science as well as some ways in which faculty members and researchers might organize their environments to facilitate similar practices.

Interdisciplinary Collaboration

Frequently culturo-behavior science is of interest to or requires support from other disciplines. Cooperation is not only important as a target of many of the studies in culturo-behavior science but it is also a critical component skill for faculty members, researchers, and students who are pursuing work in this area. We help each other, and our students, when we embrace collaboration, identify what behavior analysis can bring to the table in interdisciplinary collaborations, and identify how the combined efforts can generate conceptualizations of social problems and solutions that are greater than what can be generated by each discipline in isolation. One practice we embrace and emulate is that the goal for collaboration is not to force one or the other to shift or to adopt the other’s perspective. Humility is critical, particularly as we are expanding the scope, reach, and versatility of our own science.

Finding Mentors

Just as mentoring is important for students, mentors can provide an important source of support for faculty members and researchers who are developing expertise in a new area. Identifying mentors may prove challenging for faculty members and researchers who are just entering the domain of culturo-behavior science. The BFSR SIG has published a directory that includes several professionals with interests in mentoring others in culturo-behavior science.⁹ As previously mentioned, another potential source for mentors is retired faculty. Faculty members, researchers, and students might find support from authors of recent papers or chapters published in culturo-behavior science (e.g., *Behavior and Social Issues*; Cihon & Mattaini, 2019). Several students in the Cultural Design & Systems Lab have forged interactions with culturo-behavior scientists in this way, obtaining advice on the extension of the research they are planning, obtaining resources (e.g., computer programs and various materials), and/or working collaboratively on projects of mutual interest. Lastly, mentors can be contacted through attendance at conferences focused on or with presentations related to culturo-behavior science.

Communities of Practice

Similarly, faculty members and researchers who are interested in culturo-behavior science can benefit from developing or becoming part of a community of practice (e.g., Ellis & Glenn, 1995; Wenger, 2000). The Think Tanks in Cultural Analysis have served as an important community of practice for many culturo-behavior scientists. The Cultural Design & Systems Lab frequently hosts meetings online in which members of the Think Tanks as well as others working in culturo-behavior science discuss their research. Another important source of mentorship and community might be found by joining ABAI SIGs that support advancing culturo-behavior science.

Student and faculty exchanges between institutions and research labs are another way to develop mentoring relationships and communities of practice (for an example, see Cihon et al., 2018). Student and faculty exchanges were integral to Glenn's Behavior and Culture Lab and have become common practice in the Cultural Design & Systems Lab. In the short time that the lab has been reestablished we have already hosted three visiting scholars from Brazil and Cihon served on the dissertation committees for one of Sandaker's students at Oslo Metropolitan University in Norway. In addition, a number of our graduate students are actively pursuing exchange opportunities for collaborative research and internships at institutions with related interests.

⁹ https://docs.google.com/spreadsheets/d/1MaMe2P84Q3on4VgHltyC1zpZeMLMB2sP1H_m58_JTh8/edit

Closing Remarks

Culturo-behavior science will develop through the actions of the participating scientists, through their explorations of new ideas, critical reviews of concepts and theories, and conduct of experimental analyses. Diverse perspectives and participation are critical for the growth of the science. The faculty-led research lab in culturo-behavior science can be conceptualized as its own microculture, or system, and as such, is an important context for cultural transmission. There are various actors, and the individual scientists will change over time. Although starting a culturo-behavior science lab may seem daunting at first, it is our hope that the experiences that we have shared and the suggestions offered here will help interested faculty members and researchers to move forward, to realize their interests in culturo-behavior science, and to transmit the science to their students, to each other, to behavior analysis, to other disciplines, and to the world at large.

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Chapter 6

Experimental Analysis in Culturo-Behavior Science: The Search for Basic Processes



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The host of problems facing society from the overuse of natural resources to social injustices are often the result of human behavior. Social issues are some of the major reasons behavior scientists have sought to identify basic mechanisms to explain behavior change and to develop interventions that improve humans' quality of life. Behavior scientists have discovered principles and developed technologies that shift behavior-environment relations to produce socially significant behavior change (e.g., Baer, Wolf, & Risley, 1968; Wolf, 1978). Yet, tackling deleterious cultural practices has proved more challenging for behavior scientists (e.g., Skinner, 1987).

Behavior scientists have approached the science of cultural change from three vantage points. The first is a philosophical enterprise. Over the years, a considerable amount of conceptual and interpretative work has been done to describe cultural practices and their supporting contingencies (e.g., Glenn, 1986, 1988; Lamal, 1991; Skinner, 1953; Todorov, 1987). The second is applied research and practice. Work in organizations (e.g., Malott, 2003), public policy (e.g., Biglan, 1995), correctional

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settings (e.g., Ellis, 1991), and communities (e.g., Aspholm & Mattaini, 2017; Watson-Thompson et al., 2018), for example, have brought behavioral strategies and techniques to solve socially relevant behavioral phenomena. The third is the experimental analysis of behavior (EAB).

EAB is the domain of behavior analysis that is concerned with basic research or the description of processes and principles that explain behavior (Moore & Cooper, 2003). EAB researchers control as many variables as possible, to the extent possible, manipulating one at a time in order to identify orderly relations between independent (environmental) and dependent (behavioral) variables, using precise terms (Johnston, Pennypacker, & Green, 2019; Sidman, 1960). Aside from defining and manipulating variables with precision, another major concern for EAB is the methodology. Lattal (2013), for example, points out that single-subject design is one of the pillars of EAB. It allows investigation of how specific independent variables change the behavior of an organism, who serves as its own control. Statistical methods and between-groups designs may be important in understanding correlations (e.g., knowing that 95% of organisms in such a situation would behave in such a way) but there is nothing a priori to guarantee that the scientist or professional is not dealing with one of the other 5% (Johnston et al., 2019; Sidman, 1960). Once the explicit functional relations are identified through single-subject design, these results can be expanded to single-system designs (e.g., multiple baseline across communities designs) or designs commonly used to address public health concerns in which statistical analyses focused on incidence and prevalence, thus bridging the knowledge produced from fully controlled lab designs to community and cultural research and intervention.

The experimental analysis of cultural practices manifested in laboratory studies of the metacontingency is a recent addition to behavior-scientific efforts to address social issues, bringing new experimental strategies and tactics to the behavioral research regarding cultural phenomena. These efforts have been heavily inspired from Skinner's (1981) proposal that there are three kinds of selection: phylogenetic, ontogenetic, and cultural. According to Skinner (1981), the phylogenetic level is selection that occurs over evolutionary time; ontogenetic selection is that which occurs during the lifetime of the individual (i.e., operant); and cultural selection is that which accounts for the evolution of cultures. Expanding his earlier discussions of social behavior and culture (e.g., Skinner, 1953), the third kind of selection has been controversial (see Catania & Harnad, 1988) and highly influential, particularly for those behavior scientists interested in the transmission and selection of cultural practices.

Criticisms regarding the laboratory research on the metacontingency (e.g., Mattaini, 2019; Zilio, 2019) are similar to those made of EAB. Some suggest that researchers simplify the behavior and environmental controlling variables such that something is lost when extrapolating the results produced with very simple behaviors to complex phenomena (see Mace & Critchfield, 2010). Thus, it may be difficult for applied researchers and practitioners to bridge findings from basic research to practice. Glenn and Malgodi (1991) assert that such criticisms discount the goal of EAB. Principles are content-free: their objective is to "provide the framework

within which specific behavioral relations are understood. That conceptual framework enhances transfer of skills to new populations, problems and settings” (Glenn & Malgodi, 1991, p. 3). The content—the phenomena itself that needs to be explained—is then more readily described because of the principles identified from the research conducted in experimental settings.

The distinction between process and content is especially important in cultural analysis because two very different cultural phenomena may be explained by the same processes and “similar phenomena” may be described by different processes. For example, da Hora and Sampaio (2019) suggest that corruption can be described by both operant and cultural contingencies. In both cases, the underlying processes involve concurrent alternatives with conflicts between immediate and delayed consequences. In one, choices for the immediate consequence produce higher reinforcement magnitude for the individual (operant) but delayed harmful consequences for the group (cultural). Choices for delayed consequences lead to more beneficial outcomes for the group, and lower reinforcement magnitude for the individual. Borba (2019) suggests the same principles maintain the selection of plantation-like monocultures in the production of açai berries in the Brazilian Amazon. The monocultures allow for bigger harvests at the expense of the native vegetation, resulting in overuse of the soil. Native populations do not benefit from the revenue produced by selling the fruit to international markets. Here, the same processes explain two different phenomena (content). On the other hand, Agbota, Sandaker, De Carvalho, and Couto (2017) highlight different aspects of corruption. They suggest that the interplay among clients, administrators, and officers is maintained by individual consequences, but interlocking behavior also produces a cultural consequence in the form of avoiding detection (penalties). These suggest different processes than those thought to guide choice behavior as in da Hora and Sampaio.

Although experimental researchers have tackled social behavior since the 1950s (e.g., Azrin & Lindsley, 1956), metacontingency experiments present new strategies to identify the basic processes surrounding cultural phenomena. The purpose of this chapter is to review the basic laboratory studies on the metacontingency. We begin with a description of how the concept of the metacontingency was developed prior to any extensive experimental work. Then, we describe the method employed to select the articles for review. Next, we introduce the experimental strategies and tactics that are commonly employed in the basic laboratory research and describe the major themes, findings, and limitations of this work. Finally, we close the chapter with a discussion of limitations, common criticisms, and recommendations for research.

Building an Experimental Analysis of Cultural Selection

Bridging concepts from behavior analysis, anthropology (e.g., Harris, 1964, 1979; Malagodi, 1986; Malagodi & Jackson, 1989), and biology (Hull, Langman, & Glenn, 2001), behavior scientists explored what a behavioral analysis of culture, cooperation, and cultural practices might entail and debated if it is within the purview of

behavior analysis (e.g., Glenn, 1986, 1988; Malagodi & Jackson, 1989; Ulman, 1978, 1998, 2006; Vargas, 1985). Glenn (1986) postulated that contingencies different than those at the operant level select cultural practices. She proposed the metacontingency as “the unit of analysis describing the functional relation between a class of operants, each operant having its own immediate, unique consequence, and a long term consequence common to all the operants in the metacontingency” (p. 2), a definition that is now more closely associated with the macrocontingency. The most recently proposed definition of the metacontingency is the “contingent relation between (1) recurring interlocking behavioral contingencies having an aggregate product and (2) selecting environmental events or conditions” (Glenn et al., 2016, reprinted in Chap. 2, this volume). Yet, the definition of the metacontingency has also been expanded by Houmanfar, Rodrigues, and Ward (2010). The five-term metacontingency includes the cultural–organizational milieu → socio-interlocked behaviors → AP → consumer practices → group-rule generation.

Glenn’s (1986) work led to subsequent theoretical and conceptual papers (e.g., Glenn, 1988, 1989, 2004) in which she advanced and refined the initial concepts. Many behavior scientists working in social institutions, communities, and organizations embraced the metacontingency in their efforts to develop an understanding of the selection of cultural phenomena such as apathy (Kunkel, 1991), education (Greenspoon, 1991), correctional settings (Ellis, 1991), political systems (Rakos, 1991), among others. These works were consistent with Glenn’s (2004) suggestion that the metacontingency might explain the selection of cultural practices or “similar patterns of behavioral content, usually resulting from similarities in environments” (p. 140).¹

The proposition that interlocking behavioral contingencies produced by two or more individuals working together and their resulting product could be selected was alluring. It was so compelling that many contributors to Lamal (1991) interpreted metacontingent relations that might explain various cultural phenomena. Malott (2003) brought the metacontingency into the realm of behavioral systems analysis and those behavior scientists working in organizational settings. Glenn and Malott (2004) garnered the attention of several prominent behavior analysts who published commentaries and responses to the metacontingency (e.g., Hayes & Houmanfar, 2004; Mattaini, 2004; Pennypacker, 2004; Sandaker, 2004; Ulman, 2004).

In 2005, the first Think Tank on Behavior and Culture was held in Campinas, Brazil (Todorov & Malott, 2005). Not every scholar who attended the first Think Tank embraced the metacontingency or was convinced that a new concept (beyond the operant) or a third kind of selection (cultural selection) was required for a selectionist account of culture (e.g., see Branch, 2006; Marr, 2006; Mattaini, 2006). Concerns were arguably understandable; there had yet to be any experimental analysis, observations, or demonstrations that confirmed that interlocking behavioral contingencies and aggregate products could be selected and that the contingencies accounting for selection differed from operant contingencies. The first experimental

¹Ulman (1978) provided an earlier concept of the macrocontingency without a functional definition, later defined as, “a set of differing actions (topographies) of different individuals under common postcedent control” (Ulman, 1998, p. 209).

analysis (Vichi, Andery, & Glenn, 2009)² inspired what would quickly become an important partnership among leading scholars of Culturo-Behavior Science (CBS), particularly those in Brazil, Norway, and the US. These partnerships served as the impetus for further experiments on the metacontingency as evidenced by the plethora of studies published since.

Method

We searched the PsycINFO database for “metacontingency.” To be included, articles had to be peer reviewed and include the term “metacontingency” in the title, abstract, or keywords. This resulted in 90 papers, published in English. The papers were chased forward (using Google Scholar citations) and backward (hand searched) to identify additional articles that were cited in one of the identified articles or that cited one of the articles previously identified. The resulting papers were also chased forward and backward. This process continued until all articles that were cited or had cited the selected articles were on the master list. A total of 154 articles published in English through 2018 met the inclusion criteria. This list was further refined to exclude articles that did not involve an experimental manipulation (e.g., articles that were conceptual, theoretical, descriptive, applied, or interpretative), leaving 29 articles.

Next, the authors added papers published in 2019 that also met the inclusion criteria. A hand search of *Perspectives on Behavior Science*, *BSI*, *The Psychological Record*, *The European Journal of Behavior Analysis*, *Revista Brasileira de Análise do Comportamento*, and *Revista Latinoamericana de Psicología* was completed to identify papers from 2019. Three articles met the inclusion criteria, resulting in 32 papers. Then, nine additional studies that were not conducted in a laboratory setting (i.e., experimenter contrived with experimental microcultures)³ or focused on concepts other than the metacontingency were excluded, leaving 21 articles.

Lastly, the authors added articles published in Portuguese that met the inclusion criteria.⁴ These articles were obtained by first identifying those included in the bibliography from Zilio (2019) and the papers published in peer-reviewed journals described by Martins and Leite (2016), and subsequently chasing these articles both forward and backward as previously described. Twenty articles were identified and added to the master list. In sum, 41 articles, divided into seven categories based on the experimental strategy, are included in the review (see Table 6.1).

²The experiment is based on the first author’s master thesis, completed in 2004, but not published until 2009.

³An experimental microculture is defined as a group of two or more individuals working together to complete a task, often arbitrary or designed by the experimenter to promote coordinated behaviors, in an experimental (analogue or contrived) setting.

⁴The authors could have also reviewed papers published in Japanese and Italian; however, the decision to ultimately add papers published in Spanish and Portuguese was based not only on the authors’ fluency in multiple languages but also on the fact that much of the experimental work on the metacontingency has been conducted at universities in Brazil.

Table 6.1 Most common experimental strategies and tactics in the reviewed metacontingency experiments

| Experimental Strategy | Operant | IBC | CC Contingent on | Experiments |
|-----------------------|--------------------------------|-------------------------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IPDG | Choice of X or Y or card color | Individual consequences depend on all participants' choices | Sequence of choices (i.e., XXXX or YYYY) | Costa et al. (2012) Morford and Cihon (2013) Ortu et al. (2012) |
| Matrix | Choice of odd or even rows | Participants' choices are SPs for other participants | Rows of different colors | Vichi et al. (2009) Franceshini et al. (2012) Tadaesky and Tourinho (2012) Cavalcanti et al. (2014) Pavanelli et al. (2014) Soares et al. (2012) Soares et al. (2015) Marques and Tourinho (2015) Borba et al. (2017) Gomes and Tourinho (2016) Hosoya and Tourinho (2016) Soares et al. (2018) Soares et al. (2019) Alves et al. (2018) Guimarães, Leite, et al. (2019) Guimarães, Picanço, and Tourinho (2019) |

| | | | | |
|----------------|-----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Numbers | Inserting four numbers that generate odd sums | Sum of participant's numbers is S ^D for other participants | Relation between participants' sums (i.e., participant A's sum is less than Participant B's) | Angelo and Gioia (2015) Baia et al. (2017) Caldas and Andery (2016) Saconatto and Andery (2013) Vieira et al. (2016) Baia et al. (2015a) Baia et al. (2015b) Baia et al. (2019) |
| Free-Culturant | Clicking on the water tap on the screen | Participant's clicks are S ^D 's for other participants | Time difference between clicks | de Toledo et al. (2015) de Toledo and Benvenuti (2015) Velasco et al. (2017) de Carvalho (2017) |
| Chessboard | Moving piece | Participant's movement is S ^D for another participant's move | Meeting in particular areas of the board | Vasconcelos and Todorov (2015) de Carvalho, Couto, et al. (2017) Azevedo and Todorov (2016) |
| Other | | | | Alfaix-Melo et al. (2010) Baia and Vasconcelos (2015) Hunter (2012) Neves et al. (2012) Nogueira and Vasconcelos (2015) Sampaio et al. (2013) Smith et al. (2011) |

Results

Vichi et al. (2009) was based on Wiggins (1969), shifting to single-subject research methodology with a metacontingency manipulation. They arranged participants into two groups of three or four participants each. Participants each received tokens at the onset of the experiment and placed individual bets on each trial. After all participants made bets, they selected a row from an 8×8 matrix, and the experimenter announced a column. If the intersecting cell contained a “+” then the experimenter added the same number of tokens bet on that trial and if it contained a “-” then the experimenter took away half of the tokens. The participants then divided the remaining tokens equally or unequally among themselves. The experimenter selected the columns based on how the participants had divided the tokens on the previous trial (unbeknownst to participants). The metacontingencies were reversed across Conditions A and B such that the consequence provided on the subsequent trial was contingent upon equal distribution of the group’s earnings in Condition A and on unequal distribution of earnings in Condition B. The results (later replicated by Franceshini, Samelo, Xavier, & Hunziker, 2012) suggested that the cultural contingency selected each group’s distribution of earnings in both conditions. Vichi et al. demonstrated that the coordinated actions of two or more humans could be selected by consequences contingent upon production of the aggregate outcome—a phenomenon observed in day-to-day social and cultural interactions but not previously arranged with the precision afforded in the lab.

Culturo-behavior scientists continued to conduct laboratory research on the metacontingency in order to isolate the basic processes that explain the recurrence of interlocking behavioral contingencies and their aggregate products. In the following sections, we review these studies grouped by research strategy. We first introduce the features of the experimental strategy that permit an evaluation of selection processes as they relate to the interlocking behavioral contingencies (IBCs), aggregate products (APs), and cultural consequences (CCs). Then, we summarize the corresponding studies and their major findings.

Iterated Prisoner’s Dilemma Games

Some culturo-behavior scientists have adapted strategies and tactics from experimental games used by other social scientists (e.g., economics, social psychology, anthropology; Axelrod, 1984; Axelrod & Hamilton, 1981) to interpret and predict social phenomena (cf., Camerer & Fehr, 2004). One early strategy based on game theory that culturo-behavior scientists have employed is the Iterated Prisoner’s Dilemma Game (IPDG; Costa, Nogueira, & Abreu-Vasconcelos, 2012; Morford & Cihon, 2013; Ortu, Becker, Woelz, & Glenn, 2012). In the typical IPDG there are two players who committed a crime. They have been arrested but the police do not

have enough evidence to convict either unless one player betrays the other and the players cannot talk to one another. Each player is given the opportunity to betray their partner (defect) or remain silent (cooperate) and the choice to do one or the other determines the length of the prison sentence, which is dependent upon the choices of *both* players. For example, if one player chooses to defect but the other cooperates, the player who defects receives no jail time but the player who cooperates receives the maximum sentence. However, if both choose to defect both go to prison; but the length of the prison sentence is shorter than if they were the player who did not defect when the other had. If both choose to cooperate, both will go to prison but for fewer years than if both had defected. The better outcome for the group is contingent upon both players cooperating. The individual contingencies promote defecting and players often do, even though this results in the worst outcome for the group.

In studies investigating the metacontingency, players earn points by choosing one of two stimuli (e.g., X or Y). The choice is associated with individual earnings and IBCs in the sense that both players' choices affect the number of points the other player earns such that the combination of both players' choices serves as the AP (e.g., XX, XY, YX, YY; see Fig. 6.1). The dependencies between the players' choices that determine the corresponding contingencies are the IBCs; the combination of the players' choices form the AP. Together they make the culturant (IBC + AP; Hunter, 2012). The cultural consequence (CC), or the additional points allocated to the group (e.g., both players) is contingent upon the culturant, which includes the AP (in this example the YY). The addition of the CC is a critical methodological distinction between metacontingency experiments and other behavioral research that may use an IPDG. Points are divided equally among players and are often exchanged for money at the end of the experiment. Because players are predicted to defect given the operant contingencies, the application and withdrawal of the CC contingent upon particular APs increases the probability of cooperating, thereby demonstrating the selective effects of the metacontingency.

Ortu et al. (2012) were the first to employ the IPDG to study metacontingencies. They assessed variations in individual and CCs on the IBCs and APs of groups of four players in five experiments. The results suggested that the CC selected variations in performance different from those that would be predicted based on operant contingencies alone. Subsequent research conducted with the IPDG has replicated these results (Costa et al., 2012; and one of two microcultures in Morford & Cihon, 2013). In addition, these studies have explored variables that might promote or prohibit coordinated responding in metacontingency manipulations such as allowing communication or not among participants in the microcultures (Costa et al., 2012; Morford & Cihon 2013) Costa et al. (2012), for example found that although communication facilitated coordination, it did not ensure it. Morford and Cihon (2013) gave participants the opportunity to fine one another and found that even though players from two microcultures allocated fines to other players, the fines were used to "punish" responding away from the AP in only one of the microcultures and even when fines were applied they did not seem to reduce defection.

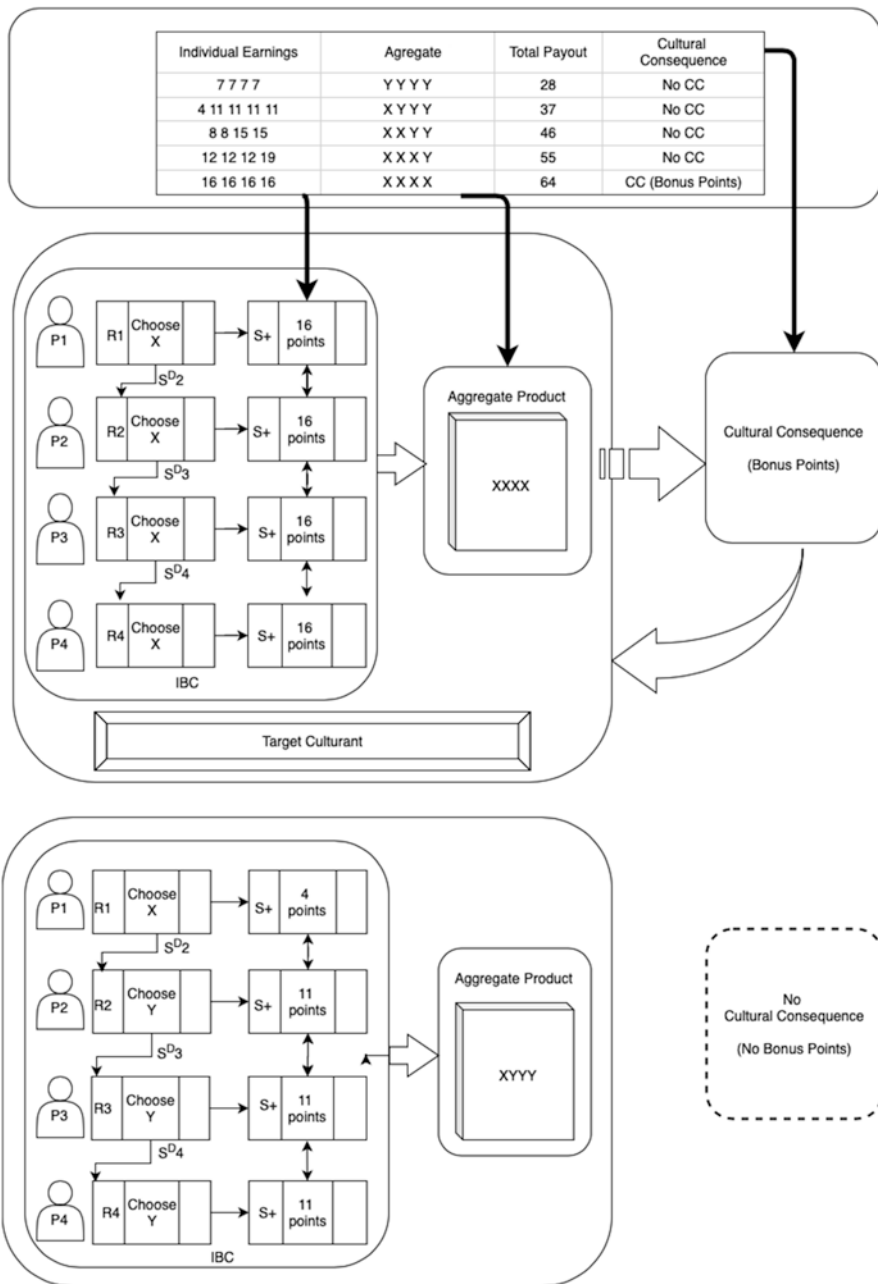


Fig. 6.1 Sample experimental strategy and arrangement for metacontingency studies conducted with the IPDG with four players. In this example, the CC is contingent on four X choices

Matrix

Vichi et al. (2009) offered a way to explore how IBCs + AP are selected by CCs. However, there were some aspects of the experimental strategy that muddled the conclusions. Tourinho (2013) noted that the experimental strategy did not distinguish the selective effects of the operant contingencies from those of the metacontingencies. In addition, the CC was contingent on IBCs that occurred in the *previous* cycle and the operant and CCs were the same, both in function (contingent on an IBC) and in type (money divided among the group). The research group led by Emmanuel Z. Tourinho at the Universidade Federal do Pará developed a strategy that draws from the original experiment, recognizing its versatility. They made some adjustments to control the limitations and employed a matrix in subsequent studies.

The basic strategy includes a matrix of rows and columns shown to participants on a computer screen or board. The rows are colored and numbered; each cell is marked with a “+” or “-” or an open or closed circle. The task for each participant is to choose a row; each choice is considered a trial. The choices of all participants compose a cycle, resulting in a sequence of rows. Depending on the study, the experimenter chooses a column after each trial or cycle, according to the participant’s choice or the IBCs. Experimenters can program operant consequences contingent on the participants’ choices and CCs contingent on sequences of rows selected. In most of the experiments these sequences require that each participant respond differently depending on the other participant’s choice (see Fig. 6.2). The strategy separates operant contingencies and metacontingencies, making it possible for the experimenter to manipulate each independent of the other. This has also allowed researchers to explore the effects of operant and CCs of different types. For example, experimenters often use tokens exchangeable for money at the end of the session or study as operant consequences and items donated to a public school as CCs. Finally, programmed operant contingencies and metacontingencies can be delivered in the same cycle in which the responses occur rather than contingent upon the responses from the previous cycle. These adjustments are especially salient after Tadaiesky and Tourinho (2012); they use aspects of both this basic strategy and maintain many tactics similar to Vichi et al. (2009).

Tadaiesky and Tourinho (2012) examined the selection of an IBC that was composed of the sequence of three participants’ choices with four experimental microcultures of three players each. The task was similar to Vichi et al. (2009) in the sense that each participant would bet a token; however, the individual consequences were contingent on choosing a token of a specific color. Conditions included one in which operant consequences were contingent on responses that matched the criteria for producing the AP, one in which CCs were contingent only upon the culturant, and one that included both operant and CCs (ABCA design). The results suggested that CCs were necessary for the recurrence of the IBCs and as the number of possible token colors increased target IBCs occurred less frequently.

Cavalcanti, Leite, and Tourinho (2014) and Pavanelli, Leite, and Tourinho (2014) used a shaping procedure in the matrix to explore Glenn and Malott’s

(2004) discussion of environmental and component complexity. Cavalcanti et al. examined complexity as related to the number and type of external variables that may affect a group or organization. In their first experiment, they addressed environmental complexity and found that in both microcultures, the participants

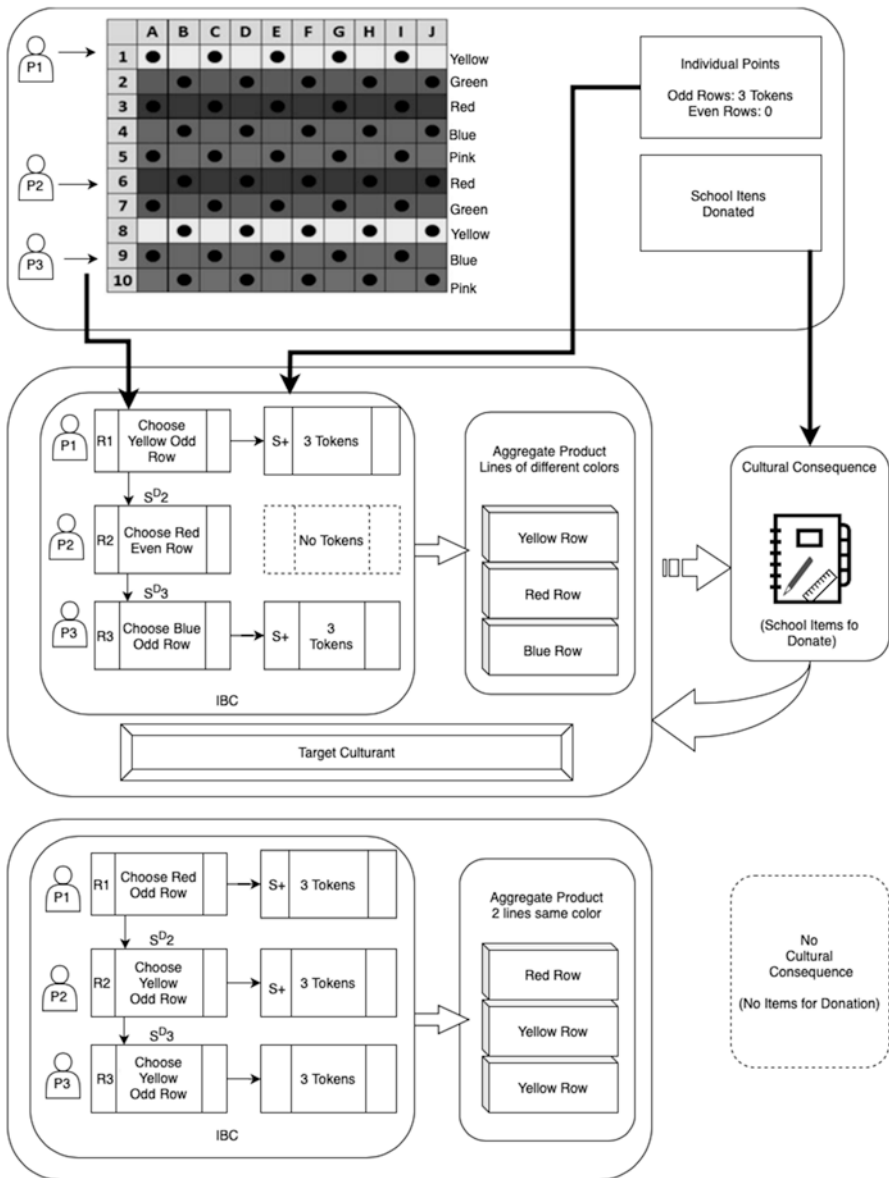


Fig. 6.2 Sample experimental strategy and arrangement for metacontingency studies conducted with the matrix. In this example, the CC is contingent on three rows of different colors

consistently produced the CC. In the second experiment, Cavalcanti et al. added component complexity and environmental complexity; the number of criteria to produce the CC and the number of participants increased across successive phases. Selection of the IBC was not as evident as in Experiment 1; Cavalcanti et al. noted that increasing both types of complexity simultaneously likely affected their results. Pavanelli et al. replicated Cavalcanti et al. increasing component complexity by replacing participants every few trials to form generations and found that the microcultures consistently produced the target culturants even when participants changed across generations.

Soares, Cabral, Leite, and Tourinho (2012), Soares, Martins, Leite, and Tourinho (2015), and Marques and Tourinho (2015) further demonstrated the importance of the contingent relation between the culturant and the CC. Soares et al. (2012) did so under VR and FR schedules of CCs; and in a preparation similar to investigations of superstitious behavior at the operant level, Marques and Tourinho found that non-contingent cultural events were only moderately effective in developing and maintaining nonspecific IBCs and APs. Both Marques and Tourinho (2015) and Soares et al. (2015) additionally found that culturants decreased in frequency when placed under extinction contingencies.

The matrix preparation has also been used to evaluate situations in which gains for the individual and gains for the group are mutually exclusive (Borba, Tourinho, & Glenn, 2017; Gomes & Tourinho, 2016; Hosoya & Tourinho, 2016; Soares et al., 2018; Soares, Martins, Guimarães, Leite, & Tourinho, 2019). Borba et al. (2017), the first to explore this, arranged competition between operant and CCs for participants to engage in “ethical self-control.” Borba et al. (2017) suggest that ethical self-control occurs when an individual chooses a response that produces a consequence that is beneficial for the group even if it may not be immediately beneficial to the individual. Throughout the experiment, choices of odd rows produced three tokens and choices of even rows produced only one token; tokens were exchangeable for money. When the metacontingency was in effect, CCs (school items) were contingent upon an AP of different even rows. Thus, to produce CCs, all participants needed to produce smaller individual consequences. The results suggested that ethically self-controlled choices occurred consistently for each group once they contacted the CC and were maintained across generations. Gomes and Tourinho (2016) showed similar effects when operant contingencies were of greater magnitude and Hosoya and Tourinho (2016) included measures of the participants’ verbal behavior that showed, unsurprisingly, that participants’ communication typically took the form of requests for information, instructions, or statements indicating agreement.

In further evaluations of competition between operant and metacontingencies, Soares et al. (2018) found that both nonverbal and verbal CCs had selective effects on target culturants; however, their effectiveness, alone or combined, was influenced by the presence or absence of competition between operant and CCs, as well as the sequence of experimental conditions to which microcultures were exposed. Soares et al. (2019) noted that target culturants were selected in both CRF and VR3 conditions when there was no competition between operant and CCs, but this only occurred, and did so rarely, when competition was in effect.

Recently, the matrix strategy has been used in studies exploring the effects of negative reinforcement and punishment on the selection of culturants (Alves, de Carvalho, & Tourinho, 2018; Guimarães, Leite, de Carvalho Neto, Tourinho, & Tonneau, 2019; Guimarães, Picanço, & Tourinho, 2019). Alves et al. (2018) found that negative reinforcement produced a higher percentage of APs for one of two triads. Guimarães, Picanço, and Tourinho (2019) analyzed the effects of negative punishment on impulsive culturants—those that produced an operant consequence of greater magnitude, preventing the production of a CC. The results indicated that negative punishment generally reduced impulsive culturants and appeared to strengthen self-control culturants in two of three microcultures. Guimarães, Leite, et al. (2019) replicated the effects of operant punishment on operants and the effects of cultural punishment on culturants. Additionally, changes in operant contingencies resulted in changes in IBCs and APs, and changes in metacontingencies resulted in corresponding changes in operants.

The Numbers Task

Maria Amália Andery's research group in São Paulo developed an experimental strategy called the Numbers Task. The basic preparation involves participants placing numbers in a box below computer-generated numbers (see Fig. 6.3). Participants receive points if they insert a number that produces an odd number when summed with the computer-generated number. If the sum between the computer-generated number and the participant-inserted number is even, an "error" message is displayed, and points are deduced from the amount generated. These contingencies are generally kept constant across all conditions. When the metacontingency is in effect, the CC is contingent upon a particular combination of the sum of the numbers entered by each participant. The CC is applied if the sum of the first participant's number is lower than the sum of the second participant's number. In experiments with three participants, the CC is produced if the second participant's sum is higher than the first and lower than the third participant's sum; the third participant's sum must be the highest. The numbers strategy permits experimenters to manipulate CCs and keep the operant contingencies constant.

This series of studies extends research conducted with operant concepts and principles, for example, exploring the effects of schedules of reinforcement, but in this case CCs are contingent on culturants (Angelo & Gioia, 2015; Baia, Lemes, Bianco, Pereira, & Sousa, 2017; Caldas & Andery, 2016; Saconatto & Andery, 2013; Vieira, Andery, & Pessôa, 2016). Angelo and Gioia (2015), for instance, examined if an abrupt increase in fixed ratio of delivery of the CC would maintain a culturant. The results for one group showed that the rate of the AP increased with increases in the ratio size and was extinguished after the onset of an extinction condition. For the other group, an FR1 produced the highest rate of APs, and the AP was nearly extinguished on the FR10. Caldas and Andery (2016), in a simple exploration of the selective effects of CCs on culturants, replicated the results of previous experiments

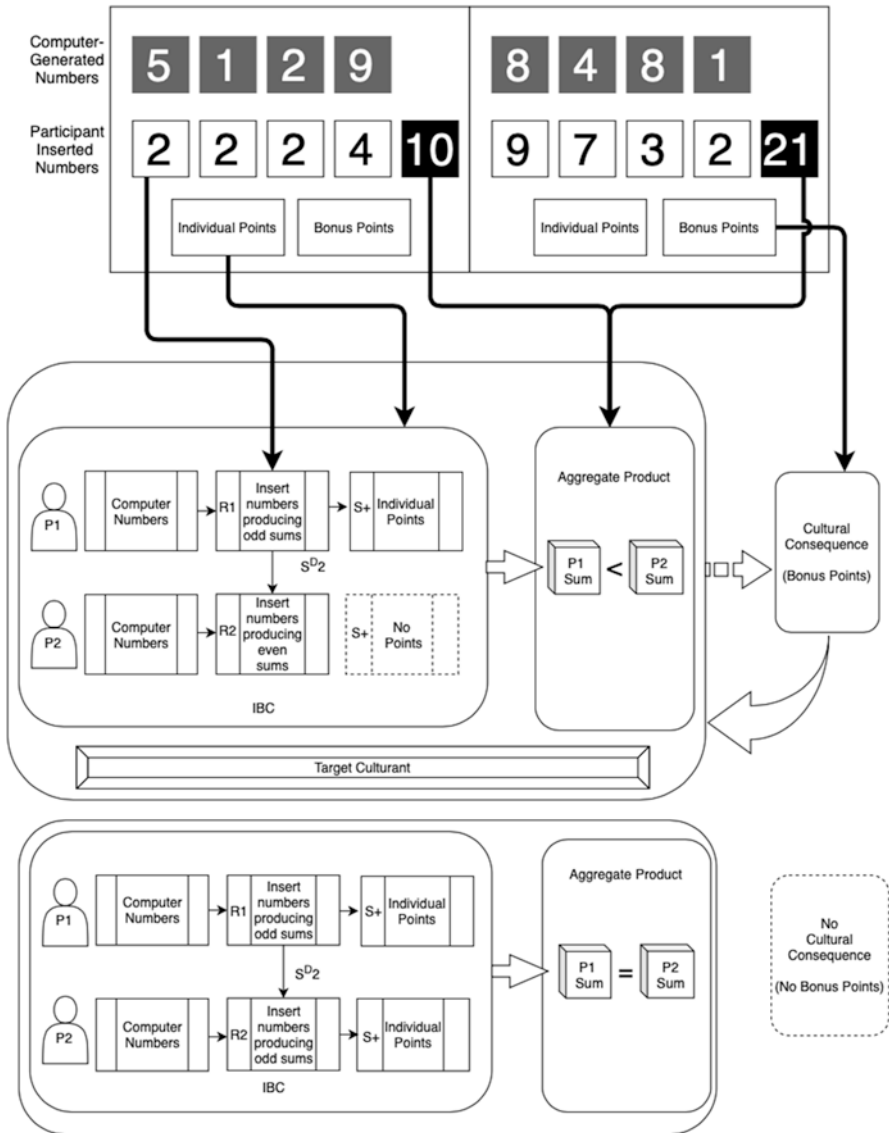


Fig. 6.3 Sample experimental strategy and arrangement for metacontingency studies conducted with the numbers task with two participants. In this example, the CC is contingent on P1 inserting a sum smaller than the sum inserted by P2

in one of two microcultures studied. And, in an analogue of discrimination training, Vieira et al. (2016) showed that culturants came under contextual control and were transmitted to new generations.

Another group of studies focused on manipulating dimensions of the operant consequences and the corresponding effects on the culturants (Baia, Azevedo, Segantini, Macedo, & Vasconcelos, 2015a, 2015b; Baia, Lemes, da Silva, dos Santos Baia, & Cabral Bianco, 2019). For instance, Baia et al. (2015a) showed the selection of culturants by different types of operant and CCs and Baia et al. (2015b) evaluated the effects of individual and CCs of different magnitudes. Baia et al. (2015b) showed that both groups acquired target operants and culturants, but the group contacting CCs of higher magnitude produced the target APs earlier. However, like in Baia et al. (2015a), both groups maintained high frequencies of operants and culturants throughout the extinction phases. In a follow-up experiment, Baia et al. (2019) found that two triads produced culturants at high levels throughout the experiment and that the percentage of individual responses (producing odd sums) that were previously tied to operant reinforcement occurred at lower levels when only CCs (no operant contingencies) were in effect.

Free-Culturant

Adapted from free-operant strategies used to study social behavior, the free-culturant is a software developed for the investigation of metacontingencies (de Toledo et al., 2015). It was inspired by a procedure developed by Skinner (1938) that came to be known as *free-operant*. It is *free* because it allows investigation of behavior in an experimental context in which subjects can respond at any moment; it is *operant* because targeted responses change as a function of their consequences. In metacontingency studies, the participant responds by clicking on the tap on the screen. A jug is displayed below each tap. Individual contingencies are arranged for individual clicks and metacontingencies are arranged for the temporal coordination of the clicks of three participants (IBCs). Coordinated responses are followed by “increments of water” in a displayed water jug (AP; see Fig. 6.4).

de Toledo et al. (2015) arranged conditions in which operant and CCs conflicted or did not conflict. The results showed that: (1) individual responses were maintained at high levels when operant contingencies alone were in place; (2) culturants were maintained at low levels in the absence of CCs and increased under CCs; and (3) increases in the frequency of culturants were sometimes followed by decreases in individual responses. The first and second results were replicated by de Toledo and Benvenuti (2015) but the third result occurred in only two of four triads.

Some have also used the free-operant strategy to study metacontingencies with non-human participants (de Carvalho, 2017; Velasco, Benvenuti, Sampaio, & Tomanari, 2017). de Carvalho (2017) showed that two pairs of rainbow fish emitted and maintained the target AP. Velasco et al. (2017), alternating between individual

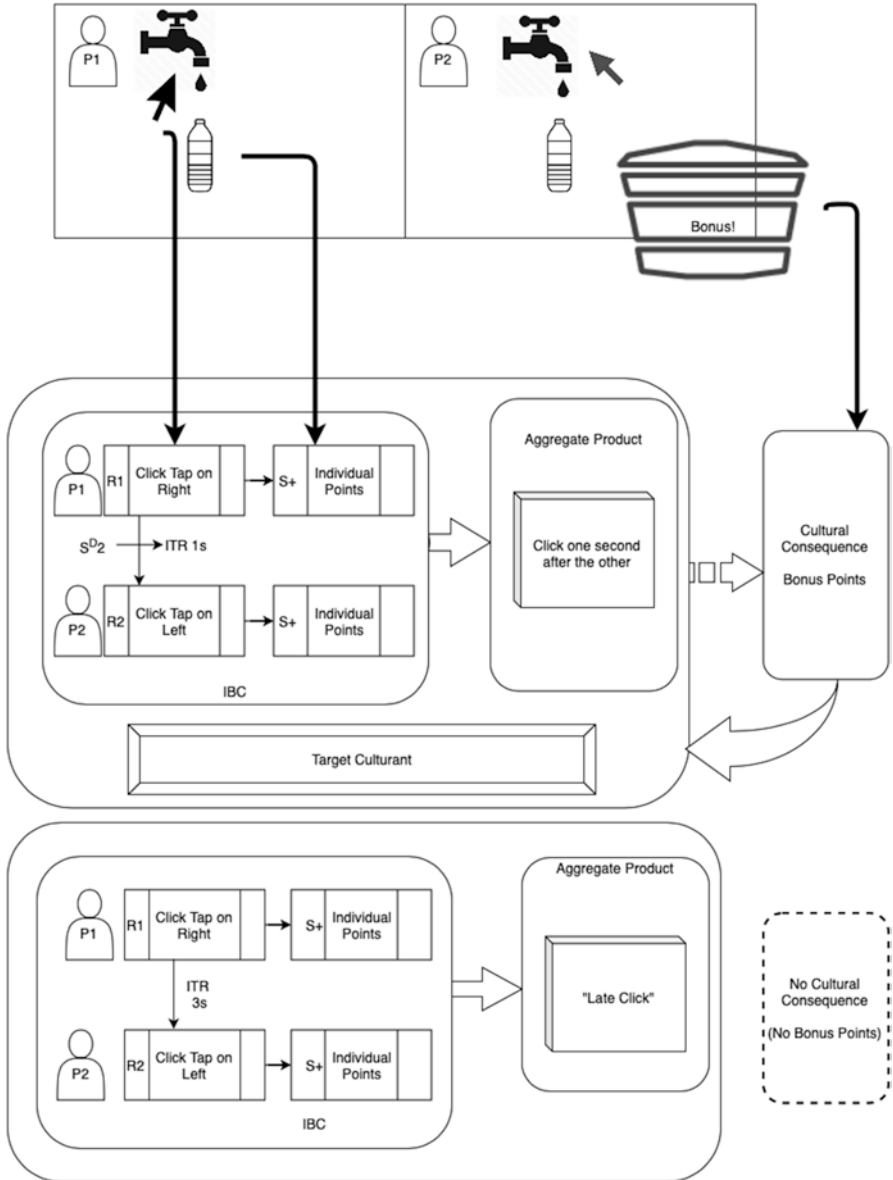


Fig. 6.4 Sample experimental strategy and arrangement for metacontingency studies conducted with two participants using the free-culturant. In this example, the CC is contingent on an interval of one second between the participants' clicks

contingency and mutual contingency conditions, showed that the mutual contingency increased coordinated behaviors between three pairs of pigeons.

Chessboard

Another strategy and tactic for basic laboratory research on the metacontingency developed during discussions regarding the need to experimentally test the validity of the metacontingency in a simple task. João Claudio Todorov and his master's student, Isis Vasconcelos, developed a strategy in which IBCs and APs were easily defined and measured and confounding variables were restricted. The strategy employs a virtual chessboard and two knights, each controlled by a participant. Participants take turns moving their pieces (either two squares vertically and one horizontally or two squares horizontally and one vertically). The IBCs are the movements between players (the squares occupied during such coordinated interaction) and the AP occurs when the two players' pieces meet in adjacent squares on the board (see Fig. 6.5). Experimenters can program the board dimensions, the number of players, the types of movements possible, the location in which meetings are reinforced, and the feedback messages.

Vasconcelos and Todorov (2015) were the first to employ the chessboard strategy to study the effects of CCs on the variability of IBCs and APs. They showed that the meeting location (AP) could be shaped through successive approximations to specific areas of the board, results replicated by de Carvalho, Couto, de Souza Gois, Sandaker, and Todorov (2017) who also showed that CCs produced stereotypy for both IBCs and APs. Azevedo and Todorov (2016) showed that culturants occurred at higher frequencies in the presence of a contextual variable correlated to the availability of a CC than in the presence of a contextual variable that was not correlated to the availability of a CC.

Additional Strategies and Tactics

Several other strategies and tactics have been developed in order to explore different aspects of cultural phenomena. Smith, Houmanfar, and Louis (2011), for example, designed a computer-based program to simulate a task that employees in an organizational setting might encounter. They evaluated the differential effects of explicit, implicit, or no instructions on the production of the target AP. The results showed that the target IBCs and APs were selected by the CC (consumer feedback) and that explicit rules were more effective in generating the target APs.

Researchers who have developed experimental strategies beyond those presented thus far provide additional support for the selective effects of the CC on the target culturants (Alfaix-Melo, Souza, & Baia, 2010; Baia & Vasconcelos, 2015; Hunter, 2012; Neves, Woelz, & Glenn, 2012; Nogueira & Vasconcelos, 2015; Sampaio et al., 2013; Smith et al., 2011). In each case, the results also differentiate between operant and CCs.

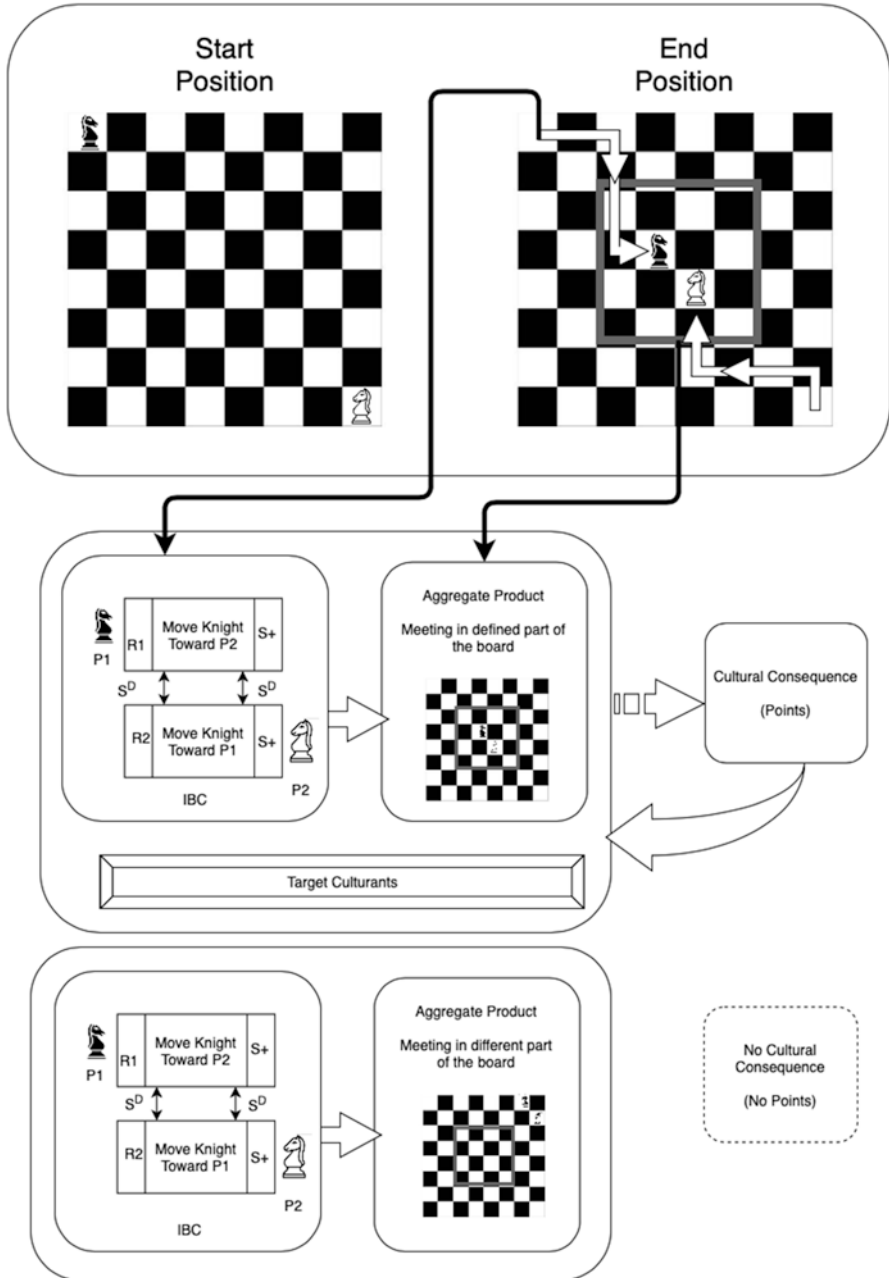


Fig. 6.5 Sample experimental strategy and arrangement for metacontingency studies conducted with the chessboard. In this example, CCs are contingent on meeting in the central area of the board

Discussion

Glenn's theoretical work (e.g., Glenn, 1988, 2004) contributed significantly to advancing the understanding of cultural selection as evidenced in this review. The basic laboratory research on the metacontingency conducted thus far suggests first and foremost that IBCs and APs can be differentially selected by cultural consequences (e.g., Ortu et al., 2012; Soares et al., 2012; Vichi et al., 2009), thus confirming the selective properties of CCs on culturants. Second, replication has been shown across experimental strategies and tactics, in groups with as few as two and as many as four participants (e.g., de Carvalho, 2017; Hunter, 2012; Ortu et al., 2012; Sampaio et al., 2013), or when repertoires are transmitted to new participants across generations (e.g., Baia et al., 2015a; Pavanelli et al., 2014; Saconatto & Andery, 2013). Thirdly, the research suggests that target culturants are formed and selected when communication between or among participants is restricted (e.g., Costa et al., 2012; Morford & Cihon, 2013) but that if permitted to communicate, culturants form more readily (e.g., Costa et al., 2012; Hosoya & Tourinho, 2016). Fourth, culturants are sensitive to aversive control (e.g., Guimarães, Leite, et al., 2019; Guimarães, Picanço, & Tourinho, 2019; Saconatto & Andery, 2013) as well as other parallels of basic operant principles such as schedules of reinforcement (e.g., Angelo & Gioia, 2015; Soares et al., 2019; Soares et al., 2015) and extinction (e.g., Angelo et al.; Baia et al., 2015b). Finally, culturants have been selected when operant and CCs are nonconcurrent (e.g., Baia et al., 2017; Caldas & Andery, 2016) and in conditions in which the operant consequence of higher magnitude is concurrent with the production of the CCs (e.g., Borba et al., 2017; Ortu et al., 2012).

Given the recency of the onset of experimental analyses of the metacontingency there are still a number of variables that have yet to be explored experimentally. One oft-criticized aspect of the basic laboratory research on the metacontingency is the reliance on experimental strategies and tactics informed by game theory, social psychology, and behavioral economics (e.g., Zilio, 2019). Game theorists assume participants will make the rational choice—choices based on their tendency to behave in ways that maximize their available consequences. Based on the concept of Nash Equilibrium, studies outside of behavior analysis conducted with strategies derived from game theory often rely on group design, one trial/cycle presentations, and hypothetical scenarios thought to serve as analogues to social environments (Camerer & Fehr, 2004; also see Vichi et al., 2009 for a detailed discussion). Zilio (2019) points out that these experimental strategies, and the metacontingency in particular, offer nothing more than a procedural concept, providing unconvincing evidence of the selective effects of the metacontingency, as cooperation has been studied using these experimental strategies long before the conceptualization of the metacontingency (e.g., Azrin & Lindsley, 1956). Although some may not consider the data to fully support Skinner's (1981) "third kind of selection," there do seem to be sufficient data to suggest that culturants can be selected by CCs, providing evidence of selection beyond that of the individual operant using experimental strategies that are not derived from game theory or based on rational choice (e.g., Saconatto & Andery, 2013; Smith et al., 2011; Toledo et al., 2015).

Second, the results of the experiments do not always replicate across experimental microcultures (e.g., Morford & Cihon, 2013) or experiments (e.g., Franceshini et al., 2012). This suggests that, at least in some experiments, there are variables that are not under the control of the experimenter. Although many strategies and tactics have been developed, some attention may be needed to refine them to reduce the potential effects of extraneous variables. Conversely, the various strategies and tactics have unique features that can be advantageous (or disadvantageous) depending on the experimental question. Moreover, if all studies were conducted using only one experimental strategy, the generality of the findings would be limited.

Third, Mattaini (2019) for example, raised concerns that the basic laboratory research incorporating experimental microcultures cannot account for all aspects that are important for a complete behavioral account of culture. Yet behavior scientists have struggled to agree on a definition of culture (e.g., Glenn, 2004; Mattaini, Chap. 3 in this volume; Sandaker, 2009; Skinner, 1953, 1987) and others emphasize the differences between experimental microcultures and “culture” as a social phenomenon, particularly those adopting general systems principles (e.g., Krispin, 2017, 2019). Skinner (1953), for example, defined culture as a set of contingencies that control behavior or, “a particular set of conditions under which a large number of people grow and live” (p. 430), a definition similarly adopted by Mattaini (this volume) who emphasizes that a culture is a network of contingencies. These definitions differ from those that emphasize the entities that make up the culture (Glenn, 1988) such as “patterns of learned behavior transmitted socially, as well as the products of that behavior” (Glenn, 2004, p. 139).

The implications of the contrasting views on culture are not yet salient in the experimental analyses conducted thus far. In cultures, histories exist between and among the members that may not often be present in experimental microcultures unless explicitly arranged for or controlled by experimenters. There are “social codes” already established in cultures that describe and govern the contingencies that exist within the culture. Even though they are often unspoken, they function much like the networks of contingencies described by Mattaini (this volume). Examples parallel to Skinner’s (1957) discussion of audience control illustrate this in scenarios in which certain responses are more or less likely to contact reinforcement in the presence of different audiences (communities). These are, perhaps only recently gaining attention by culturo-behavior scientists who are exploring the effects of contextual variables on culturants (e.g., Azevedo & Todorov, 2016; Vieira et al., 2016). Some may argue that it may not be fruitful to compare the results of research conducted with experimental microcultures with the cultural practices of members of a community. Even now, some suggest that experimental microcultures may restrict the types of experimental questions culturo-behavior scientists ask, particularly as related to emergence, complexity, and self-organization (Krispin, 2017, 2019; Mattaini, 2019; see also Bento et al., Chap. 4 in this volume).

A fourth and related limitation of the basic laboratory research on the metacontingency is that none have explicitly arranged for the study of principles of self-organization. It is unlikely that the evolution of cultures is solely dependent upon an external entity arranging CCs (see also Skinner, 1953 and Lemos & Todorov, Chap.

8 in this volume for a discussion of controlling agencies). What might happen in basic laboratory studies, for example, if the members of the microculture itself were responsible for the creation and control of CCs without the support of an external entity? Experimental questions such as these are also supported by recent discussions regarding self-organization and calls to bridge concepts from general systems theory to a behavioral analysis of culture (e.g., Krispin, 2017, 2019; Marr, 2006; Mattaini, 2006, 2019, also Chap. 3 in this volume). Culturo-behavior scientists might find studies that evaluate whether culturants selected by their own APs show support for positive and negative feedback loops or are reflective of self-organization whereas culturants selected by an external entity responsible for the delivery of the CCs are more or less sensitive to these variables. Studies that incorporate experimental strategies and tactics to explore whether selection processes affect networks of contingencies and those that examine rule generation by participants would be valuable in advancing a behavioral account of what some behavioral scientists call a culture (see also Houmanfar et al., 2010).

As previously mentioned, some researchers have begun to explore contextual stimuli (e.g., Azevedo & Todorov, 2016; Vieira et al., 2016). These studies may serve as precursors for investigations that explore components of the five-term metacontingency such as the cultural milieu (e.g., Ardila Sánchez, Houmanfar, & Alavosius, 2019), motivating contexts (e.g., Mattaini, 2013), or consumer and market demand (e.g., Foxall, 2010). Such studies may provide insight into aspects of the cultural milieu that include not only products of operant behavior such as rules, morals and laws, but also environmental variables such as resources and technological improvements—variables that are notably present and important to human society. Studies that have started to investigate the effects of competition between operant and CCs and others exploring ethical self-control (e.g., Borba et al., 2017; Gomes & Tourinho, 2016) illustrate the selective properties of CCs when operant contingencies are in conflict with CCs. Research in this area and studies that explore and analyze the selective properties of institutional contingencies and interactions common in complex systems may prove important in the development of a more complete understanding of the evolution of cultures.

Fifth, there are concerns regarding the temporal scale of microcultures such as whether or not they last long enough to be reflective of the transmission of cultural practices across generations (e.g., Harris, 1964) and the number of participants working at the same time in experimental microcultures. It is worth noting that the basic laboratory research has incorporated participant replacement strategies that are thought to serve as analogues to generations; however, participants change around every 20 cycles or so and there are generally fewer than 20 generations in each experiment. Furthermore, no experiments have included more than four members of a microculture at a time. As strategies and tactics informed by game theory predict that cooperation declines as the number of participants in the microculture increase, the extant research may not be representative of culturant-environment relations in which there are greater numbers of people in a given “culture” such as in organizations or communities. Concerns as to how seemingly simple and contrived experimental microcultures can be analogous to cultures, to the evolution of

culture, to the selection of culture, and/or to the selection of cultural practices are understandable. These are concerns similar to those found in criticisms of EAB; and, as in that case, it may be useful to explore more complex arrangements after understanding simpler relations (Lattal, 2013; Sidman, 1960). These variables might be explored from the perspective of organizational complexity posited by Malott (2003) and Glenn and Malott (2004). Additionally, studies that include cooperation *and* competition (even between groups; see Couto & Sandaker, 2016; Wilson, Ostrom, & Cox, 2013) as variables are needed.

A sixth limitation of the current body of research is the lack of analysis of the IBCs themselves or of the social interactions occurring (or not occurring) between and among participants. Instead, much of the basic laboratory work on the metacontingency has emphasized the contingent relation between the AP and the CC and is often focused on the AP (e.g., Vasconcelos & Todorov, 2015). In most of the research, the IBCs are defined when one participant's behavior is the discriminative stimulus for the other participant's behavior. These are points for improvement and additional research. However, studies that have reported on specific features and topographies of the APs *and* IBCs (e.g., variability and stereotypy; Azevedo & Todorov, 2016; de Carvalho, Couto, et al., 2017; Vasconcelos & Todorov, 2015) may offer a start.

Along a similar line, it might be informative to conduct research that explicitly examines the role of communication and verbal behavior beyond allowing it or disallowing it in some conditions (e.g., Costa et al., 2012). Many experimenters allow participants to interact freely during the experiments (e.g., Marques & Tourinho, 2015; Soares et al., 2018; de Toledo et al., 2015; de Toledo & Benvenuti, 2015; Vichi et al., 2009) and some have even recorded these interactions (e.g., Gomes & Tourinho, 2016; Ortu et al., 2012); however, these interactions are rarely reported or analyzed. Given that cultural phenomena include, and are emergent from, social contingencies and communication (Glenn, 1989; Skinner, 1953), then we need to employ experimental work that bring experiments closer to understanding how networks of contingencies are established and maintained through communication and cultural transmission. Studies that have explored the role of verbal behavior and communication in the production and selection of culturants (e.g., Sampaio et al., 2013) suggest that culturants were produced and sustained even if participants were not able to verbalize the rules for the production of CCs (e.g., Sampaio et al., 2013; Vichi et al., 2009). The findings are consistent with investigations of operant responding that show that the ability to describe the contingencies responsible for the selection and maintenance of behavior is not necessary in order for those consequences to affect behavior (e.g., Risley & Hart, 1968), reminiscent of Harris' (1964) etic and emic distinction.

Harris (1964) defined the emic approach as when, "the observer attempts to acquire a knowledge of the categories and rules one must know in order to think and act as native" and the etic approach as when, "the observer is free to use alien categories and rules derived from data language of science. It involves the measurement and juxtaposition of activities and events that native informants may find appropriate or meaningless" (p. 32). This distinction is salient in observations of

outside of the lab settings, as noted in the distinction between ceremonial and technological metacontingencies (see Glenn, 1986; Lemos & Todorov, Chap. 8 in this volume; Todorov, 2013). Similarly, people may continue to engage in cultural practices that no longer contact the direct acting contingencies (e.g., Baia et al., 2017), have never contacted the direct acting contingencies (e.g., Marques & Tourinho, 2015), and/or may even describe the contingencies responsible for the maintenance of cultural practices that are irrelevant to the actual contingencies that are in effect (e.g., Caldas & Andery, 2016). As previously mentioned, the transmission of cultural practices across generations has been explored, but additional work is needed. Experiments that isolate variables that help participants more accurately tact and transmit rules regarding the contingencies maintaining the IBCs or that explore how ceremonial metacontingencies persist need to be conducted. Those versed in community practice and intervention as well as basic laboratory research may be able to draw parallels between the etic and emic distinction and the content and process distinction, preventing the loss of critical information gained via the emic approach or lost in studying process independent of the content.

Lastly, one of the trends in the laboratory studies has been to explore basic operant principles at the cultural level; however, this might cause some hesitation for those skeptical of the third kind of selection. The findings in these studies are important though, as they may highlight some similarities between processes operating on operant *and* cultural phenomena. Moreover, the simplicity of creating contingencies with CCs that parallel those organized for operant phenomena (e.g., schedules of consequence delivery) may serve as a starting point for moving metacontingency studies from simple arrangements to more complex arrangements as experimenters are better able to control extraneous variables. Additional complexity in the experimental analogues as well as a focus on more translational research, the benefits of which have long been noted by operant researchers, might strengthen collective efforts toward a thoroughgoing selectionist account of behavior (Critchfield, 2011; Poling, 2010) and culture.

Closing Remarks

The confluence of these limitations, questions, and challenges force one to consider the role of basic laboratory studies in advancing our understanding of cultural selection. One important consideration is under which conditions do we need to go to the lab and under which conditions do we need to be immersed in communities, organizations, etc. One clear situation in which basic laboratory research with experimental microcultures is necessary is to identify the mechanisms by which culture and cultural practices are formed, maintained, and transmitted such as when new units and processes have yet to be discovered at the cultural level—e.g., in some ways similar to how the experimental work on the metacontingency developed.

A second reason to go to the lab occurs when new concepts and interpretations of culture and cultural phenomena are proposed. Evaluations of the five-term

metacontingency (Houmanfar et al., 2010) and Couto and Sandaker's (2016) distinction between cultural selection and the selection of cultures have not yet been considered in basic laboratory studies. Krispin (2017, 2019) further develops this latter distinction building in systems concepts such as positive and negative feedback loops and the recently proposed culturant hypercycle. Consistent with the earlier discussions of self-organization and culture defined as a network of contingencies, these concepts are ripe for experimental analysis.

Third, there are situations in which an experimental manipulation of controlling variables is not possible in the natural environment. In some cases, there may be situations in which it is not feasible or ethical to withdraw effective interventions in order to demonstrate functional relations in the communities (Chap. 9, this volume). For example, in studies that explore how income inequity affects cooperation, there might be ethical concerns with manipulating income disparities for research purposes. These situations necessitate laboratory research that creates analogues to those situations in order to isolate the variables responsible for certain social issues. Nevertheless, in experimental analogues of complex social issues, we must pay particular attention to details, variables, and contingencies such that they parallel those in effect in the environment of interest (e.g., the number of participants required for an experiment and the duration of an experiment to demonstrate cultural lineages).

Importantly, we also need to avoid a basic to applied research gap. Currently we are in a unique position in that much of our work is published primarily in just a few journals (e.g., *BSJ*) so we are in some ways protected from the research to practice gap salient in operant research (see also Critchfield & Reed, 2017; Federov, 2020; Sidman, 2011) but if the basic laboratory research does not maintain its applied relevance culturo-behavior scientists may risk such a separation. At some point we have to move to translational research and to research conducted in cultural and community settings. We have to move outside of the lab (see also Mattaini, 2019), even if it is only to start to observe and count variables of interest. Given the confluence of specializations represented in CBS one strategy toward this aim may be to formulate a clearer basic to applied continuum and conversation. Laboratory work with experimental microcultures emphasizes basic processes; organizational work provides a more controlled but still applied environment in which translational work can be conducted; and the community is clearly the applied domain. Currently, there are several examples of non-laboratory research in CBS. Some of this work is descriptive (e.g., Aspholm & Mattaini, 2017; de Carvalho, Sandaker, & Ree, 2017), interpretative (Malott & Glenn, 2019), a natural experiment (e.g., Todorov, 2009), or relies on manipulations of variables specific to operants (e.g., Hayashi, da Rocha Woelz, & de Melo, 2019) extended to interpretations of cultural change (Tagliabue & Sandaker, 2019). Additional research that explicitly manipulates CCs and assesses the impact on IBCs and APs in organizational and community settings is needed in addition to ensuring that basic laboratory research explicitly comments on the applied implications. Practical reasons are of course difficult to circumvent, and for that culturo-behavior scientists might need to work more interdisciplinarily to extend research to organizational and institutional settings, public policy, and advocacy.

We conclude with what we believe to be the most important question. As culturo-behavior scientists what do we need to do to mitigate those problems that have been facing humanity since Skinner (1987) first penned in *Why Are We Not Acting to Save the World?* Our search for basic processes began with the belief that we can change the world for the better with a natural science of human behavior and we believe that it is possible:

Those who saw the danger began to do more than talk about it. They began to study human behavior with methods that had first evolved in physics and biology. They turned from observing what people had done up to that time to observing what people did under carefully controlled conditions. A science and a technology of behavior emerged that were free of governmental, religious, and economic ideologies. Better cultural practices were designed. Meanwhile, older practices grew weak as their justifications became suspect. Governments no longer provided order and security. Religions failed to give peace of mind and joined with governments in threatening the peace of the world. Their answers to puzzling questions yielded to the answers of science. Economic institutions lost control as automation destroyed both the need for and the enjoyment of productive labor. Education emerged as the dominant force in the maintenance and transmission of cultural practices. The species survived for many thousands of years, and before those visitors from outer space reached Earth, they were met by a similar caravan coming from Earth itself. Agreed, that is a utopian ending—but in which of the two senses of that word? Is it to be a better world, or no world at all? (Skinner, 1987, p. 14).

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Chapter 7

Role of Cultural Milieu in Cultural Change: Mediating Factor in Points of Contact



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Introduction

In recent decades, the majority of efforts by psychologists to analyze consumer behaviors and choices related to global warming focus on theories about attitudes toward environmental issues (Foxall, 2015; Lehman & Geller, 2004; Newsome & Alavosius, 2011). The approachability of the constructs applied within this school of thought, such as attitudes and beliefs contribute to the popularity of “social/environmental psychology.” The familiar terms communicated by the associated theories are highly attractive to both laypersons and policy-makers perhaps because these terms summarize complex phenomena and do not require analysis of intricate relations. Although studies about the relationships between reported attitudes and socially impactful behaviors have penetrated the societal discussions, the subfield of environmental psychology has had very little influence on solving the problems associated with consumption (Lehman & Geller, 2004; Newsome & Alavosius, 2011). It is clear that scientific approaches focused on the correlations between what people say and what people do is of limited help for changing cultural practices. Moreover, verbal reports are to be interpreted with caution, as perceptions of subjective experiences are difficult to anchor to objective measures of social benefit (Houmanfar, Alavosius, Morford, Herbst, & Reimer, 2015).

The sweeping societal changes needed to combat and mitigate consumption practices that contribute to climate disasters and associated sociocultural upheavals such as post disaster recoveries and population migrations and associated social conflicts, must change more than attitudes. The challenge is to organize massive numbers of people to behave in ways that are sustainable within available resources. Influencing behavioral patterns of hundreds, thousands, millions, or even billions of

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people will require changes in many environmental sources of influence on resource consumption such as institutions, social groups, private and public organizations, etc.

An alternative behavior scientific perspective provides objective prescriptions for ways to change environmentally relevant behaviors. Approaching culture change by identifying key environmental factors that influence patterns of consumer behaviors that constitute cultural practices (Alavosius, Houmanfar, Anbro, Burleigh, & Hebein, 2017; Houmanfar et al., 2015) may lead to practical and effective solutions to social problems like global warming, wealth inequality, and resource depletion. This chapter discusses metacontingency and macrocontingency as foundational concepts in the behavior scientific analysis of the interaction between organizational practices producing products and behaviors of their consumers. Moreover, the role of cultural milieu as a mediating factor in this interaction will be highlighted.

Glenn (2004) describes two kinds of contingencies: metacontingencies and macrocontingencies. The latter describe topographically similar behaviors in macrobehavior, which operate independently of one another. For example, two neighbors who do not know each other drive electric cars. The cumulative effect of driving this type of car instead of cars burning fossil fuel is reduced greenhouse emissions and a reduced likelihood of pollution or carbon footprint across the community in the future.

Metacontingencies, on the other hand, describe selective contingencies that operate on interlocked patterns of behaviors between two or more persons or groups of persons. When the behavior of one person (e.g., in carpooling network with others to share travel expenses) becomes interlocked with (i.e., dependent upon) the behavior of another, a pattern of behavior emerges that Glenn (2004) describes as “interlocking behavioral contingencies” (p. 144, IBCs). IBCs, when they occur, have a measurable effect on the aggregate outcome (e.g., carpooling as a community practice could reduce the number of cars needing to be manufactured and sold per month) and on the environment (decreased greenhouse emission).

Glenn’s (2004) perspective holds that cultural practices are comprised of cumulative, non-interlocking behaviors, which can vary in complexity from the cumulative car consumption of several individuals to cumulative IBCs of autoworkers in several manufacturing companies producing cars. Although the IBCs of organized entities (e.g., car companies) may be maintained by a metacontingency, cumulative IBCs of a particular type (e.g., car manufacturers operating in a competitive market across countries) may prompt alterations in macrobehavior (e.g., switching production from internal combustion to electric cars). When macrobehavior generates a cumulative product (e.g., reduced greenhouse emission) the relation between the two is called a macrocontingency (Glenn, 2004; Glenn & Malott, 2004).

Houmanfar, Rodrigues, and Ward (2010) elaborated account of the metacontingency offers points of entry to alter contextual factors influencing cultural practices. *Cultural milieu*—the first term of the elaborated account of the metacontingency—consists of contextual factors influencing the acquisition and maintenance of IBCs as well as the collective behaviors of individuals interacting with the associated aggregate products. The design of a product and its generation rely not only on

selection by consumers but also on the cultural milieu which consists of the prevailing beliefs and values within the culture as well as predictions about the future. Product designers study market trends and create consumer demand. In much the same way that rules can govern behavior before that behavior comes into contact with contingencies, societal values and beliefs about the future—be it the economy, a richer middle-class, the competition, advocacy organizations, or other factors—can also guide the production of different goods which consumers may or may not purchase. This relationship can be circular in that consumer purchases of goods will often alter the cultural milieu resulting in a different set of predictions about which products will be successful. In the early days of the twentieth century, automobiles were powered by steam, electricity, and gasoline. Internal combustion engines won the marketplace competition among these three alternatives and became the dominant choice of consumers. Imagine if electric cars had emerged in 1900 as the favored propulsion method for transportation needs and what effect this would have had on the greenhouse gas emissions from fossil fuel combustion. A shift to electric powered transportation appears probable as consumers turn away from fossil fuels and increasingly adopt cleaner technologies.

The growth of Facebook, as another example, has ramifications beyond its simple use by netizens. It revolutionized access and sharing of information and created a whole new online marketplace plus media platform that retailers and media networks are forced to compete with, to name just two of its effects. Though touted for its benefits of enhanced communications and information sharing, only recently have the negative effects of open access to social media and manipulation of people by special interests been recognized as an unintended consequence of these technologies. The unintended consequences of exciting new technologies emerge with their widespread adoption and reveal that human choice of these is driven by short-term consequences and not by the larger delayed effects from cumulative use.

The Tesla Corporation serves as an example of organizational impact (e.g., an organization producing solar batteries, electric cars, shifting cultural practices from usage of fossil fuel energy toward clean energy) on cultural change as depicted by consumer practices (as related to energy consumption) throughout this chapter. Multiple reports of Tesla's organizational practices pertaining to erratic leadership decision-making and aversive management practices change Tesla's image (in terms of leadership values) as related to the associated cultural milieu over time. The misalignment between the positive impact of Tesla's products on consumer practices, and the dysfunctional leadership and management practices inside of the organizations offers a unique case for our discussion of cultural milieu as a mediating factor in the analysis of cultural change over time.

In the following sections, we will provide an overview of the elaborated account of metacontingency with the primary focus on ways this perspective offers points of entry to alter contextual factors influencing cultural practices. The elaborated account of metacontingency provides a process account relevant to the psychological and sociological levels of analysis as well as their interrelations with macrobehaviors associated with consumer practices. We believe that any such account of cultural phenomena must acknowledge its interdisciplinary nature involving the

behavior of verbally sophisticated consumers interacting with the many aggregate products of cultural entities. Moreover, the contexts within which members of organized group behave are predominantly verbal as well.

Five-Term Metacontingency¹

Cultural Milieu

Identified as the first term in the elaborated account of the metacontingency (Houmanfar et al., 2010), cultural milieu is the collection of stimulus functions influencing the acquisition and maintenance of interlocked behaviors and the behavior of individuals interacting with the associated aggregate products (Ardila, Houmanfar, & Alavosius, 2019) (Table 7.1). These stimulus functions are inherent in different environmental features, such as biological, anthropological, and psychological tiers or vantage points. In this context, the term “environment” strictly refers to the natural conditions under which humans live (Kantor, 1982).

For example, the *biological* environment includes all the objects and conditions necessary for organisms (e.g., natural resources) to live; the *anthropological* environment is composed of the products of human civilizations (e.g., institutions, artifacts, federal, state, or national objects); and in the *psychological* environment (e.g., cognition, behaviors) comprise the individual’s context. The biological and anthropological objects may acquire different functions through the interaction with individuals (Kantor, 1982). In turn, the cultural milieu comprises the collection of functional properties inherent in objects, events, and persons acquired across the three environmental tiers (i.e., biological, anthropological, and psychological), and that are shared by group members of systems of IBCs and associated consumers (Ardila et al., 2019).

Elements of the cultural milieu can be identified by careful examination of the environmental boundaries. The identified boundaries of any behavioral system facilitate our focus on the associated dynamics (Glenn & Malott, 2004; Houmanfar & Rodrigues, 2006). For example, communities can be centered on various boundaries for social systems (Luke & Alavosius, 2012) such as anthropological, psychological, and geographical, among others. Simply stated, boundaries are analytical limits that allow further identification of the cultural groups (organized and independent individuals) involved in social issues. For example, various countries and cultural groups rely on the ocean’s fisheries for food. Different groups adopt various guidelines for harvesting fish and the variations may focus more on political boundaries than the natural habitats of the fish. One result is depletion of the resource when populations of fish succumb to overharvesting by fishermen pursuing catch for their markets and unfettered by consideration of their behaviors on the fish

¹ See glossary of definitions in Table 7.1.

Table 7.1 Glossary of definitions

| Term | Definition |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Aggregate Product | Conglomerate outcome or result of socio-IBs that may function as selector of future recurrences of socio-IBs or as mediator between socio-IBs and consumer practices. |
| Consumer Practices | Constitutes similar patterns of consumer responses (i.e., psychological collectivities) which also affect the future occurrences of the aggregate product and associated socio-IBs. |
| Cultural Milieu | The collection of stimulus functions influencing the acquisition and maintenance of IBs and the behavior of individuals interacting with the associated aggregate products. |
| Group-Rule Generation | The cultural entity's (e.g., organization) response to the practices of consumers, typically in the form of verbal rules crafted by those in power that may alter the cultural milieu and the socio-IBs. |
| Five-Term Metacontingency | A sociological unit that involves group relations such as those between whole organizations and the consumers of their aggregate product(s). The terms of this unit of analysis are: (a) cultural milieu, (b) socio-IBs, (c) aggregate products, (d) consumer practices, and (e) group-rule generation. |
| Interlocking Behavioral Contingency | Comprised of operant contingencies in which behavior of two or more people functions as environmental events for the behavior of the others. |
| Socio-Interlocked Behaviors | Emergent unit (i.e., cohesive whole) upon the organized or collective behavior of individuals and that is responsible for the aggregate product. |
| Two-Term Metacontingency | A contingent relation between (1) recurring interlocking behavioral contingencies having an aggregate product and (2) selecting environmental events. |
| Web of Interlocking Metacontingencies | The relations among the systems and their subsystems in organizations. The greater the component complexity in organizations, the more interlocking metacontingencies may be identified. |

population. Thus, establishing boundaries is the first analytical step toward the identification of the cultural phenomenon of interest within some framework. Catching fish to meet market demand frames the boundary differently than fishing in ways that sustain the marine ecosystem. Next, the functional properties of enviroing factors (i.e., collection of stimulus functions or the cultural milieu) associated with the commercial compared to recreational fishing practices as well as the cultural groups reacting with respect to their shared functions need to be analyzed.

Cultural-organizational milieu Houmanfar, Rodrigues, and Smith (2009) and Houmanfar et al. (2015) provide several examples of cultural milieu factors such as properties of materials, resources, policies, rules, traditions, institutions, technological progress, art, other organized groups, competition, and individuals (e.g., societal leaders) that are adopted and practiced at the organizational level as cultural-organizational milieu (see Fig. 7.1). Organized group practices or IBCs can be defined as learned interactions with cultural-organizational milieu (e.g., rules, values, policies, traditions, other organizations, etc.), acquired under group auspices,

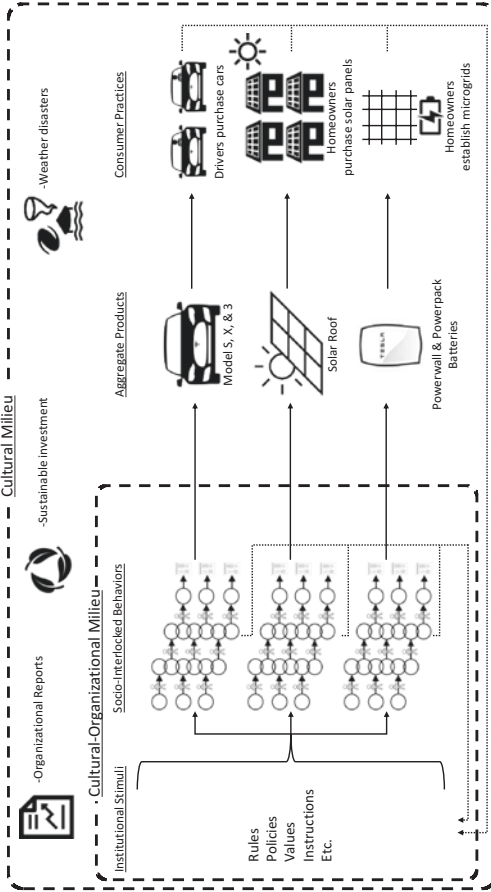


Fig. 7.1 Metacontingency describing group interactions among Tesla Inc. (i.e., socio-IBs) and leadership values (i.e., institutional stimuli) occurring under cultural milieu associated with the company’s revenue and position in the marketplace (e.g., organizational reports), sustainable technology and investment, and weather disasters disrupting energy sources of small communities. Elon Musk and board of directors’ decisions and associated rules and policies have functioned as institutional stimuli influencing the selection and maintenance of the socio-IBs and associated aggregate products of Tesla. The selected socio-IBs have produced resources delivered to several small communities (i.e., consumer practices) during post-weather disasters. Consumers accessing these products have demonstrated similar patterns of behavior (also known as macrobehavior; see Glenn et al., 2016)

and shared among members of a given organization (Houmanfar & Johnson, 2003; Houmanfar et al., 2009). Given the coordinated nature of these practices, they can be influenced by verbal products such as rules, historical records, and organizational statements (e.g., value statements, vision, consumer feedback, management feedback, other recurring messages, updates, etc.) that constitute critical features of cultural-organizational milieu referred to as institutional stimuli.

Shared stimulus functions associated with institutional stimuli are specific to group members (Kantor, 1982); thus, these features of cultural milieu (in form of cultural-organizational milieu) differentially influence IBCs and consumer practices, including ways the consumer group accesses aggregate products, manages waste products, and distributes liabilities and costs. For example, several cultural milieu factors were altered in Puerto Rico in the aftermath of Hurricane María in 2017. The devastation to the island altered organizational values of sustainable and resilient development (e.g., the government's post-hurricane recovery plan; see Rosselló and Governor of Puerto Rico, 2017), and also highlighted shared values among the leaders of a group of island nations sharing economic, social, and ecological challenges, known as Small Island Developing States or SIDS (Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, 2017). The hurricane created a crisis that heightened sustainable as well as ecological factors in the cultural milieu but also created opportunities for corruption and mismanagement of relief resources. These factors set the context for the development of metacontingencies consisting of the IBCs associated with the interactions among Puerto Rico's governor and private investors (e.g., Tesla corporate leaders) and the adoption of associated products of solar energy. Specifically, cultural milieu factors (i.e., sustainability and ecological threats) demonstrated a "shared values" function with respect to the formation of IBCs that favored new energy alternatives to the island's poorly operating system which was virtually demolished by the hurricane. These IBCs resulted in the provision of solar panels and batteries (i.e., aggregate products) to meet the evolving consumer demands. The citizens' usage of energy relying on old and damaged fossil fuel infrastructure changed to what is presumed to be more sustainable practices (i.e., usage of solar energy). In sum, the cultural milieu of ecological and sustainable factors set the occasion for the development of metacontingencies and Puerto Rico's attempts to adopt associated aggregate products during post-hurricane recovery.

The cultural milieu also influences the development of interrelated non-recurring behaviors of many individuals generating significant social change, known as macrobehavior (Glenn, 2004). For example, following the shortage of water and electricity occasioned by Hurricane María in Puerto Rico, and the extent of aid from federal agencies that citizens received, the people of Puerto Rico (constituting the target cultural group) engaged in creative activities to adapt to constringent circumstances. Their resilient macrobehavior in response to electricity and water shortages at home led to using rivers instead of showers for bathing. This resulted in public health challenges and, interestingly, in alternative hairstyles (Ardila et al., 2019).

As discussed recently by Ardila et al. (2019), resilient cultural practices are often developed by multiple individuals exposed to extreme ecological stress to successfully establish metacontingencies and macrocontingencies within sustainable boundaries. History is rife with examples of cultural groups adapting to environmental degradation by changing established practices and creating new ways of organizing themselves. The Rochdale Society of Equitable Pioneers were a group of weavers in Rochdale, England suffering famine. They organized themselves into a cooperative to pool their collective resources and sustain their families during times of resource scarcity. This group codified their principles of collective action and served as a model for others who replicated and extended their cooperative model (Alavosius, Getting, Dagen, Newsome, & Hopkins, 2009; Rochdale Pioneers, 1844). Within a decade, thousands of cooperatives were established in England and their ideas are recognized as the foundation for cooperatives across the globe. The development of resilient cultural practices in small cultural units in Puerto Rico such as towns, neighborhoods, and families were occasioned by the impact of a climate disaster and influenced by their cultural milieu. Group adaptation in this case has been influenced by group members' shared histories with respect to their development as an island colony of other nations and their current identity as an unincorporated territory of the United States. The movement toward statehood is complex and Puerto Ricans hold various positions from desiring statehood, remaining a commonwealth, and asserting independence.

The hurricane devastated the Puerto Rico island infrastructure, forced many to flee and migrate off the island and revealed the limited federal government's acknowledgement of Puerto Rico as a legitimate part of the United States of America. Ardila et al. (2019) describe the dire circumstances hurricane María created for Puerto Ricans and their ongoing struggles to rebuild under the growing realization that global warming increases the probability of future climate related impacts that may be more impactful than María. Many lessons can be learned by examining this trajectory and analyzing the drivers of communities to determine contextual factors that facilitate resiliency and those that promote conflicts and the collapse of communities. Moreover, the disaster recovery in Puerto Rico has proven to be an ongoing challenge, and an experimental platform for behavior scientific analysis of resiliency. As mentioned earlier, resiliency of cultural practices is demonstrated by patterns of multiple individuals' behaviors that result in the development of metacontingencies and macrocontingencies within sustainable boundaries (Ardila et al., 2019). The following section provides an overview of recurrence of behaviors in metacontingencies.

Interlocked Behaviors (IBs) and Socio-IBs

The five-term metacontingency provides an elaborated analysis of IBCs in terms of both psychological and sociological characteristics. The behaviors of individuals participating in IBCs are influenced by contextual factors (i.e., cultural milieu;

cultural-organizational milieu), and are selected at two levels: (1) interlocked behaviors (IBs) influenced by an individual's history of reinforcement as well as local contingencies within organized groups; and (2) socio-IBs and associated aggregate products that together are influenced by the cultural milieu, and recipients of the aggregate products. At the psychological level, the term *IB* highlights the critical role that individual participants' histories play in the interaction of individuals within a given IBC and, ultimately in the selection process associated with the metacontingency; the term *socio-IBs* refers to the cohesive unit—collective behaviors of individuals—responsible for the aggregate products (Houmanfar et al., 2010). As highlighted by many high technology and global energy companies with multi-cultural work force, addressing engineering controls alone without the recognition of individuals' histories of reinforcement and cultural repertoires limits efforts to promote effective cooperation in organized groups (Alavosius et al., 2017; Alavosius, Newsome, Houmanfar, & Biglan, 2016).

In short, the IBs of individuals are simultaneously selected at the psychological level by contingencies of reinforcement and at the sociological level by the recipients of the associated aggregate product (i.e., consumers). Socio-IBs are also responsible for aggregate products influencing the behaviors of other individuals outside the organization. For example, Tesla Corporation and its associated aggregate products (e.g., vehicles, solar panels, batteries using solar energy) have influenced changes in cultural practices in multiple small island nations: safety-related practices using emergency backup power to move trains in Osaka, Japan in the event of a grid outage (Lambert, 2017); recovery strategies using battery systems and solar panels to restore electricity in Puerto Rico in the aftermath of Hurricane María (Korosec, 2017); transitioning from fossil fuels to solar energy using microgrids to power whole communities of Ta'u in American Samoa and in the Hawaiian island of Kauai (Golson, 2017; Kaufman, 2016). The socio-IBs of Tesla Corporation and the associated aggregate products have influenced the development and maintenance of a number of cultural practices associated with energy conservation and renewable energy over recent years (Tesla, 2018).

Aggregate Products

Socio-IBs generate aggregate products that impact at the sociological level. Aggregate products vary as a function of the cultural milieu (Houmanfar et al., 2010), and mediate relations between socio-IBs and consumer practices. For example, on the island of Ta'u in American Samoa, consumer practices were altered by the change in Tesla's aggregate products in 2017. More specifically, citizens shifted from diesel to solar energy consumption by the replacement of old energy infrastructures with Tesla's energy microgrids (Lin, 2017). Interestingly, the new aggregate products (e.g., solar panels, batteries, and microgrids) altered consumers' cultural practices. For instance, although the people of Ta'u still use energy in their daily activities, energy-consumption practices have significantly lowered their carbon footprint on the environment (Lin, 2017).

Consumer Practices

The consumer response to aggregate products constitute similar patterns of behavior, known as macrobehavior (Glenn, 2004; Glenn et al., 2016). Further, a relation of macrobehavior and certain cumulative effects is described as a macrocontingency (Glenn et al., 2016). The behavioral products depicted in macrocontingencies pertain to the state of affairs associated with many social issues (Malott & Glenn, 2006) such as pollution, global warming, corruption, and youth violence. Thus, cultural interventions targeting macrocontingencies focus on changing socially relevant cumulative products of the behavior of multiple individuals. However, the cumulative effect in a macrocontingency is not in a contingent relation with the macrobehavior, thus, this unit cannot be selected (Glenn et al., 2016). Alternatively, the shared mode of responding of two or more individuals with respect to institutional stimuli constitutes a functional unit, known as a psychological collectivity (Kantor, 1982). Designing interventions that target institutional stimuli such as the aggregate products of organizations may nudge responding by psychological collectivities to produce positive social cumulative effects. The aforementioned example of Ta'u illustrates an intervention targeting psychological collectivities in a macrocontingency—that between energy-consumption practices in Ta'u residents and the carbon footprint of the community in the environment. Ta'u citizens reduced their consumption of diesel fuel from 100,000 gallons per year to almost zero by the acquisition of Tesla's batteries and solar panels (Lin, 2017). The intervention did not target the cumulative outcome of fossil fuel consumption; rather by providing an alternative source of energy, Ta'u citizens continued their regular energy-consumption practices without the harmful effect on the environment. Thousands of psychological collectivities in Ta'u were nudged to produce a positive social outcome (i.e., reducing their carbon footprint in the environment) by modifying the functional properties of energy consumption. In other words, Ta'u residents' macrobehavior of energy consumption did not change in form—they still used energy in the same ways for their daily activities; rather, these practices changed their function with respect to the institutional stimuli of energy. Changes in psychological collectivities' responding may be observed in the ways in which people verbally behave with respect to institutional stimuli present in the cultural milieu. For example, after Ta'u became 100% solar, citizens began to consider their energy-consumptive practices as an example of sustainable and resilient adaptation to climate change for all other Pacific islands dealing with similar environmental challenges (Lin, 2017). Moreover, the institutional stimuli shared by Ta'u psychological collectivities, as it relates to solar energy consumption, acquired new functional properties such as sustainable and renewable energy.

Many consumers have little or no understanding of the production and distribution processes that deliver their purchased goods and services. Purchasers of laptop computers, athletic shoes, clothing, and jewelry, for example, likely do not realize many of these products are manufactured by workers earning wages below sustenance levels in challenging working conditions producing externalities like pollution, waste products, and resource depletion. Product choice is probably most

influenced by price, perceived value, and reputation of the product. Producers camouflage the unsavory features of their products and instead promote the comfort, convenience and cachet owners of their products enjoy until the next product version replaces the still functional but now less fashionable model. Countercontrol interventions to offset deceptive marketing and reveal the true costs of consumption are a class of interventions effective in altering consumer behavior. Advocacy organizations play a critical role in providing consumers with genuine information and shaping the cultural milieu. Witness the many decades of effort to counter the deceptive marketing of tobacco companies and the slow progress of interventions to reduce smoking. The same strategies can be and are being applied to other products with mass appeal and huge social cost (e.g., fossil fuels) but the approach alone may be too slow to meet the accelerating problems.

In short, the consumer side of an organization has been largely ignored within behavior analysis. Fortunately, a few ideas about this area lay substantial groundwork for an advanced analysis of consumer behavior (e.g., Foxall, 2001, 2007, 2015; Hantula, DiClemente, & Rajala, 2001). Most consumer research disregards the effect of the consumer setting on behavior and is often not grounded in empirically demonstrated principles. Behavior scientists working in the areas of behavioral systems analysis and economics would benefit from empirical explorations of consumer behavior particularly in the areas of choice and alternative selections. The impact of consumer practices as well as other components of cultural milieu on organizational practices can be analyzed in the context of group-rule generation.

Group-Rule Generation

Those who design and implement organizational contingencies (i.e., group leaders and managers) maintain, change, or generate new roles and contingencies as a function of their interaction with an evolving organizational cultural milieu including consumers' response to the aggregate product. More specifically, the consumer response (e.g., purchase of product, communication of their like or dislike of the product etc.) is mediated by verbal rules generated by decision makers and designers of organizational contingencies (i.e., group leaders or managers). Group-rules affect the recurrence of interlocked behaviors or organized actions.

Our account of rule governance highlights the importance of functional characteristics of rules in the management of IBCs or organized group practices in organizations. In many cases, the source of rule may have quite a different history and perspective from those of the rule followers, and this discrepancy may explain the often-seen mismatch between the rule author's objective and the rule followers' understanding. Based on the literature on communication in behavioral systems, (Houmanfar et al., 2009; Peláez & Moreno, 1999; Rafacz, Houmanfar, Smith, & Levin, 2018; Smith, Houmanfar, & Denny, 2012; Smith, Houmanfar, & Louis, 2011) explicitness and accuracy of rules and instructions may generate environmental ambiguity associated with rule followers' behaviors.

Furthermore, the effectiveness of group-rule generation to influence acquisition and maintenance of socio-IBs has to do with ways leaders craft rules using values that occasion rule follower behavior. Values (i.e., overarching life directions or the qualities of being and doing that the person or a cultural group aspire to live or work in alignment with) are an inherent part of the cultural milieu, and are shared stimulus functions when used as group-rules affecting the behavior of the socio-IBs of individuals inside organizations.

With regard to the topography and function of rules, organizational rules are institutional stimuli that correspond to a shared response from a group (Kantor, 1982). Accordingly, the institutional nature of organizational rules requires our focus not only on their structure but also the shared function they serve among employees (Houmanfar et al., 2009). Organized group practices or IBCs can be defined as learned interactions with institutional stimuli (e.g., rules, policies, other organizational members, etc.), acquired under group auspices, and shared among members of a given organization (Houmanfar & Johnson, 2003). And, given the coordinated nature of these practices, they can be influenced by verbal products such as rules, policies, instructions, etc.

In the case of Tesla Inc., its aggregate products are generally well received in the marketplace (Tesla, 2018)—at the sociological level of analysis consumers interact with the products of the organization; however, certain organizational practices have affected the organization from a psychological standpoint (e.g., local contingencies and cultural milieu factors). Despite Tesla Inc.'s undeniable success in diversification and rapid expansion of its product-line (Tesla, 2018), Elon Musk's leadership style in relation to his employees has affected his image as well as his products—from the standpoint of the market place—over time (Lashinsky, 2019). Following Glenn and Malott's (2004) analysis of organizational complexity, we may say that Musk's Tesla has increased its component complexity (e.g., multiple assembly lines for different products), without the needed adjustments to its hierarchical complexity: Musk is still both chairman and chief executive (Gelles, Stewart, Silver-Greenberg, & Kelly, 2018). Such product diversification without leadership adjustments for an effective oversight has led to several communication issues over the recent years (Gelles et al., 2018). Musk announced plans of closing the majority of Tesla's showrooms and selling cars online, which turned into a dispute with the store landlords in relation to the store leases (Fung, 2019). Also, Musk has declared many ambitious production objectives and failed to meet the associated goals (Lashinsky, 2019). The impact of these leadership factors, quality control issues, and delays in product delivery on consumers plus investors' confidence remain a topic of debate.

Tesla's influence in shifting energy-consumption practices in several small nations, while being under Musk's erratic decision making—saying that he will close most of the company's retail stores and later announcing that no closure will occur (Lashinsky, 2019)—is a clear example of how leadership practices can hinder communication networks which are part of the process by which IBCs are managed (Houmanfar & Johnson, 2003). When individuals are given clear and explicit rules of operation, they produce more, faster, and with fewer errors (Smith et al., 2011).

Particularly, values and traditions that are communicated by leaders may act as a source for rule governance (Houmanfar et al., 2009). For example, shared values among group members are an essential feature in teamwork performance (Rafacz et al., 2018). Moreover, when leadership values are aligned with the overarching cultural-organizational milieu, they can affect not only organizational well-being but also the well-being of individuals outside the organization who may be members of multiple cultural groups interacting with its aggregate products.

As highlighted by Houmanfar et al. (2010), a better understanding of the consumer response to the aggregate product and the various contingencies that affect that consumer response is critical to the generation of more effective organizational group-rules. The surveys and focus-groups conducted by organizations are an aid to crafting useful group-rules. The role of language here cannot be overstated. The assessment of the cultural milieu that affects (a) organizational practices in the form of cultural-organizational milieu, as well as those of its consumers, (b) the evaluation of the organizational practices in terms of their efficiency and productivity, (c) the evaluation of the aggregate product in terms of its quality (by consumer and market place), and (d) the consumer response of choosing or rejecting the product based on its value adding function, are primarily verbal in nature (Houmanfar et al., 2015). In short, language serves as an intermediary between the multiple interlocking processes associated with product generation and response to consumer demand.

The five terms of the metacontingency are interdependent relations between sociological and psychological factors that participate in human interactions. The selection of human behavior in a social environment occurs at two levels: (1) at the *psychological* level, response and stimulus functions, analysis of contingencies, personal history, and the roles individuals take in organized groups are all relevant factors to understand in the selection of individual behavior; (2) at the *sociological* level, human behaviors are configured as a collection of interlocked behaviors producing aggregate outcomes, such as organizations generating material products, universities producing of knowledge, and governmental congress producing laws. Further, these organizations (i.e., metacontingencies) are interrelated with the collective behavior of individuals (i.e., macrocontingencies) accessing aggregate products. Because meta- and macrocontingencies capture the dynamics of interactions among cultural groups, further consideration of these interactions is warranted.

Meta- and Macrocontingencies Dynamics

Organizations consist of the interaction of human behavior and its products that affect the behavior of other humans outside the organization (Glenn & Malott, 2004). As such, organizations affect one another building a reciprocal ecological relationship referred as “co-evolution” (Glenn & Malott, 2004). Given that organized and self-organized systems must co-evolve, any mismatch between aggregate products and environmental requirements is likely to be detrimental to both systems (Glenn & Malott, 2004). In this sense, organizations that focus on maintaining an

ecological balance—adapting to consumer demands and ecological challenges—are in a position to affect culture in a variety of ways. Five-term metacontingencies may help us understand the processes by which organizations partly determine the survival and success of certain cultural practices of collectivities interacting with its aggregate products. The participation of Tesla in many small nations illustrates how the aggregate products of organizations (e.g., solar batteries and electric cars) may directly influence consumer practices (e.g., changing cultural practices of usage of fossil fuel energy toward clean energy). However, rarely does a single organization affect whole cultural groups because consumers are continuously interacting with multiple aggregate products of various organizations.

Figure 7.2 illustrates the complexity of meta- and macrocontingency dynamics, whereby a web of interlocking metacontingencies and associated cultural milieu developed in the aftermath of Hurricane María in Puerto Rico, and ultimately affected the citizens’ recovery (i.e., cultural practices). The web of interlocking metacontingencies began at the federal and end at the local level of government where consumer practices directly interacted with its aggregate products. At each governmental level, metacontingencies generated aggregate products influenced by different cultural milieu factors that were identified by examining the boundaries of Puerto Rico as a community. In their analysis, Ardila et al. (2019) identified ecological, geographical, and psychological boundaries for Puerto Rico through a careful consideration of historical and legal documents related to its status as a nation.

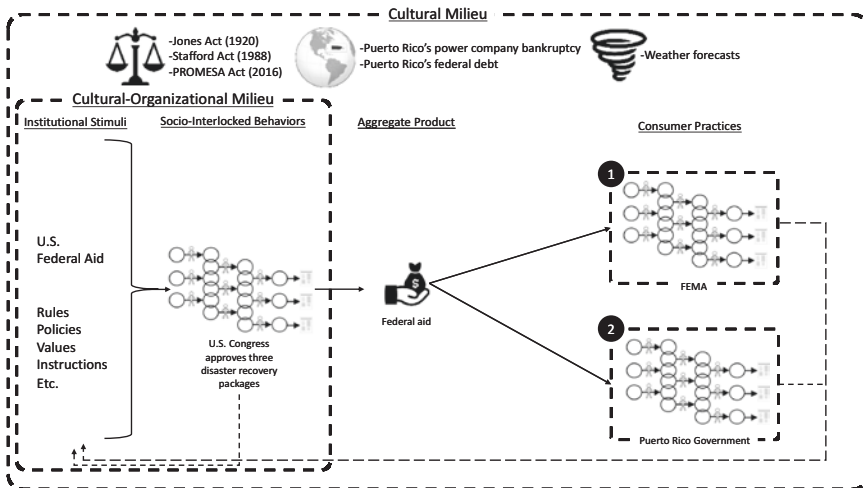


Fig. 7.2 Web of interlocking metacontingencies describing functional relations among the U.S. Congress metacontingency and associated aggregate products with two other metacontingencies: (1) FEMA and hired companies in charge of delivering critical resources to Puerto Ricans during post-hurricane recovery and (2) Puerto Rico government and profit and nonprofit companies producing sustainable products for resilient recovery. (Reprinted with permission from Ardila et al., 2019)

The identification of these boundaries resulted in further identification of differences among milieu factors at each level of the web of interlocking metacontingencies and the ways by which they affected the variability of aggregate products. For example, the metacontingency of U.S. Congress generated insufficient and delayed federal funding (Ardila et al., 2019) in the presence of cultural milieu including Puerto Rico's citizenship status and federal debt (post Hurricane Maria in August 2018). Similar observations of serious problems with federal funding were not made during the recovery process following Hurricane Harvey (April 2018) in Houston.

With regard to post-hurricane recovery process in Puerto Rico, the federal budget was received by another set of actors participating in other metacontingencies that developed at the local governmental level. Cultural milieu factors influencing the aggregate products of metacontingencies at the local governmental level included Puerto Ricans shared values as a resilient nation, and shared values of sustainable development (SIDS). As a result, metacontingencies and their associated aggregate products varied as a function of cultural milieu favoring alternate sustainable and resilient practices (Ardila et al., 2019).. The different perspectives among Puerto Ricans as being a state, territory, or independent country reveal the variability in values related to sustainability, self-sufficiency, and internal governance of collective resources. The tangled web of community interests within the island is influenced by the external special interests that do not necessarily share the same history and values. The devastation wrecked by María punctuated a history of interdependencies among residents on the island, diaspora who had migrated elsewhere, outside agents seeking gain (e.g., markets for their products and services), and the US governance of Puerto Rico as an unincorporated territory. The hurricane essentially devastated the island and the fabric of society was shredded as the energy system, health care, and food and water supplies degraded. Business as usual on the island ground to halt and the internal resources were inadequate to rebound without external resources, the delivery of which was widely seen as inadequate.

In short, while approval of relief-packages at the federal level was delayed and insufficient at lower governmental levels, the associated aggregate products occasioned significant social change. Some were positive, for example, Puerto Rico's governor participated in socio-IBs between Tesla and the Puerto Rican government that resulted in solar energy aiding Puerto Rico's recovery process (Ardila et al., 2019). That same governor was later forced to resign in July 2019 when massive social protests of his alleged corruption with his aides, disrespectful communications about those suffering losses, and mismanagement of relief funds forced him from office (Rosa, Mazzei, Kao, & Cai, 2019).

In the co-evolution of business organizations and cultural groups, leaders are the key players in maintaining an ecological relationship or exposing imbalance. In other words, citizens' choices can be restricted by the policies and rules crafted by organizational leaders who determine which aggregate products are available to them and which are not. In this context, the citizens are not only participating in the selection of aggregate products from outside their boundaries and the generation of them within, but are also influenced by the associated consumption and interaction

with those products. Moreover, the role of leaders in cultural change goes beyond how they manage people within organizations. Their practices also influence the culture more generally. In crafting messages, community or organizational leaders may want to account for conflicts of human values—between tendencies toward tolerance and tendencies toward extremism; between tendencies toward embracing diversity and the creation of ethnic purity; and/or between consumption of the products of others or generation of these locally. Values conflict is a by-product of environmental ambiguity associated with communication networks in organizations. This type of conflict produces insensitivity to direct contingencies (e.g., insensitivity to the pain of others and insensitivity to one's own pain), which can negatively impact group cohesion and cooperation. Puerto Ricans' uprising against their governor is a stark example of how insensitive communications occasion social upheaval. Therefore, our challenge is to help community or organizational leaders understand the damaging nature of such conflicts and promote the utilization of verbal networking systems that can prevent their destructive effect on organizational functioning and the associated impact on consumer practices. Uncertainty (i.e., not having a history with the governing contingencies) may become part of the implicit practices of organizations (depicted by metacontingencies) and their consumer groups among community members (associated macrocontingencies). In the absence of strong leadership and management of metacontingencies, organizational practices can become unfocused and ineffective in the face of newly changed contingencies that are influenced by associated cultural milieu (Houmanfar & Rodrigues, 2012).

Conclusion

This chapter calls for more work in behavior analysis, emphasizing the importance of contextual factors such as cultural milieu, and cultural-organizational milieu to capture cultural dynamics between organizational practices and those of their consumers. With regard to social problems like those under global warming, it is not enough to eliminate aversive conditions for an individual or even a single family. Rather, it is necessary to arrange community and organizational interventions that can create environments that support establishment and *maintenance* of target behaviors at the population level that operate within sustainable boundaries. Some organizational leaders, perhaps under mounting pressure from social forces or in alignment with their personal values, may seek to direct their organizations' resources toward broader social values. Others may look for ways to protect and defend their gains against sharing with others with less. As briefly discussed in this chapter, behavior analysis provides assessment tools that may guide potential solutions to some of the challenges that humanity faces and offer corporate leaders a systematic strategy for cultural change. A technology of behavior and culture change can be hijacked and applied by special interests to perpetuate their agenda.

As global warming accelerates and the social impacts of an increasing uninhabitable planet mount, the transition to a new energy economy requires maintaining social order as the practices that brought us here are replaced with more sustainable ones for a rapidly expanding population. Levin, Cashore, Bernstein, and Ault (2012) describe an iterative process in which humans constrain their future selves and reinvent culture in a series of stages. This shaping of culture is a process toward an unknown future where each step reveals opportunities and faults leading in step changes to a point where humans live within planetary boundaries.

In keeping with Skinner's earlier enthusiasm, we believe that behavior analysis has the capability of making a significant impact on certain issues in which behavior change plays a vital function (Houmanfar et al., 2015). Consumptive behaviors are fundamental to global warming, and other huge threats to human survival. Ostrom (1990) examined how communities managed common-pool resources for generations and organized themselves into producers and consumers that operated within sustainable limits. The science of behavior is reaching a point where we can contribute to understanding and shaping cultural change (Alavosius et al., 2016; Alavosius & Mattaini, 2011; Biglan, 2009; Biglan & Glenn, 2013; Glenn, 1988; Glenn & Malott, 2004; Houmanfar et al., 2010; Malott & Glenn, 2006; Mattaini, 2013). Socially significant leadership in this context not only relates to leaders' actions and management practices that affect the well-being of organizational members (e.g., their safety, health, financial security, etc.) but also bear positive or negative impact on consumer practices (e.g., education, obesity, cancer, safe or green driving, energy conservation, diversity based health care, etc.). In many ways, leadership practices demonstrate and influence the morals and values of the society. Social responsibility is not new ground for behavior analysts to consider. Wolf (1978) and Hawkins (1991) explore social validity and functional assessment of the societal importance of the goals, technologies, procedures, and impacts achieved by applications of behavior analysis. Their analyses consider the social validity of interventions applied to help special needs populations and provide a framework to consider the impact of behavior science on larger social issues (Baer, Wolf, & Risley, 1968).

The challenges ahead in achieving sustainable cultures within global limits will require humans to organize themselves in ways that promote collective well-being, allow future generations to live within sustainable boundaries, and restore environments damaged by past practices. Underlying this path to future well-being are identifying and countering the many forces that drive isolationism, unbridled consumption, and conflict over depleting resources. The coming decades will reveal the extent to which humans can successfully respond to global challenges that will generate much conflict over dwindling resources, and perhaps bring out socially responsible adaptations that essentially reinvent how humans regard their stewardship of the planet.

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Chapter 8

Applying Behavioral Science to Large-Scale Social Changes



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What Is Behavior Analysis?

The experimental analysis of individual behavior has been the trademark of behavior analysis, whether in basic research or applied work. However, in *Science and Human Behavior*, Skinner (1953) was clear on one point: behavior analysis is more than experimental analysis. What characterizes behavior analysis is not exclusively individual behavior; rather, it is the scientific method—but this is not only limited to experimentation. Behavior analysis as science may use field observation, for instance, to search for independent variables that can be manipulated (cf., Zilio, 2019). Prediction and confirmation or disconfirmation do not require experimentation (Todorov, 2009).

Following what Skinner said about science in general, one could say that behavior analysis is first of all a set of dispositions. It is a disposition to deal with behavior rather than with what someone has said about behavior. Behavior analysis is a disposition to accept facts about behavior even when they are opposed to hypotheses. Behavior analysts have also discovered the value of remaining without an answer until a satisfactory one can be found. Behavior analysis is a search for order, for uniformities, and for lawful relations between environment and behavior (Skinner, 1953).

The material to be analyzed in a science of behavior comes from many sources: casual observations, controlled field observations, clinical observation, extensive observation under rigidly controlled conditions in institutional research, and laboratory studies of human behavior (Skinner, 1953). The behavior of a single subject can be observed under many circumstances, even when other individuals are present. When the focus of interest is individual behavior, a social episode can be described

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using the same terms, concepts, and principles involved in the person's interactions with his physical environment.

The behavior of persons in groups has also been of interest to behavior analysis. Collectively, groups can produce unique results (Glenn, 1986). Skinner (1953) says.

A social environment is usually spoken of as "culture" of a group. The term is often supposed to refer to a spirit or atmosphere or something with equally nonphysical dimensions. Our analysis of the social environment, however, provides an account of the essential features of culture within the framework of a natural science. (p. 419).

When working with social issues, the focus on a single subject can be expanded to the analysis of cultural practices involving groups of persons behaving in concert, where the behavior of a person makes sense only when considered in the context of the group's outcomes.

Practically all human operant behavior may come under the classification of a cultural practice. Even behaviors common to all humans, like eating, are linked to social contingencies that determine what to eat and how to eat. Newcomers to any given group, either a child or a stranger, acquire such behaviors by learning processes that may involve modeling, rules, and/or direct exposure to the contingencies. Social contingencies will maintain a child's behavior through interactions with her mother, family, caretakers, and controlling agencies like school and church. Certainly, that is why we say that it takes a village to educate a child.

Cultural practices often involve interlocking behavioral contingencies (IBCs), where the behavior of one person may provide positive consequences for the behavior of a second person, discriminative stimuli for the behavior of a third person, and so on. In that case a cultural practice is structured through those IBCs, which produce an aggregate product maintained by cultural consequences (Glenn et al., 2016, reprinted in Chap. 2 of this volume).

Nevertheless, a cultural practice might also involve repeated patterns of operant behavior governed by individual contingencies that produce a cumulative social effect of significance. In this case, behaviors are selected and maintained by their own consequences and the consequences are not the same for everyone behaving. The cumulative effect does not select or maintain the behavior of each individual and cannot be manipulated independently.

Cultural practices, as a set of behaviors and of its products, characterize a society. They are maintained by social contingencies that prevail in a given society, group, or organization (Skinner, 1953). Those contingencies may be in vigor for variable lengths of time, for a few months, as in fashion, to others that persist for centuries. One way to study cultural practices is to analyze large sets of data that are gathered by private or public organizations (Lemos, 2018; Oliveira, 2018). Another way to study cultural practices is the use of systematic observation of groups engaging in such practices (Vasconcelos-Silva, Todorov, & Silva, 2012).

Contingency, Macrocontingency, Metacontingency, and Schedules of Cultural Selection

Groups do not behave, nor do cultures behave. People behave. Interest in the behavior of persons in groups was present in Skinner's writings, but its systematic study is more recent (e.g., Lamal & Greenspoon, 1992). As the science of conditional relations, behavior analysis now is showing progress in understanding how the environment shapes, maintains, and/or changes cultural practices that are controlled by social contingencies prevailing in a given society, group, or organization (cf., Lemos, 2018; Oliveira, 2018).

Contingencies are conditional relations involving a situation, a behavior, and the consequence that depends on that behavior. One example of a behavioral contingency can be seen in the behavior of a person who is unemployed: if this person looks for a job, the probability of getting a job is higher than zero; if the person does not look, the probability is zero. Looking for a job is reinforced by being employed. As with all operant behavior, that behavior is extinguished if it is never followed by finding a job.

Macrocontingencies are composed of the behavior of many persons,¹ with such behaviors controlled by independent contingencies. No collaboration between or among the people behaving is present. The behaviors are related only by their cumulative effect on the environment. This happens, for example, when there are a number of unemployed people in a society. When unemployed workers are few, the proportion of applicants per job offered decreases and managers must offer higher wages to compete; when unemployed workers are many, the ratio of applicants per job offered increases and managers can choose those applicants who accept work for lower wages. Economists consider an unemployment rate of about 5% as a good number in order to keep wages and inflation stable. When unemployment is low, fluctuations do not affect average salaries or inflation.

Looking for a job is individual operant behavior, but the circumstances in which that behavior occurs result from collective decisions. Jobs are lost when erroneous interventions in the economic environment mess with the chain of production and marketing, arbitrarily alter prices, and bring insecurity to those who might invest. These events produce establishing (motivating) operations for some of the behaviors of those who are involved in the economic chain. Each dealer in the market will cut costs and/or lay off some of the employees when selling diminishes or clients do not pay on time. As Skinner (1953) noted in *Science and Human Behavior*, laws for the social sciences have their correspondence with the behavior of persons. When the economists say that the bad money retires the good money from the market, it is

¹Regarding the concept of macrocontingency, two important points should be noted. The first one is that behaviors are selected and maintained by consequences that are not the same for everyone. The second point is that the cumulative effect is not independently manipulated and does not select or maintain behavior.

the owner who decides (behavioral contingency) to keep the dollars and spend only reais.²

Metacontingencies are conditional relations between a set of IBCs necessary for the production of a given aggregate product and the consequences provided by a selecting cultural environment. This relation can be summarized as follows: If an IBC set produces an aggregate product, then the social environment reacts with cultural consequences (Todorov, 2009). As an example, people who are unemployed and who have the same objectives might realize that they can accomplish more collectively than they could individually. One example is a cooperative or a private business organization that is owned and controlled by the people who use its products, supplies, or services. Small farmers can join an agricultural cooperative, for example, with the aim of assuring markets and supplies, achieving economies of scale, and gaining market power through collectively marketing, bargaining, processing, and purchasing supplies and services. Benefits are derived and distributed equitably on the basis of use.

So far, metacontingencies have been classified as *ceremonial*, *technological*, *conservative*, and *transformative*. Ceremonial and Technological (Glenn, 1986) are classifications of the metacontingency that are based on consequences scheduled by conditional relations:

Ceremonial contingencies (...) involve behavior that is maintained by social reinforcers deriving their power from the status, position, or authority of the reinforcing agent independent of any relation to changes in the environment directly or indirectly benefiting the behaving person. (p. 3)

Examples are easily found in the early education of youngsters. Adults might ask their children to leave the room if they want to have a private conversation. Adults might force a child to eat a specific type of food even if it does not taste good.

“Technological contingencies involve behavior maintained by non-arbitrary changes in the environment. The reinforcers entering into technological contingencies derive their power from their usefulness, value, or importance to the behaving person as well as others” (Glenn, 1986, p. 3). Examples can be found when a group of fisherfolks trying to bring food to their home plan their next fishing routes and practices based on their previous fishing outcomes.

As defined, the adjectives ceremonial and technological can apply to behavioral contingencies as well. Conservative and transformative (Todorov, 2013) are, instead, classifications based of the definition of the aggregate product:

Contingencies and metacontingencies are *conservative* when behavior in the contingency and the aggregate product in the metacontingency are closely specified, with little room for variation. Ways to salute (behavior in a triple contingency) in the army and folk dances like the Brazilian “Bumba Meu Boi” (the aggregate product in a metacontingency) are examples. In the first example, saluting is both conservative and ceremonial.

²“Real” is the name of the Brazilian currency; “reais” is the plural form.

Sometimes, in certain circumstances, or in some organizations, society requires originality as a characteristic of the aggregate product in a metacontingency, here called *transformative*. Examples might include a scientific paper produced by a single author as the result of the behavior in a triple contingency or two or more authors who collaborate to generate a novel aggregate product. A group of behavior analysts working on applied research may behave according to metacontingencies that are both technological and transformative. Their collaboration is intended to result in new solutions to social problems and their behavior is (in the ideal case) not under the control of social reinforcers controlled by authorities.

Context may lead to other classifications, like concurrent or chained metacontingencies, for instance. Defining culture as a set of conditional relations that characterizes a group, a society, an organization, etc., may leave the wrong impression of a static structure. Concepts like contingency, macrocontingency, and metacontingency are only tools that may help us to understand complex processes. Our present task is to understand how the controlling agencies, like government, religion, family, etc., establish and maintain such conditional relations.

Controlling Agencies

The arrival of a stranger who joins a given group or organization shows more clearly how social contingencies may vary and how aversive the adaptation to new rules of cultural selection is. Discriminative stimuli in the new culture will exert control over the stranger's previous behavioral repertoire. Without explicit rules or modeling, direct exposure to new contingencies will generate extinction and/or punishment in cases where similar discriminative stimuli control different responses in each culture. In other instances, new discriminative stimuli may have no control over any behavior given how different the sets of social contingencies are. A new repertoire will require frequent exposure to stressful situations. Escape and avoidance are related to foreigners' less than optimum adaptation to a new culture: efforts will cease when a new repertoire is enough to get by.

Direct exposition to stressful contingencies is avoided by learning to follow rules and to observe others behaving. Rules modulate life in any society. Controlling agencies (religion, education, government, etc.) are in charge of enforcing the rules. These agencies are part of the group that exerts ethical control over its members. They are responsible for installing, maintaining, or extinguishing particular patterns of behavior. To do so, they are allowed to use reinforcement and punishment according to the rules previously established (Skinner, 1953).

Different agencies are defined by the types of variables they can manipulate and the types of behavior they may target. Priests propose an act of penance when a devotee commits a sin and they use the prescribed act to regulate the relationship between the members of a family and a community. Schools use grades to approve or disapprove of an educational or socio-emotional repertoire. Firms use wages to

select and maintain productive behavior. Governments classify behaviors that affect the well-being of society as legal or illegal.

Generally speaking, the government is the agency that has the power to regulate the interactions between the controller and the controlee by setting limits to the behavior of the controller in different areas. In some countries, teachers cannot spank as a way to discipline children. In others, employers cannot offer less than the minimum wage when hiring someone. For this reason, the government has a special role in installing, changing, or extinguishing cultural practices. Governors and the governed constitute a social system, a situation in which the behaviors of two or more individuals are interlocked (Skinner, 1953). Governors decide on a set of practices that involve the behavior of their members, the behavior of members of other controlling agencies, and the population.

These practices can be described in the form of conditional relations and codified in an attempt to ensure greater effectiveness in controlling behavior. Thus, to understand the control exercised by a governmental agency, it is crucial to analyze the behavior of those who make the rules, of those who apply the rules by delivering consequences, and its general effect on the behavior of the governed.

Government and Laws

Some very special rules are called laws, or a kind of social control exerted by the government (Black, 1976, 1998). But what is a law? What is the role of law in government control and what is the effect of laws on the behavior of the people and of persons in the controlling agency? As Skinner (1953) wrote:

A law is thus a statement of a contingency of reinforcement maintained by a governmental agency. The contingency may have prevailed as a controlling practice prior to its codification as a law, or it may represent a new practice which goes into effect with the passage of the law. Laws are thus both descriptions of past practices and assurances of similar practices in the future. (p. 339)

Laws are written to control behavior. In a perfectly democratic society where the due process of law is more than just verbal behavior, laws are the codification of the controlling procedures of governmental agencies (Skinner, 1953). Laws usually involve complex behavior—complex in the sense that their articles describe more than single responses, specify applicable circumstances, and sometimes point out attenuating conditions. Outside the laboratory or controlled clinical interventions, only rarely can we find any regulation of behavior by only one independent variable.

Contingencies are easily found in laws, decrees, etc. (e.g., Skinner, 1953; Todorov, 2005). A contingency refers to a single action, but a law usually deals with a set of actions, especially when it is destined to promote new living conditions. A set of IBCs is needed to guarantee that a change in cultural practices in society will occur and be maintained (e.g., Black, 1998; Ross, 1901/2012; Todorov, 1987). Legal control involves a web of laws; a single unlawful act puts an entire apparatus

into motion. It may represent the beginning of a behavioral chain involving dozens of agents over months or even years.

Laws should control behavior to promote desirable (for society) behavior and to eliminate undesirable and deleterious (for society) actions (e.g., Chriss, 2010). In behavior analytic terms, control is not synonymous with coercion, but quite often we think of laws as implying aversive control. Laws also prescribe positive consequences for desirable behavior, as in tax exemptions, or negative income tax for parents who keep their kids in school.

However, in most of the examples Skinner used, coercion is involved and behavior is defined by its consequences, not its topography. The controlling agencies do not usually take steps to advertise the contingencies of aversive control that are in their power to enforce; those involving positive reinforcement, on the other hand, usually receive special attention. Recently in Brazil, state governments have been involved in a fierce competition to attract new business, offering tax exemptions. Their marketing techniques are superb.

But how does a law come to control behavior? How can a society ensure that a new law, approved with the intention of promoting changes in cultural practices, will control new behavior of citizens and of government agents alike? Ignorance of the law is not an excuse; once the law is in effect it is up to each person to know it and to behave accordingly (in the everyday language sense of it). Family, the ethical group, educational and religious institutions, the media, and so on, are all in charge of teaching what is wrong and what is right under the law.

When a new law specifies ongoing cultural practices only, conformity is more easily obtained. Enforcement of the law does not conflict with the behavioral repertoires of the governmental agents in charge of that enforcement. But in a different region of the same country, that new law is a technological metacontingency (Glenn, 1986).

Laws approved to change current practices are a set of rules concerning the intentions of the government and its legal bodies. Changes in the cultural practices of the community will typically be slowed by the necessity of prior changes in the behavioral repertoires of those who shall enforce the law. Cultural practices will change more rapidly when past laws and decrees were strictly enforced, i.e., when consequences followed behaviors promptly and accordingly to the legal texts (Todorov, 1987). Skinner (1953) describes the procedure:

How codes of law affect governmental agents is the principal subject of jurisprudence. The behavioral processes are complex, although presumably not novel. In order to maintain or "enforce" contingencies of governmental control, an agency must establish the fact that an individual has behaved illegally and must interpret a code to determine the punishment. It must then carry out the punishment. These labors are usually divided among special subdivisions of the agency. The advantages gained when the individual is "not under man but under law" have usually been obvious, and the great codifiers of law occupy places of honor in the history of civilization. Codification does not, however, change the essential nature of governmental action nor remedy all its effects. (p. 341).

If a law should be a clear description of contingencies, how should it be written?

Cabral and Todorov (2015) went to the “law factory” in Brazil to see what happens. The law is a product of behavior, which is in constant transformation. New laws revoke previous laws. The development of these new laws is given through the legislative process. There are two meanings for the term “legislative process”, one legal and the other sociological (Sampaio, 1996). In a legal sense, the legislative process is a kind of procedural law that regulates the creation of standards. The sociological sense covers the factors that control the behavior of legislators in the exercise of the legislative function, such as partisan agreements, public opinion, social crises, organized groups, lobbying pressure, and the exchange of vows between the parliamentarians, among others.

The following description refers to the Brazilian legislative process. However, similar analyses can be carried out for other types of regimes or processes. In fact, the legislative process traversed in Brazil and in the USA for a bill to become a law are similar.

Usually, the legislative process begins when a given entry turns into a parliamentary proposition (bill proposal for amendment to the Constitution, etc.). In Brazil, for example, two houses of Congress must process bills: the House of Representatives and the Senate. In each instance the matter is discussed, amended, and voted on. When introduced, the bill is dispatched to the committees, which have the jurisdiction to examine it. In each commission, a rapporteur’s opinion is called before approval or rejection of the project, which is voted on by its members. Part of the bills will be voted on in the plenary after being approved at the last commission, the other legislative House that serves as a review House. After placing the project in review, it returns to the first House. Changes made by the review House may or may not be binding. Finally, the bill is forwarded to the Presidency of the Republic to be sanctioned in whole or in part; it may also be vetoed in full (Bernardi, 2009; Pacheco, 2013). Similar processes operate in most democratic countries.

Despite all the complexity of the legislative process in a democracy, metacontingencies can be observed by means of legislative production. Aggregate products involved in each stage of the legislative process can be identified, such as reports, amendments, and substitutes. Discussions between different parties can lead to laws that represent interests restricted to some groups at the expense of societal interest (Ferreira Filho, 2012). Partisan interests and lobbies can control the behavior of the legislator. Parts of the IBCs, such as those that generate agreements, do not become public, and occur behind the scenes. The aggregate products generated from these interactions occur without technical subsidies and hamper adequate cultural planning. When this occurs, the law loses its primary function.

To better understand the controlling procedures of governmental agencies, two settings of research have been developed in the past few years: (1) the legal setting under which formal control is established, and (2) the public arena under which natural experiments occur and can guide the formulation of rules. None of them require experimentation.

Legal control A set of laws is a good source for the study of the kinds of contingencies in effect in any given society. As behaviorists did not invent control, behavior

analysis may have much to learn from many centuries of technological development in legislation. Until the concepts of ceremonial and technological metacontingencies (Glenn, 1986) and of macrocontingency (Glenn, 2004) were presented, behavior analysts had only the triple contingency as a tool to understand how laws could control behavior (Marr, 2006). The analysis of laws as metacontingencies helps in the study of how, when, and why laws do control behavior. Thus, one way of looking at how a law controls behavior is to begin with the analysis of the law as a written statement of interlocked contingencies that control individual behavior.

Todorov, Moreira, Prudêncio, and Pereira (2004) analyzed the text of a Brazilian law designed to protect children and adolescents. In Brazilian law, children and adolescents do not perform unlawful acts; at most, their behavior may be in conflict with the law. Thus the law introduces a new vocabulary, which should be accompanied by new cultural practices regarding children and adolescents. The law is better written when it deals with the undesirable behavior of adolescents and the desirable behavior of governmental agents when they are dealing with the undesirable behavior of the children and adolescents. With other issues, however, the law is not clear. Who will have custody of a child caught infringing the law? This depends on a personal decision of a judge, which may be influenced by advice from psychologists and social workers, for instance (when the State provides these services in that locality).

An incomplete contingency opens the possibility of different interpretations of the law, and sometimes opens the possibility of inaction. Article 4 of the aforementioned law specifies that it is the duty of the family, of the local community, of society in general, and of the government to assure the rights of children to food and health, without specification of consequences. As a means for controlling behavior, this statement is of no value.

Later, Prudêncio (2006) examined the official records of the judiciary system in Brasília, Brazil as they pertained to dealing with children and adolescents. Prudêncio studied actual cases of adolescents in conflict with the law, analyzing each step of the process according to the contingencies specified in the law. The results showed clearly why laws should be clear, detailed, and specific. Practically every time a judge could choose freely between two possible contingencies, one specifying consequences for those governmental agents who do not act as the law prescribes and the other described in general and almost fuzzy terms, this second alternative was chosen. In almost every case the process was finished and archived without the acts of judges, district attorneys, policemen, teachers, or technicians occurring as the law prescribed (Todorov, 2005; Todorov et al., 2004).

In a national judiciary system that is already slow, if not archaic, decision-making by judges and attorneys sometimes follows the line of least effort. The “zero tolerance” effect in New York is an example of the necessity of never letting any system run by itself. One of the four points of the successful program was “relentless follow-up and assessment” (Greene, 1999, p. 171).

Police brutality, even with children, is seen in some parts of Brazil as a necessary educational measure. In other cases, the protection measures determined by the law

are costly in terms of resources and manpower, so nothing happens. Thus, for a technological metacontingency to produce new cultural practices, other agencies besides the judiciary must act, like the educational system and the media, especially television, with society as a whole acting as an external control for governmental agencies.

Laws may be described as webs of contingencies, metacontingencies, and macrocontingencies. The Brazilian law for the national educational system is a web of contingencies with one general purpose: to educate the person to be a worker and a citizen (de Carvalho & Todorov, 2016). Four behavioral contingencies and several metacontingencies, were identified in the text of this law. The contingencies correspond to the duties of the State and the family related to education, especially with elementary schools. The metacontingencies are organized in a chain of aggregate products. The law defines an aggregate product (full development of the learner) that depends on other products (preparation for citizenship and qualification for work) found in basic education.

The general findings depict the importance of elementary school as the basis of education. It is in this phase that the detailed description of contingencies and metacontingencies can entice better control. Nevertheless, in a country where there are higher rates of school dropout, legislators might want to consider better descriptions of the contingencies and metacontingencies related to this educational stage.

Natural experiments Major changes in cultural practices are happening everyday in some part of the world. In some cases, a government, an organization, a church, or other institutions plan careful steps to change people's behavior. Sometimes the planning and implementation of a major change is well documented, so behavior analysts can reconstruct behavioral processes and describe events in behavior analytic terms.

Lé-Sénéchal-Machado and Todorov (2008) investigated the reconstruction of behavioral processes involved in the installation of new behaviors of pedestrians and drivers in Brasília, Brazil. Until 1996, the crosswalk sign on streets was utterly ignored by drivers and pedestrians everywhere in Brazil. Since 1996, it has been safe to use the crosswalks only in Brasília; the rest of the country did not change.

Cultural practices of drivers and pedestrians changed after a concerted effort involving government, media, nongovernmental organizations, churches, schools, and civil associations in general. The mobilization involved two major strategies. First, a dissemination of the rules—the law designed to control the use of crosswalks—was carried out.

After that, modeling was used widely: both professional and amateur artists showed how to use the crosswalk, both in vivo and in schools. Artists would go to popular street intersections and perform repeated acts involving drivers, pedestrians, and police officers. Groups of artists would also visit schools and set up a scene to demonstrate to the students how the new rules should be followed. Interestingly, all this work was done by volunteers.

Finally, after 3 months of rules and modeling, pedestrians and drivers were exposed to the legally established contingencies: fines for those misbehaving, with

the media showing everyone else who was being fined. The well-coordinated actions of so many institutions were possible through the intervening role of the University of Brasília. A short-term metacontingency was established during meetings of a forum, where representatives of all institutions voluntarily engaged in the campaign discussed and voted on actions that should be taken, and on the timing of those actions. The aggregate product that resulted from the interaction between these actors (the plan) helped to establish control of the behavior of drivers by pedestrians approaching a crosswalk, and of pedestrians by cars approaching a crosswalk.

Almost 25 years later, the change in behavior of drivers and pedestrians in Brasília has maintained and the number of accidents has decreased. The work of Lé-Sénéchal-Machado and Todorov (2008) offers the opportunity for a manual for the education of drivers and pedestrians in any city, written in behavior analytic terms and describing the behavioral processes involved.

Taking a different approach, Oliveira (2018) analyzed the contingencies and metacontingencies of two local programs of payment for environmental services for water conservation aiming to contribute to the development of a bill to regulate this type of program at a federal level. Oliveira's findings demonstrated that positive reinforcement with different dimensions of reinforcement (such as delay and magnitude) could control behaviors that result in the improvement of the quality and quantity of water that supplies the population as opposed to traditional aversive contingencies. When analyzing the proposed federal bill, the author verified that it was aligned to the programs. The federal bill defines conditional relations that allow the application of alternative consequences to increase the targeted behaviors related to environmental conservation and possible interlocking behavioral variations in program management to implement the planned contingencies.

Functional Analysis of Public Policy

As we have already seen, the study of how behavioral patterns are selected and maintained in a society and which environmental variables affect them deserves attention from behavior analysts. In general, such patterns are related to social issues that concern contemporary society as a whole, such as teen infractions (Prudêncio, 2006; Todorov et al., 2004), low levels of schooling (de Carvalho & Todorov, 2016), high rates of traffic accidents involving pedestrians (Lé-Sénéchal-Machado & Todorov, 2008) or water pollution (Oliveira, 2018), for example. The identification of these issues and controlling variables are the starting point for the formulation of proposals for large-scale interventions that can affect the behavior of many individuals and solve a particular problem. The concepts and methods previously mentioned are especially useful to support the government in planning effective action to solve human problems. In this matter, governments are primarily focused on large-scale social change through the development of public policy opportunities. To better explain: a policy is a set of rules that guides decisions. A public policy is a set of government actions directed at the common interest of the

people. From a behavioral perspective, a public policy intervenes at the cultural level: (a) to alter contingencies that prevail for a large number of people and maintain similar behavioral patterns that are detrimental to the survival of the culture and/or (b) to widely implement behavioral contingencies that may select behavioral patterns that produce beneficial consequences to society.

Lemos (2018) suggests that a possible behavior analytic approach to inform policy makers might consist of two steps: understanding public policy and contributing to public policy. Understanding public policy consists of identifying the social issues and the role of the government in using public policy to shape social behavior. Contributing to public policy is comprised of the investigation of potential conditional relations that might be implemented at a large scale to resolve these social issues. This proposal, detailed below, is not intended to exhaust the potential contributions of behavior analysis to public policy; rather, it is to offer a concrete path that can be followed.

Understanding Public Policy

Identifying social issues The media constantly warns us about social issues like unemployment, the greenhouse effect, the water crisis, illiteracy, obesity, and many others. Social issues like these are demonstrably harmful to societies. To express the seriousness of these issues, news media commonly cite numbers produced by statistical systems. Two examples of paragraphs extracted from newspapers' webpages can help us illustrate.

Obesity among all US adults reaches all-time high

The United States will not be escaping the obesity epidemic crisis anytime soon: Nearly 40% of adults and 19% of youth are obese, the highest rate the country has ever seen in all adults, according to [research released Friday](#) by the National Center for Health Statistics (CNN, 10/13/2017).

Hiding in plain sight: The adult literacy crisis

According to data from the 2014 U.S. Census Bureau, 21%—or nearly 60,000—of working age adults in the city lack a high school diploma. At the same time, 19% of adults cannot read a newspaper, much less complete a job application, according to the National Center for Education Statistics (The Washington Post, 11/01/2016).

Obesity and illiteracy can contribute to the development of additional problems for society. The first leads to higher rates of unemployment, lower incomes, lower self-esteem, and lower levels of civic participation, for example. The latter can produce several health disorders, such as asthma, diabetes, depression, and higher economic costs for public health systems. Solving these problems is definitely in the common interest of people and therefore should be of governmental concern.

From a behavioral perspective, we could say that a social issue exists due to the cumulative social effects of the emission of repeated behavioral patterns by many individuals. In the first example, excessive eating behavior by many people might

cause high rates of obesity, individually and collectively. In the second example, emitting any other behavior other than going to school when children and adolescents are supposed to might cause high rates of illiteracy. In this case, competing contingencies select different behaviors.

The consequence that controls the behavior may be different for each individual. The key feature in a macrocontingency is that many people behave in the same way, which causes a cumulative effect that impacts the whole society. The reconstitution of behavioral processes and the analysis of the laws and other regulations might help us understand how these practices were selected and evolved.

Behavior analysts are used to planning interventions to address obesity and illiteracy at an individual level. Nevertheless, a cultural level intervention carried out by a controlling agency might be more efficient when the occurrence of repeated patterns of these behaviors can be observed in a given society. The focus is still the behavior of the individuals. However, instead of arranging contingencies aiming to affect the behavior of one person, contingencies might be arranged to affect the behavior of more than one individual, which may or may not be interlocked with the behavior of another individual.

Recognizing the role of the government The government tends to segment its work within thematic areas in order to facilitate the management of its actions. There is one sector responsible for education, another for labor, a third for sports and culture, and so forth. The governmental agents from each sector design and implement interventions that manipulate environmental conditions at large scales to try to install, maintain, or extinguish certain behaviors.

A first group of interventions deliver consequences contingent to behavior or to interlocked behaviors:

- (a) Payment by environmental services programs are implemented to increase the behavior of farm families' members to manage their land in order to provide ecological services (Melo & Gonzalez, 2017; Oliveira, 2018);
- (b) Cash is transferred only if families' members comply with a couple of conditions previously determined, such as attending school, getting vaccinated, or getting prenatal care, in order to increase access to educational and health services (Fava & Vasconcelos, 2017; Lemos, 2018; Oliveira & Todorov, 2018);
- (c) Athletic grants provide money for the best athletes and sports professionals to keep them playing sports and winning (Oliveira & Todorov, 2018);
- (d) Apprenticeship programs encourage firms to hire adolescents 16 or older, hoping that they will learn a trade and have a job experience (Lemos, 2018);
- (e) Remission of sentences for prisoners who attend educational courses is proposed to increase their behavior of studying (Cabral & Todorov, 2015);
- (f) Discounts on monthly bills for the households that reduce residential water usage are designed to increase water saving behaviors;
- (g) Healthy eating programs reward children for trying fruits and vegetables with the aim to increase consumption of these items;

- (h) The obligation to remove graffiti vandalism aims to reduce this kind of offense against property;
- (i) Sanctions are applied for those who rob a bank in order to avoid reoccurrence.

A second group of interventions deliver consequences that are not contingent to behavior:

- (a) Cash is transferred to fisherfolks during the reproductive cycle of the species hoping that this will prevent them from fishing;
- (b) Cash is transferred to poor families to ensure minimum conditions of survival (Fernandes, 2018).

A third group of interventions try to establish antecedent control:

- (a) Short text messages containing information on scheduled medical appointments are sent to increase patient attendance at primary health care centers;
- (b) An app encourages young people to socially commit to planned activities aiming to decrease exposure to unsafe and unfamiliar environments.

From the examples above, it can be seen that money and freedom to come and go are the consequent variables most commonly manipulated. Information is the antecedent variable most used. Government has broad power to manipulate these types of variables in ways that may control the behavior of many people.

Arranging effective interventions Government attempts to manipulate the environment to change behavior at large scale is not a novelty. Nevertheless, a detailed examination of the operational level of these interventions might reveal some flaws.

When manipulating the antecedent event, giving complete information may improve effectiveness (Skinner, 1953). The description of the antecedent condition, the expected behavior, and its consequences or the consequences of not behaving might better control behavior. For example, receiving a message that contains the following statement: “You have an appointment today with Dr. Sloan at 14h30. If you don’t show up, the next available spot is in two months,” would be more complete than if only the first sentence were sent.

When manipulating the consequent event, the literature has shown that contingent events can control behavior better than non-contingent ones (cf., Hart, Reynolds, Baer, Brawley, & Harris, 1968). Also, evidence-based decision-making about the features of the consequence that will be manipulated, such as quality, magnitude, frequency, and delay (Catania, 1979) can lead to more effective outcomes. These features can vary widely in governmental interventions. Different conditional cash programs in Latin America have very similar concerns related to access to education and health services. Nonetheless, the programs differ from each other regarding the amount of money related to each conditionality (expected behavior), the places where the money can be spent, the frequency of the payment (monthly, bimonthly, once a year), and the time gap between the behavior and the payment (2 months, 3 months, 4 months, and so on).

Supporting metacontingencies—manipulating environmental variables. In order to implement the planned contingency at a large scale, the behavior of the competent agents needs to be selected. The analysis of the laws and other regulations usually reveals that many actors need to coordinate their behavior to generate aggregate products that may function as the antecedent or consequent variable to be presented before or delivered contingent to the behavior of people. Sometimes chained metacontingencies can be identified. The interlocked behavior of agents from one department may produce an aggregate product, which is the antecedent condition to the behavior of the agents of another department. The cultural consequence that selects the behaviors of the governmental agents and their aggregate product is usually related to a broad popular support.

The level of complexity of the supporting metacontingencies varies depending on some features such as the number of departments involved and the number of variables manipulated. In a federal conditional cash transfer program, for example, local governmental agents need to include the families in the list of beneficiaries, state governmental agents need to compile the lists from every city, federal governmental agents need to compile the list from every state and report to the financial agency that needs to know who can benefit from the program. After that, the local government needs to start monitoring target behaviors. Information needs to follow the same trail until the financial agency transfers the cash to the families who complied with the conditionalities.

In an energy bill discount program, the level of complexity seems lower. The power meter helps the government to identify what consequence applies for each case. Governmental agents disseminate the rules of the new program and deliver consequences contingent on energy saving.

To summarize our argument until this point, Fig. 8.1 depicts an example of a low-level complexity public policy in which important elements based on cultural analysis are highlighted. First, a social issue is identified as the cumulative effect of repeated patterns of behavior of many people. After that, a new contingency is planned aiming to affect the behavior of people at a large scale. In order to implement this contingency, IBCs from governmental agents generate aggregate products, which function as antecedent and consequent events in the new contingency. If the new arrangement can effectively change the behavior of people, then, a new cumulative effect of social significance will result.

Supporting metacontingencies—coordinating target behaviors The division in thematic areas can be useful for the government, but from the perspective of the person who is behaving, dealing with existing competing contingencies can be challenging. What is most advantageous for an adolescent: to help the family to manage the land, to go to a sports facility to practice, to become an apprentice, or to go to school? The government encourages these four behaviors. However, time constraints might impose a situation of choice.

Some adolescents will help to manage the family's land, others will play sports, others will become apprentices, and others will go to school. Some of them might

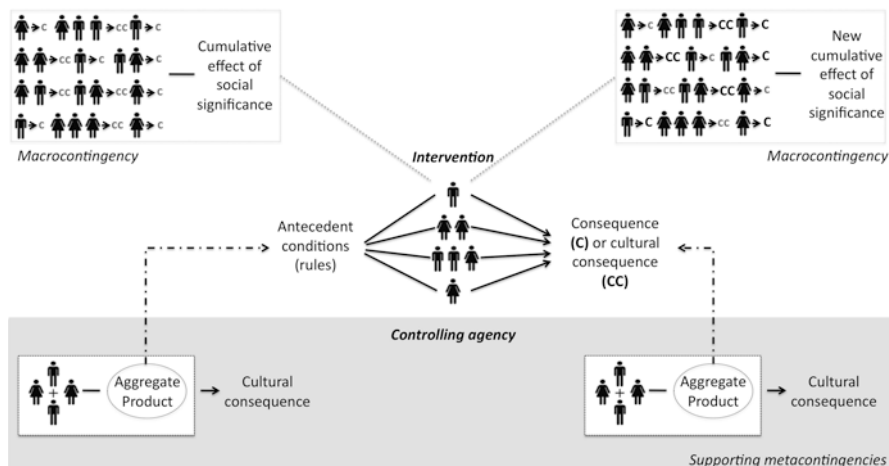


Fig. 8.1 Macrocontingencies and metacontingencies in public policy

be able to combine two or even three of these activities. However, doing all of the activities is unlikely. The problem is that the government creates interventions in different areas to achieve different goals, but they are all contingencies that apply to the behavior of the same individuals.

Coordinated actions may be useful to help different departments to achieve a common goal. We could use the behavior of going to school as an example. The emission of this behavior seems to be crucial in this age, given the behavioral repertoire developed by the school expands the possibilities of engaging in reinforced behavior during adulthood. The existence of other contingencies at the same time might select a different behavior resulting in school dropout.

In fact, school enrollment and/or attendance is a common requirement to access other social services such as professional training or apprenticeship programs, sports practices, or cultural activities. However, to verify this condition, each program gives a different instruction to the governmental agent. Some of them ask for the student’s proof of enrollment. Others have daily access to attendance data online. Others receive monthly attendance sheets. To what extent are they all effectively contributing to education?

Contributing to Public Policy

Investigating potential conditional relations Until this moment, we have described a possible model to analyze the state-of-the-art of social policies. Nonetheless, to discuss potential contributions from behavior analysis, we believe that it is also crucial to detail the decision-making process underlying public policies.

In 1988, a report of a task force on Public Policy commissioned by the Association for Behavior Analysis International was published. The task force was created to examine how behavior analysts could be more functional citizen scientists in the policymaking arena, which represents the spaces for debate and decision-making. The authors pointed out three general ways that the behavior analyst could contribute: conceptual analysis, research development, and advocacy engagement. Regarding research development in particular, the authors suggested that a greater contribution from behavior analysis would occur during opportunities of interaction between behavior analysts (who know the basic principles of behavior and its possible applications) and those concerned with public policies (who know the range of policies and possible areas of influence in the Executive and Legislative branches (Fawcett et al., 1988)).

Since its origin, researchers studying public policies have considered the process as a sequence of stages that occurs cyclically. The conventional way to describe the chronology of the process considers four phases: (a) agenda setting, (b) formulation and decision-making, (c) implementation, and (d) evaluation. Different versions highlight other phases, such as the separation of elaboration and formulation or implementation and execution. Usually, it is argued that they constitute different fields of negotiation (Saravia, 2007).

Nevertheless, a minimum of these four stages seems to be accepted as consensus among scholars (Jann & Wegrich, 2007; Rua & Romanini, 2013; Saravia, 2007). The public policy cycle has allowed systematization and comparison of different debates, based on the relations established for decision-making in each phase. Criticism of this cycle is based on empirical observations that public policies are elaborated, implemented, and evaluated in innumerable comings and goings rather than through a sequential and sealed path (Jann & Wegrich, 2007).

Although being an abstract conception of the political process (Saravia, 2007), the public policy cycle functions as an analytical resource (Rua & Romanini, 2013). Behavior analysis can be incorporated in every step. It can help to identify opportunities for engagement (Fawcett et al., 1988) and to organize and systematize the potential research contribution. In this section, the main features of the public policy cycle will be described and suggestions will be made as to how behavior analysis can contribute.

Agenda setting. Agenda setting begins with the moment of recognition of the problem and selection of the issue to be tackled. Numerous social issues that arise from harmful practices can be observed in different cultures. In a first step, practices that refer to public problems and need state intervention to be modified are listed. In a second step, it is necessary to select the problem that will be on the governmental agenda. The problems that will be included on this agenda and selection of priorities depend on different types of evaluations carried out by the government: economic possibilities to face the problem, mobilization of society around the theme, and governance of the government agency to carry out interventions, among others (Jann & Wegrich, 2007; Rua & Romanini, 2013).

Research in behavior analysis can identify data on related macrocontingencies: accumulated social effects, similar behavioral patterns (individual or interlocked behavior) that generate such effects, and the variables that control the occurrence of the behavior of many individuals. Thus, it is possible to make long-term projections of the effects of the behaviors emitted by many individuals that configure the problems and to predict the destructive potential of such cultural practices. Subsequently, it is possible to suggest incompatible behaviors and procedures to install them, as well as to project the accumulated social effects of their emission at large scales that could contribute to the solution of the social question. With these analyses, it is possible to interact with the Executive Branch to demonstrate the need for directing actions to a specific focus or region; or with the Legislative Branch, to incentivize proposals of parliamentary committees of inquiry or public hearings that stimulate debate among parliamentarians about the social issue.

Formulation and decision-making After a certain problem appears on the public agenda, the next concern is how to deal with it. Formulation of public policy requires the definition of objectives and of the associated legal, administrative, and financial framework. The formulation of action alternatives establishes the occasion of a decision that will be used to face the problem. The literature in the area reveals that many studies try to introduce techniques and tools to allow management decision-making (Saasa, 2007). Economic and social approaches prepare predictions of the consequences of adopting different alternatives. In this phase, technical knowledge informs the political activity of the different actors who interact to defend the proposals they believe are the most favorable to solve the problem (Jann & Wegrich, 2007; Rua & Romanini, 2013).³

After that, the procedures used to implement the public policy are codified (Meehan, 2007). Laws approved by the Legislative Branch and/or other regulations, such as decrees, ordinances, or normative instructions issued by the Executive Branch, guide the competent bodies to execute the actions.

Research in behavior analysis may help identify which practices would be better established, based on existing data, observation, or even theoretical suggestions (Mattaini, 1996). This can be done by analyzing each of the proposed alternatives and their predictions of changes in people's behavior, or by proposing new alternatives with different conditional relations to generate the desired effect on behavior. Mattaini (1996) calls attention to one of the biggest issues related to the establishment of new cultural practices: how to maintain the desired change? For this to happen, it is necessary to choose contingencies that can be maintained by their natural environment. Thus, behavior analysis can contribute to the planning of self-sustaining IBCs. Behavior analysis can also help to describe the governmental procedure that will be codified in the law or other regulations, so as to specify

³Important to note, competing contingencies might influence legislators' behavior during formulation and decision-making. Contingencies that are beyond the scope of the issue being discussed and the best solution to solve the problem can shape legislative decisions (cf., Farber & Frickey, 1987, 1988). The desires of high-income groups or the next elections are some examples.

objectively not only the three terms of the contingencies, but to specify also those that are interlocked in metacontingencies, those to be implemented when this is the case, and the contingencies and metacontingencies related to the behaviors of those agents who will implement the policy.

Implementation The implementation is carried out by individuals, groups, or public or private organizations that work toward the achievement of the previously established goals. It comprises a set of actions that would allow new policy to be put in place by the responsible bodies. This is a critical phase given that a previous decision does not guarantee that this set of actions will follow its guidelines and protocols. The definition of the institutional arrangement for the allocation and distribution of human, financial, material, and technological resources are crucial to perform an adequate implementation (Jann & Wegrich, 2007; Rua & Romanini, 2013).

Research in behavior analysis can conduct preliminary tests of interventions on a small and reversible scale using “single-system” design methods (an analogy to the single subject design, Mattaini, 1996). Experimental designs such as multiple baselines, changing criteria, AB designs with replications, and others might be used to investigate if the intervention is achieving the desired results (Biglan, Ary, & Wagenaar, 2000). After the implementation of the intervention at a large scale, behavior analysis can also ensure a systematic monitoring of the activities carried out by the operators of the policy; that is, to gradually evaluate the effect of the manipulation of the independent variables on the dependent variables to provide information that leads to possible corrections. In this phase, the choice of the best way to measure the dependent variable is critical, in order to guarantee the reliability in the observation of the phenomenon.

Evaluation As mentioned, a public policy is supposed to contribute to the solution of a problem or at least reduce it. The evaluation phase consists of the measurement and subsequent analysis of the effects produced by the intervention, especially with regard to the achievements and expected and unforeseen results. Although evaluative studies should be carried out through the policy process, this phase focuses on the results and the impact of the intervention (Januzzi, 2011). Evaluations can lead to the termination of a public policy for several reasons: problem solving or inefficiency of its programs or regulations or loss of importance, for example (Jann & Wegrich, 2007; Rua & Romanini, 2013), or they can guide the process of changes and improvements to policy implementation.

Behavior analytic research can demonstrate a posteriori the causal relationships between the behavior of the target population and the environment using, for example, secondary data that are produced by official agencies. In this way, it is possible to analyze the effectiveness of the interventions introduced in the attempt to overcome existing problems and to change cultural practices.

It is evident that, regardless of the stage or phase of the public policy process, behavior analytic research can investigate and highlight functional dimensions of government interventions directed toward changing the behavior of the target population. A culturo-behavioral approach to public policy can inform policymakers

about the best alternatives for engaging the group in cultural practices with considerable potential to increase their chances of survival, practices that are capable of competing with those practices that are harmful to the culture. By using this approach, behavior analysts can play an active role in promoting effective action at large scales to address social issues.

Conclusions

Behavior analysis's main concern is a search for order, for uniformities, for lawful relations between environment and behavior. This posture can be applied no matter whether the focus of the analysis is the individual behavior or the behavior of persons in groups. Functional units of behavior like macrocontingencies and metacontingencies help us describe the behavior of persons in groups and to propose interventions at a larger scale. Behavior analysis of cultural practices is only beginning, and much work related to behavioral contingencies remains to be done. This should not stand in the way of the development of these new concepts.

When planning large-scale interventions, behavior analysts should pay attention to the tools used by controlling agencies to control behavior. Among those agencies, the government plays a special role in regulating not only the behavior of controllees, but also the behavior of the controllers. By codifying which behaviors are legal or illegal and applying systematic consequences to their occurrence, the government is in a position to shape social behavior.

Public policy is a crucial tool used by governments to change behavior at large scales. Research from behavior analysts can acquire discriminative functions for the decision-making behavior of policymakers. The planning, management, and provision of government services depends primarily on the behavior of citizens. Thus, a scientific approach to the description, prediction, and control of behavior has much to contribute to the formulation, implementation, and evaluation of government interventions.

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Chapter 9

Ethics for Cultural and Community Applications of Behavioral Science



Traci M. Cihon, Diana Walker, Kyosuke Kazaoka, and Malika Pritchett

In a research lab meeting, a faculty member and their students started to discuss ways in which behavior analysis might provide support to a population considered, by social norms, as disadvantaged. Specifically, the students were discussing ways in which behavior analysts might work with members of the population who were homeless. In the course of the discussion, the faculty member, while listening to their students' discussion, overheard phrases such as "those people," "that community," "we should do...," and other phrases and statements that suggested that their students somehow viewed their perspective, their assessment of the problem, and their solutions as superior to those of the members of the population considered disadvantaged.

The students came up with a number of innovative and interesting "solutions" clearly grounded in the principles of behavior science; however, not a single student started the point they were making or predicated their suggestions with talking to members of the population that they purported to "serve." What were the needs of the persons living in tent communities in Los Angeles? What were the primary concerns, needs, and troubles of the population the students were so eager to serve?

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*Did the “solutions” they were providing meet those needs? Did they align with values of community members? The students were quick to “call out” others who had designed ineffective solutions, but based only on their lack of science or their failure to eradicate the “problem.” But whose problem is homelessness, and if behavior analysts were to work with a population identified as such colloquially, how do we establish our ethical boundaries? Should there even be “boundaries?” How do we ensure that the members of said community are treated with dignity and respect? How do we ensure that we are not “treating” them but working **with** them, or not working with them if they ask us not to? Why is it our business, anyway? What does ethics mean when behavior analysts work toward culture- and community-based research and interventions? Whose ethics are important?*

Distinctions must be made between ethics as a field of study, ethical standards which control the behavior of members of the culture, and statements which purport to describe the events which control the ethical behavior of members of a community.

—Krapfl & Vargas, *Behaviorism and Ethics*.

Ethics for Cultural and Community Applications of Behavior Science

Since Skinner’s *Walden Two* (1948), *Science and Human Behavior* (1953), and “Why We Are Not Acting to Save the World” (1987), behavior analysts have grappled with how the science of behavior can be applied to produce large-scale change and to address issues of social and cultural importance (e.g., Chance, 2007; Dixon, Belisle, Rehfeldt, & Root, 2018; Leigland, 2011; Mattaini & Luke, 2014). Recently the interest among behavior scientists considering applications of behavior science to cultural and community phenomena has resurged. The problems explored are often framed as problems that involve *creating behavior change* for a large number of people producing a cumulative effect (i.e., a macrocontingency; Glenn et al., 2016¹) or as those that go beyond individual behavioral contingencies and consider how behavior interlocks between two or more individuals, such as in cooperation (e.g., McElreath et al., 2005). Such applications of the science present a number of nuanced situations that require *collaboration* with stakeholders to solve *mutually identified* problems that arise from *environmental conditions*, and solutions that focus on improvement in population-level outcomes and equity (Fawcett, Schultz, Collie-Akers, Holt, & Watson-Thompson, 2016). The purpose of this chapter is to introduce, articulate, and elaborate on proposed ethical guidelines for behavior scientists engaged in culture- and community-focused research and practice.

The proposed ethical guidelines are grounded in the philosophy of radical behaviorism and aspire to engender and facilitate social justice. The authors acknowledge that their approach is not free from bias and assumptions that are culture-specific;

¹Reprinted as Chap. 2 of this volume.

all ethics must occur in a context. Therefore, we approach the ethics of cultural and community applications of behavior science from a radical-behaviorist perspective, which is particularly well suited to support social justice (Moore, 2003). Radical behaviorism emphasizes both contextualism and pragmatism (Baum, 2005; Biglan & Hayes, 1996; Morris, 1988). Contextualism tells us that the learner (in this case, the individual members that constitute the group, community, or culture) is always right because history and context are strong determinants of behavior (Biglan & Hayes, 1996; Morris, 1988). Moreover, community-based behavior science researchers and practitioners work *with* those involved in ways that respect the participants' worldviews (Pepper, 1942). The pragmatic approach tells us that if something is working, continue to do it; one should not reject a cultural practice simply because it does not fit into their worldview or because it does not yet have evidence that they have judged satisfactory to support it (Biglan & Hayes, 1996). The ethical behavior scientist working on cultural and community issues behaves not as an "impartial speculator" who imposes their principles on all of society. Rather they support the highest levels of community well-being, as defined by the community, and strive to ensure that each individual "...has the same indefeasible claim to a fully adequate scheme of equal basic liberties..." (Rawls, 2001, pp. 42–43) such that no one falls below a certain level of advantage (Rawls) and such that there is equity in opportunities and outcomes for all (Fawcett et al., 2016).

The articulation of ethical guidelines for behavioral research and practice focused on cultural and community concerns will be accomplished by first discussing the origin and definition of ethics, followed by the history and evolution of ethics, morals, and values within behavior analysis more specifically. Then, we discuss challenges and guidelines for ethical culture- and community-focused behavior science research and practice. Guidelines were chosen, rather than rules or an ethical code, because establishing rules implies that ethical practices are static and absolute. This is not the case, in our opinion, especially for an emerging area that applies the concepts, logic, and assumptions of behavior analysis, cultural selection, behavioral systems analysis, community-behavioral psychology, and radical behaviorism to culture- and community-based phenomena, issues that often encompass some of the most seemingly impenetrable social problems.²

Ethics

Ethics are defined as the "moral principles that govern a person's behavior or the conducting of an activity" (Ethics, n.d.). The study of ethics has its origins in ancient Greek philosophy (circa 400–300 B.C.) with influences from Socrates, Plato, Aristotle, and others. Ethics as its own area of study came about only after societies began to form certain codes of conduct that specified how one must behave to avoid

²See ethics content in Chap. 17 for a somewhat different perspective.

punishment, such as the code of Hammurabi circa 1754 B.C. (Singer, 1985). In contrast to laws, which specify behavior and consequences, ethics is the discipline whose primary objective is to understand what is right and wrong (as opposed to legal and illegal). Instead of focusing on laws regarding behavior and consequences, ethics examines what types of behavior *should* be considered right or wrong, good or bad, and why (Singer, 1985).

Ethics, Morals, and Values in Behavior Analysis

Philosophical and Conceptual Treatment of Ethics

Skinner (e.g., 1948; 1953) was one of the first to provide a behavior-analytic interpretation of ethics, morals, and values. He asserted that we learn to help others through the contingencies that are arranged through our social environment and that we continue to help others because it increases the probability of the survival of the species (Skinner, 1975). Skinner (1975) drew an important distinction between the radical-behaviorist perspective on ethics and the perspective on ethics of society at large, noting that “[the behavior analyst] helps people by arranging conditions under which they get things rather than their receiving them gratis” (p. 9). Adopting scientism, he took the stance that the philosophy of science, as a way of knowing, surpassed any other way of knowing. He considered values as nothing more than individual reinforcers defined by the verbal community (or society more generally); for Skinner (1971), values were acquired and shaped by a common verbal community. Morals (often associated with social control established and maintained by religion) and values (associated with the more general social environment or culture), then, according to Skinner (1953, 1971), are simply verbal statements that convey what is “right” or “wrong” or “good” or “bad.” Adopting a naturalistic ethics, meaning that ethics and values can be understood scientifically (Vogeltanz & Plaud, 1992), Skinner advocated for the science of behavior to be used for the “good” of society. A number of other scholars within behavior analysis have addressed ethics, values, and morals from a philosophical and/or conceptual standpoint (e.g., Malott & Trojan Suarez, 2003; Newman, 1992; Newman, Reinecke, & Kurtz, 1996). Behavior analysts will agree to varying degrees with the conclusions reached by these authors; the examples that are given serve to illustrate the rich dialogue among behavior analysts regarding the conceptual and philosophical treatment of ethics.

From Ethical Naturalism to Practical Ethics

Shortly after Skinner (1938) began articulating his findings from nonhuman research in the experimental analysis of behavior (EAB), he and others began applying the principles and techniques to human behavior (e.g., Baer, Wolf, & Risley, 1968;

Fuller, 1949). These behavior analysts, who came to be called “behavior modifiers,” applied the principles and techniques to human behavioral problems, such as smoking (Azrin & Powell, 1968), delusional speech (Lindsley, 1956, 1960), mutism (Isaacs, Thomas, & Goldiamond, 1960), and more. These “behavior modifiers” sought to help people with the science of behavior and demonstrated the efficacy of this approach in improving people’s lives. At a certain point it became clear, though, that the application of behavior-analytic principles and procedures discovered in the laboratory to problems involving humans could be misused for various reasons, and the need for ethical oversight emerged (Bailey & Burch, 2016; Martinez-Diaz, Freeman, Normand, & Heron, 2007).

Practical Ethics

Numerous behavior analysts have addressed the ethics of practice in applied behavior analysis (ABA; e.g., Bonow & Follette, 2009; Brodhead & Higbee, 2012; Hayes, Hayes, Moore, & Ghezzi, 1994; Krapfl & Vargas, 1977; Melo, Castro, & de Rose, 2015; Miron, 1968). Malott (2002) pointed out that experimenters of ABA often conduct research with humans who have been diagnosed with developmental disabilities, and that when the research is done, the participants are left “none the richer” (p. 105). He proposed that a requirement of a “social conscience” (Malott, 2002, p. 106) be added before accepting a research project as a thesis, dissertation, or publication. In other words, he suggested that the researcher should provide treatment that results in gains for the participants, and not conduct research with specific populations solely for the researcher’s gain (i.e., degree or tenure requirements).

From Ethical Guidelines to Rule-Based Ethics

As more behavior analysts started to practice, the mistreatment of individuals receiving behavioral interventions and the misapplication of behavioral techniques drew more attention to applications of the natural science of behavior to improve the human condition (Bailey & Burch, 2016). Over some years, such misuse contributed to the development of a regulatory body both to oversee ethical practice of behavior analysts and to identify guiding principles, ethical guidelines, and eventually a code of ethics for Board Certified Behavior Analysts (BCBAs). This regulatory body is known as the Behavior Analyst Certification Board, Inc. (BACB®), and the code of ethics is known as the Professional and Ethical Compliance Code for Behavior Analysts (hereafter referred to as the BACB® Code; BACB, 2014).³ The BACB® Code guides the ethics of ABA practice.

³It should be noted that the authors of this chapter do not support the term compliance as it suggests that ethics is a practice of following a set of rules; however, the term is used here to describe the practices currently adopted by the profession though not necessarily reflective of the science.

Today, the BACB[®] Code is largely rule-based, specifying what the applied behavior analyst should do and should not do. The jump that behavior analysts have made as a discipline, and particularly as a profession, from naturalistic ethics to rule-based ethics (Rosenberg & Schwartz, 2018), has exerted some control over and perhaps restricted our scope of practice. The BACB[®] Code largely applies to practice with individual clients and those in direct contact with them, and to research in controlled settings. It does not easily translate to practice or research in the community, to large-scale behavior change, to work mitigating social issues, to understanding culture, or to behavioral systems analysis. Exclusive reference to the BACB[®] Code also restricts the content regarding ethics to which aspiring behavior scientists might be exposed; coursework is largely focused on a narrow scope of rules that suggest what is or is not allowed in behavioral practice. In addition, the code has evolved in the context of a science of behavior that has historically valued control over behavior as an ultimate goal rather than collaboration and social justice like we, and others (cf., Fawcett, 1991), argue are equally or even more important. The confluence of these variables requires that there be an explicit focus on the ethical considerations that behavior scientists working on culture- and community-focused phenomena face.

Subject Matter and Situational Factors in Applications of Behavior Science to Culture and Community

Behavior scientists working in applications to culture- and community-based phenomena are confronted with a number of situations less common to behavior scientists working in individual behavior change. Cultural and community applications of behavior science often involve taking behavior analysis to scale and/or collaborating with community members to produce behavior change for a large number of individuals. This is accomplished by facilitating contingencies that support adaptive patterns of responding among several individuals. The behavior scientist working on cultural and community issues collaborates with stakeholders to empower individuals to behave in ways that allow all community members to have input and influence even if doing so involves costs for some members (Gutiérrez, 1973).

Contingency arrangements often conflict with those that produce the best outcome for the individual(s) behaving (e.g., Borba, Tourinho, & Glenn, 2014, 2017). The contingencies that concern the cultural/community behavior scientist support changes in the behavior of more than one person, often manifested in the establishment of rules, laws, or policies (e.g., Fava & Vasconcelos, 2017; Todorov, 2005, 2009). This type of research and practice requires an analysis of the relevant systems, the interdependencies among them, and the competition between them (e.g., Biglan, 1995; Mattaini, 2013). These scenarios subject the behavioral scientist/practitioner to frequent encounters with competing contingencies resulting from differences in the morals and values of the agents who may hold more power over

contingencies (including the behavior scientist/practitioner), the community members, and other stakeholders. Ethical research and practice in behavior science applications to culture and community requires plans for avoiding unintended consequences and accounting for concurrent and competing contingencies that operate over time as changing contingencies often affect the behavior of a number of individuals.

Even though the ethical considerations facing behavior scientists working on culture- and community-focused issues are nuanced, they are also relevant to applied behavior analysts working in individual behavior change. Individuals are members of communities and participate in numerous social systems (e.g., families, education systems, organizations, etc.). Some of the challenges and considerations for conducting research and practice articulated before there were formalized ethical guidelines or the BACB® Code (e.g., Fawcett, 1991; Goldiamond, 1974/2002) illustrate this point.

Nonlinear Analysis and Competing Contingencies

Goldiamond (1974/2002) wrote about the analysis of social contingencies. He discussed ethical and legal issues in relation to behavioral interventions for individuals who are most susceptible to coercion, such as individuals with disabilities, children, and the elderly. Goldiamond described Goffman's (1961) "total institution," or a social system in which the barriers that typically separate environments of living, working, and playing do not exist, such that these environments overlap, and the contingencies interact and conflict. He went on to note that total institutions might violate individuals' constitutional rights. Thus, an analysis of the social contingencies under which such institutions operated, including individual behavioral contingencies and the contingencies outside of the facility (i.e., contingencies external, though influential to the system and/or those occurring for the members of the community), is imperative. Goldiamond's (1976a) analysis illustrates the recursive nature of the two sets of contingencies and how the impact and outcomes at the two levels can be qualitatively different, emphasizing the idea that practices considered "ethical" at the individual level (i.e., the practitioner-client relationship) may be seen as "unethical" when the community level is jointly considered and that the opposite may also be true. Goldiamond (1975) also formulated the nonlinear analysis of behavior, later applying it to the analysis of social systems (Goldiamond, 1984). He argued that any ethical analysis that focused on only one level without consideration of its effect on the other levels, and vice versa, would be inadequate as it can put members of some communities at risk for coercion (Sidman, 2001).

Goldiamond (1976b) considered the contingencies of freedom and coercion in terms of the availability of *genuine* choices and the types of consequences attached to the choices. Coercion is more severe when there is no genuine choice and the consequence contingent on behavior is critical. A consequence is considered critical if a community has restricted access to it and it is preferred over the community's other choices (Goldiamond, 1976b). If behavior scientists working in culture and community hold access to certain resources that the members of the community or

culture can access only by participating in the research, or the behavior scientist presents their approach as the “only good approach,” then the members of the culture or community have no degrees of freedom and, therefore, no genuine choice. Prisoners, for example, may consent to research to avoid boredom, meet someone new, or appear cooperative so they will be treated better (Moser et al., 2004). To avoid coercive practices in research and practice, the behavior scientist must consider the degrees of freedom of the potential participants and community members (see also de Fernandes & Dittrich, 2018) and understand that multiple contingencies operate simultaneously for different entities. Goldiamond’s (1974/2002, 1976a, 1976b, 1984) constructional approach and nonlinear analysis provide ways to mitigate the aforementioned problems and to increase protections for research participants and professionals from unintended consequences that impact the culture or community.

Community Research and Action

Fawcett (1991) described the major practical and ethical challenges of applying the rigorous, experimentally controlled, individual-subject techniques of behavior analysis to research and practice in the community. He said that insisting on the level of control demanded by researchers and practitioners at the level of individual behavior limits the work that can be done at the community level. Fawcett suggested that behavior analysts embrace new ways of creating change that are highly beneficial for those involved, even though the methods and interventions may demonstrate less experimental control. He even went so far as to say that “the standards for experimental control that were refined in laboratory contexts encourage investigators to target people who cannot avoid our interventions” (Fawcett, 1991, p. 622), similar to the concerns raised Goldiamond (1974/2002) and Malott (2002). Fawcett noted that behavior analysts have been most comfortable in a research space that is more similar to the operant-conditioning chamber. However, the behavior scientist working in community settings also needs to consider the behavior of the politicians, service providers, and the contingencies that maintain the problems (often found in the systems’ contingencies; e.g., Baer, 1992; Ellis & Magee, 2007). One specific recommendation Fawcett (1991) made was to include people in power as “participants” in our research as opposed to “silent, subservient targets of research” (p. 623).

Fawcett (1991) outlined challenges and values to guide community action and research. The goals of community research and action include contributing to the knowledge base about contingencies in the context of “open community settings, and...facilitating the development of individuals and communities consistent with their own goals” (Fawcett, 1991, p. 623). He suggested avoiding “colonial” (or researcher-dominated) relationships with research participants by *collaborating with participants* in the identification of the problem and the potential solutions. He also suggested emphasizing benefits, not just risks, in the informed consent process.

Including those in power and ensuring all community members have equal representation helps to accomplish this goal. Fawcett suggested that behavior analysts working in community settings take a strength-based approach and examine metacontingencies when developing interventions. He also suggested being open to a strategy that strives for smaller wins that can add up to large gains, as immediate large-scale improvements are unlikely to occur. A final challenge Fawcett discussed is the competing contingencies that produce and maintain the behavior analysts' behavior, such as publication requirements that value experimental rigor over community significance. He suggested that "a modified set of guidelines would support a tighter coupling of research and action, better optimizing the interests of client audiences beyond the academic discipline" (p. 628). The values that Fawcett offered are that:

1. Researchers should form collaborative relationships with participants.
2. Descriptive research should provide information about the variety of behavior-environment relationships of importance to communities.
3. Experimental research should provide information about the effects of environmental events on behaviors and outcomes of importance.
4. The chosen setting, participants, and research measures should be appropriate to the community problem under investigation.
5. The measurement system must be replicable, and measures should capture the dynamic or transactional nature of behavior-environment relationships.
6. Community interventions should be replicable and sustainable with local resources.
7. Community action should occur at the level of change and timing likely to optimize beneficial outcomes.
8. Researchers should develop a capacity to disseminate effective interventions and provide support for change agents.
9. Results should be communicated to clients, decision-makers, and the broader public.
10. Community research and action projects should contribute to fundamental change as well as understanding.

(Reprinted with permission from Table 1 of Fawcett, 1991, p. 633).

Aspirational Guidelines for Ethical Application of Behavior Science to Culture and Community

Every man must decide whether he will walk in the light of creative altruism or in the darkness of destructive selfishness.

—*Rev. Dr. Martin Luther King, Jr.*

Values

Fawcett's (1991) values continue to have relevance to behavior scientists working in culture and community settings. In the pressing societal concerns of today, additional guidelines are needed to help behavior scientists navigate situations that involve conflicting morals and values, human rights, how behavior change in one system impacts another system, how cultural practices are established and maintained, and how to predict and consider the unintended consequences of our interventions. The following recommendations are influenced by the body of literature reviewed and inspired by the experiences and examples set in other disciplines, our own personal and professional experiences, and the behavior-analytic research that has formed the basis of its applications to culture and community.

Although behavioral scientists and practitioners have been working in cultural selection (e.g., Glenn, 1986), behavioral systems (e.g., Oplente & Mattaini, 1993), and community change for decades (e.g., Fawcett, Seekins, Whang, Muiu, & Balcazar, 1984), there are few resources for ethical research and practice in these areas. The current generation of behavioral scientists and practitioners working in culture and community have a unique opportunity to continue to refine integrative values, to collaborate with stakeholders in the corresponding cultures and communities, and to establish and sustain contingencies that will support individual behaviors and cultural practices that align with aspirational and core values. We propose that these values are *creative altruism* and *social justice*. They are aspirational in that they refer to a desire to achieve "something higher than oneself" (Aspiration, n.d.). Community and cultural applications of behavior science should be conducted to help others, not to achieve personal gain. Creative altruism and social justice are values that aim to achieve such a goal.

Creative Altruism

Altruism is helping others even when there is no direct benefit to the person doing the helping. Creative altruism goes beyond altruism in that it is helping others, but for the explicit purpose of *improving the world*. Creative altruism has been contrasted with selfish behavior, which typically results in the world changing for the worst (King, 1963). Coined by Sorokin, the founder of Harvard University's Sociology Department (Weinstein, 2004), the term creative altruism appears in the work of applied sociologists, who believe that we now know enough about the negative effects of the management of human affairs to apply our knowledge for the better, and that altruism is a strategy to do this (Weinstein, 2000). Creative altruism is contingency-shaped; it is explicitly reinforced when the cultural contingencies and shifts in relational responding emphasize its value and reinforce patterns of behavior and cultural practices indicative of its aims.

Creative altruism is consistent with Fawcett's (1991) suggestion that behavior analysts working in community settings remain open to potentially beneficial techniques even if they lack conventional experimental control. In fact, Gruber (1997)

contrasted creative altruism with the typical scientific endeavor that seeks simply to gain control over nature, rather than seeking to identify what types of control over nature are beneficial. He stated that there is relatively little effort aimed at understanding how to identify what changes *should* be made and what changes will be disastrous, in contrast to the extensive effort aimed at controlling one's subject matter. Creative altruism, as an intentional plan to benefit individuals and communities, can be rigorous, in terms of both experimental control and in collecting data that point to the desirability and benefits of the change. A point highly salient to the behavior scientist, communities should not be used to do science for the sake of science or for personal gain. Change at the community level should occur only if there is a reasonable chance that it will help the people it is going to impact. This statement is a guideline that should be emphasized to our students and a practice that should be explicitly reinforced in our scientific and professional communities.

Gruber (1997) noted that creative altruism requires a level of perspective taking that is not commonly taught. It requires us to restrain our desire for personal aggrandizement while envisioning how much better the world could be. Like Skinner (1953), Gruber stated that technology progresses at a faster rate than our ability to monitor its effects; the goal is to do more, faster, and there are not enough resources and rewards to encourage a focus on creativity, wisdom, or moral responsibility. Conversely, ethical behavior scientists and practitioners working with culture and community assess their technology by measuring its effects, such as the number of people falling below the minimum level of advantage (Rawls, 2001) or the equity of outcomes achieved (Fawcett et al., 2016) before and after the intervention is implemented.

As a core value, creative altruism should guide the work of cultural and community behavior scientists. However, achieving creative altruism in research and practice in culture and community is not easy due to the competing contingencies between helping others and personal gain (Goldiamond, 1974/2002, 1976b). One solution is to facilitate environments in which the contingencies of helping people do not conflict with the helping agents' attainment of critical consequences (e.g., employment, tenure). Indeed, we might even reinforce helping people with explicit and perhaps critical consequences. Gruber (1997) states

Creative altruism is not something you can do alone. You cannot simply do something for people, you must do it with them. That means you need them; that means you have to understand their point of view and their needs as they experience them. You have to have the humility to see what is good for them, not what you would like if you were in a similar situation. In the long run the goal is to replace your help with self-help by the people in question. They have to be engaged in the actual work that needs doing—the redistribution of human resources. Thus, creative altruism requires cooperation (p. 470).

Social Justice

Creative altruism applies to everyone, but it is especially relevant to our explicit commitment to social justice. All people have a right to be free, and are entitled to equal dignity and rights. These entitlements are upheld through creative altruism in

the “spirit of brotherhood” (United Nations Declaration of Human Rights, 1948). Behaviorism offers an alternative to the traditional view of mentalism, which attributes certain repertoires to some characteristic or disposition of the individual (Moore, 2003). Behavior analysis, therefore, offers a path to social justice, recognizing that repertoires develop because of the contingencies existing in and constructed by the physical and social environment. The behavior scientist working on culture- and community-focused phenomena is tasked with the responsibility to collaborate with community members to identify and analyze the cultural practices and contingencies that sustain injustices, and to reconstruct the social environment to instead promote justice and equity for all of society.

As a core value, social justice manifests itself in the behavior scientist’s “personal responsibility to work with others to design and continually perfect our institutions as tools for personal and social development” (Center for Economic and Social Justice [CESJ], 2016, p. 1; Wilhite, 2016). As the behavior scientist collaborates with community members to understand the contingencies responsible for social injustices such as poverty, discrimination, ineffective instruction in public schools, gerrymandering, etc., they are further challenged to influence cultural practices to reduce such disparities in a way that will support and sustain those modified cultural practices. One way in which culture- and community-focused behavior scientists can succeed in their commitment to social justice is to work to reduce or eliminate the power differentials that result in unequal resource distribution. Paul Farmer’s efforts to reduce structural violence (the harm inflicted on certain populations by specific social institutions; e.g., Rylko-Bauer & Farmer, 2016), is but one example to emulate. The efforts of Fawcett et al. (2016) to improve community health and reduce health disparities is another.

The adoption of social justice and creative altruism as aspirational core values in culture- and community-focused behavior science is challenging, yet obligatory. Beneficence to humankind is inherent to ABA (Baer et al., 1968) and is brought into action through dynamic practices such as the measurement of social validity and invalidity (e.g., Kazdin, 1977; Schwartz & Baer, 1991; Wolf, 1978). Historically, behavior scientists and practitioners have contributed to the empowerment of humankind, facilitating critical skills such as choice-making (Bannerman, Sheldon, Sherman, & Harchik, 1990), self-advocacy (Kohr, Parrish, Neef, Driessen, & Hallinan, 1988), and assertiveness (Leaf & McEachin, 1999). Recently, some have highlighted the need for behavior analysts to improve their own critical skills such as compassion and empathy (Taylor, LeBlanc, & Nosik, 2018) and cultural awareness (Fong, Catagnus, Brodhead, Quigley, & Field, 2016). Miller, Cruz, and Ala’i-Rosales (2019), for example, called for an examination of ABA practices within the larger cultural context emphasizing responsiveness to diversity and social justice. They assert that executing a social justice mission requires collaboration with other disciplines; identification and amelioration of social injustices; and the development of key repertoires including cultural competence, responsiveness, and humility. Such recommendations are equally applicable to research and applications of behavior science to culture and community.

Key Repertoires

The following recommendations embrace the values of creative altruism and social justice and indicate the behaviors and goals that should guide behavior scientists in working in culture, systems, communities, and large-scale behavior change.

Collaboration

Defined as “to work jointly with others or together especially in an intellectual endeavor” (Collaborate, [n.d.](#)), collaboration takes on two distinct roles: interdisciplinary collaboration and collaboration with participants and community members.

With Other Disciplines

Malagodi (1986) argued that failure to collaborate with successful disciplines is antithetical to radical behaviorism because it is antithetical to pragmatism. He said that behavior analysts must collaborate with other social-science disciplines if behavior analysis is to achieve its full potential in helping to improve society. He called specifically for collaboration with cultural anthropologists who subscribe to cultural materialism (Harris, 1979). Cultural materialists believe that selection by consequences plays a causal role in cultural evolution, analogous to reinforcement and punishment in the behavior of individuals. Malagodi suggested that behavior analysts’ worldview should include cultural analyses, along with philosophical and behavioral analyses, and that the three components should be interdependent. He even went so far as to recommend “that principles derived from compatible social-science disciplines be incorporated into radical behaviorism” (Malagodi, 1986, p. 1).

Applications of behavior science to cultural and community-based phenomena may be inherently interdisciplinary. However, interdisciplinary collaboration may be difficult because “...the diverse cultures, norms, and language of each profession make the process of interdisciplinary collaboration resemble the bringing together of inhabitants from foreign lands” (Bronstein, 2003, p. 302). Behavior scientists have numerous technical terms, some from lay language and adapted to behavior science; they speak in those terms all too often when addressing laypersons and professionals from other disciplines (e.g., Bailey, 1991; Critchfield et al., 2017; Foxx, 1996; Lindsley, 1991), which may hinder interdisciplinary collaboration. Behavior scientists also have an aversion to mentalism or explaining behavior on the basis of mental events (Moore, 2008). Behavior scientists who cannot move past their aversion to mentalistic explanations and communicate with professionals and community members who espouse them will also have difficulty with interdisciplinary collaboration.

Interdisciplinary work requires consideration of multiple organizing frameworks to approach the subject matter (e.g., general systems theory, behavioral systems

analysis, cultural selection, behavioral community psychology, behavioral ecology) and the adoption of research strategies and intervention tactics from other disciplines (e.g., Mattaini, 2019). Collaboration with other disciplines is especially relevant for behavior scientists working on culture and community issues who seek to answer questions for which other disciplines may be helpful in providing information about the specific problem (e.g., poverty), population (e.g., youth who are at risk), or setting (e.g., prisons). Those seeking to mitigate significant social issues are also often facing wicked problems (Rittel & Webber, 1973) or super wicked problems (Levin, Cashore, Bernstein, & Auld, 2012). By definition, wicked problems like poverty, education, climate change, etc. require the combined efforts of members of multiple disciplines due to the complexity of the problem and the interconnected nature of the problems. Interventions aimed to address one social problem will likely affect another social problem. Mattaini and Aspholm (2016) stated that “behavioral systems scientists and students therefore would need to mine existing literatures, often in collaboration with other disciplines, to develop credible hypotheses regarding the behavioral systems dynamics sustaining major problem configurations and those required to construct genuine alternatives” (p. 114).

Behavior analysis, as a young discipline in the area of community intervention, may experience resistance from and toward other disciplines, which can delay the change that is needed to sustain our communities and cultures. However, our values, creative altruism and social justice, and the pragmatic philosophy of radical behaviorism, can help us navigate through this resistance, as can partnering with other disciplines and learning from their example. Social workers, for example, have long faced the challenges associated with the explicit need for interdisciplinary collaboration, and there is much behavior scientists can learn from their work in this area. Behavior scientists working on cultural- and community-based phenomena would benefit from conducting a concept analysis (Tiemann & Markle, 1978) of the core components of models adopted by other disciplines and incorporating coursework and practical training experiences for aspiring scientists and practitioners to develop these competencies.⁴

With Participants and Community Members

An important consideration for behavior scientists working in culture and community is to understand and follow the “ethical standards that control the behavior of members of the culture” (Krapfl & Vargas, 1977, p. vii). The communities we strive to support are often subject to the contingencies arranged by, or that at least favor, surrounding dominant cultures (Goldiamond, 1974/2002, 1976b; Skinner, 1953). It is important that the behavior scientist working on culture- and community-focused phenomena view the morals, values, and practices within a culture or community as attributes that reflect a unique history of learning and identity and are therefore to be

⁴See also Chap. 17 in this volume.

honored and protected. Fawcett (1991) insisted that behavior analysts working in communities *collaborate with* the community members to ensure the participants' and researchers' perspectives mutually define research questions, goals, and interventions. "Individuals are the experts in the data and conditions of their own lives" (Goldiamond, 1976b, p. 30); even "problematic" practices are outcomes of the contingencies in effect in the culture or community (Goldiamond, 1974/2002).

Effective behavior scientists working in culture and community build nonhierarchical relationships with participants and community members. Participation and roles are based on one's knowledge or expertise (e.g., Henneman, Lee, & Cohen, 1995). Behavioral community psychology's extensive work in participatory approaches to identify community needs and resources (e.g., Watson-Thompson et al., 2015; see also Chap. 14 in this volume) and building and sustaining collaborations in community partnerships (e.g., Viola, Olson, Fromm Reed, Jimenez, & Smith, 2015) provide excellent resources for behavior scientists working in culture and community.

Perspective Taking

Collaboration, regardless of with whom the behavior scientist is working, requires taking multiple perspectives. This requires a sophisticated, culturally sensitive repertoire to ensure that the perspectives, morals, and values of all members of the culture or community are embraced in the practices that result from this collaboration.

Individual

Many radical behaviorists who have studied the philosophy of science believe that one cannot objectively evaluate a person's worldview from outside that worldview (Pepper, 1942). The goal for behavior scientists working in culture and community is to be able to hear, consider, and respect (even if in disagreement with) another's perspective. Oftentimes, scientists or practitioners working on culture- and community-based phenomena may not have a shared history or experience with the members of the culture(s) or community(ies). The behavior scientist who is not a member of the culture or community likely takes the etic perspective in that they are seeking an understanding, from a scientific perspective, of the environmental variables responsible for creating and maintaining a cultural practice. Community members themselves, however, explain their practices from the emic perspective (Harris, 1979). These two perspectives, while equally important, may conflict, though both perspectives may offer important information in identifying problems and selecting and implementing interventions.

Multiple Perspective Taking

Kidder (1995) discusses right vs. right ethical dilemmas that involve multiple stakeholders. He describes four commonly encountered ethical dilemmas: truth vs. loyalty, justice vs. mercy, short-term vs. long-term, and individual vs. community. Most relevant to the current discussion are the short-term vs. long-term and individual vs. community perspectives, which might also be expanded to dilemmas that one encounters when the perspective of one group (e.g., homeless community) differs from that of another group (e.g., merchants or the larger community). An individual versus community paradigm illustrates the conflict between doing what is best for one individual and doing what is best for the community. A short-term versus long-term paradigm illustrates the choice between a course of action that results in a small, immediate impact and a course of action that produces long-term gains, perhaps with some short-term loss. These conflicting perspectives are apparent in many of the social problems addressed by behavior scientists working in culture and community. For instance, one can readily see how different strategies that have been employed to address homelessness could be considered “right.” A course of action that advances the perspective of providing the most gain for the individual is one like “Host Home” in which families host individuals who are without a home in their homes while they find work, financial stability, etc. (Scott, 2018). The “Homeless Garden Project,” conversely, emphasizes the benefits for the community. A community garden where community members and students work side-by-side benefits the entire community providing fresh produce, employment transition services, and job training for the homeless members of the community (Holloway, 2015). In contrast, a homeless shelter would offer a course of action that addresses the short-term needs. Actions toward the implementation of any of these programs are “right” in that they offer strategies that may mitigate the needs of the homeless and/or the community, but one program may seem more “right” depending on the perspective one takes. Effective behavior scientists develop the skills to consider right vs. right perspectives and far-reaching consequences—intended and unintended.

Cultural Humility

Behavior analysis has its roots in Western Judeo-Christian norms (Krapfl & Vargas, 1977) and is marked by WEIRD tendencies (Western, Educated, Industrialized, Rich, and Democratic; Henrich, Heine, & Norenzayan, 2010). According to Ulman (1983), “because behavior analysis developed within the context of bourgeois ideological hegemony, its growth as a comprehensive account of social behavior in capitalist society has been profoundly stunted” (p. 23). Behavior scientists serve clients and study participants from diverse groups and cultures and oftentimes find themselves in positions in which cultural context dictates one response and the BACB® Code requires another (see Rosenberg & Schwartz, 2018). Behavior scientists

working on culture- and community-focused issues may experience these conflicts even more frequently.

Most graduate training programs in behavior analysis have courses on ethics as they are required by our governing bodies, but few present-day students of behavior analysis (or students from other disciplines more generally) study ethics or philosophy in their own right. As a result, students with a strong scientific repertoire may lack the ability to conceptualize and analyze social issues that have been plaguing humanity for decades from a philosophical or theoretical perspective (Fryling, 2013). This is further compounded if behavior analysts struggle with cultural humility. Cultural humility “incorporates a lifelong commitment to self-evaluation and critique, to redressing the power imbalances in the physician-patient [for example] dynamic, and to developing mutually beneficial and non-paternalistic partnerships with communities on behalf of individuals and defined populations” (Tervalon & Murray-Garcia, 1998, p. 117). Ethical rigidity compounded by low cultural humility engenders adherence to rules that may be culturally insensitive (such as refusing to give and to accept gifts from clients or recommending an expensive set of teaching stimuli to a less economically advantaged family). Adherence to an inflexible set of ethical rules can have dire consequences for intervention acceptance (Wolf, 1978), the development and maintenance of healthy therapeutic relationships (Taylor et al., 2018), collaboration (Fawcett, 1991), and the development of prosocial behaviors that foster the advancement of cultures and systems (e.g., Biglan & Hinds, 2009). As a result, many behavior analysts may be ill equipped to independently tackle the complexities of ethical decision-making necessary for work on cultural and community concerns.

Applications of behavior science to culture and community are progressing toward understanding the environmental controlling variables that lead to imbalanced power differentials exerted through the control and establishment of contingencies by controlling agencies. The contingencies that control the ethical behavior of behavior scientists and practitioners share some of the same difficulties facing the constellation of contingencies at play in society more generally (Fawcett, 1991). Notably, these controlling contingencies tend to be sustained by the dominant culture. However, the cultures and communities we serve are often not representative of the larger dominant culture and the ethical guidelines and framework are less clear. The ethical dilemmas faced by behavior scientists might be framed as conflicts similar to those explored in the experimental work related to ethical self-control, in that what is good for the individual (behavior scientist) may not be what is good for the community (Borba et al., 2014, 2017). Both perspectives are right because each response supports a different value. The ethical dilemma occurs when values conflict (Kidder, 1995). Because our behavior-analytic values have been predominately constructed from Western Judeo-Christian norms and cultural practices, “the codification of its controlling practices” (Skinner, 1953, p. 338) is culturally biased. Behavior scientists working with cultural and community issues must consider how their values have been shaped and how those values influence what they do and how they treat people.

Developing Sustainable Projects

Luke and Alavosius (2012) defined sustainability as “the features of a practice or product that meet the current needs of the population while not hindering the ability of future populations to meet their needs” (p. 55). Even though not all projects need be focused on the long-term or sustainability to be considered valuable, sustainable projects are those that are replicable and can maintain after the research has been completed given only the local resources (e.g., Fawcett, 1991; Fawcett, Mathews, & Fletcher, 1980). Sustainable projects empower communities; that is, they enable the community to access more resources or other benefits through their own behavior, with less or even no reliance on outside sources. They require intentional collaboration and perspective taking to ensure that all stakeholders’ values are taken into account. However, some projects cannot continue without the support of an outside agent, or they make the community worse off than it was before. For example, Kelly (2009) reported on the construction of water points (locations where people could access water) in Africa. The water points that donors, governments, and nongovernmental organizations constructed in rural Africa were not maintained in the absence of their further involvement. These water points became useless or in some cases hazardous, costing approximately \$360 million to remediate. The water points were often built without consulting community members, who were ultimately left with new water points but without the resources to maintain them.

Conversely, Engineers Without Borders (EWB), a model for sustainable projects, was founded to address the need for “citizen engineers” (Amadei, Sandekian, & Thomas, 2009, p. 1088) and might serve as a model for applications of behavior science to culture and community. Citizen engineers develop sustainable solutions to geopolitical and economic issues worldwide. They collaborate on interdisciplinary teams, working together to design and implement solutions for the future, developing long-lasting solutions without doing any harm or creating unnecessary burden. The approach taken by EWB can guide scientists in their design of sustainable projects. Projects designed to be sustainable can be judged a success only when the researchers are gone from the community for a certain amount of time and the projects are maintained by the community members. This outcome can be achieved through capacity building or “education, training, empowerment, and the integration of economic mechanisms” (Amadei et al., 2009, p. 1090), a strategy that is consistent with many of Fawcett’s (1991) values.

Summary

The key repertoires suggested in this section are deliberately indeterminate. We do not propose specific rules for the reasons previously discussed. In addition, Fawcett (1991) makes explicit suggestions for conducting ethical community research and practice, and we have also presented his recommendations. We do, however, strongly encourage instructors of ethics and those supervising and mentoring students and aspiring behavior scientists to create opportunities for their students and

mentees to develop the key repertoires described here, as well as to adopt the aspirational core values of social justice and creative altruism. When evaluating the ethics and other merits of a research or intervention project, the behavior scientist should assess whether the project serves the values of social justice and creative altruism, as well as whether the project (in all stages) relies on collaboration, especially with community members, and is evaluated from multiple perspectives. The assessment should determine the extent to which collaboration and perspective taking demonstrate cultural humility and whether the project will sustain after the behavioral researcher or practitioner leaves. Instructors and mentors should encourage thoughtful analysis and robust discussion of checklists and yes/no items, with a focus on critical thinking and an eye toward conducting projects that use creative altruism to further social justice.

Closing Comments

Behavior analysis itself is a culture; we are responsible for the retrospective analysis of the contingencies we experience and for the prospective development of new frameworks that influence new contingencies for selection. Moving forward, the field is obligated to continually develop and change such approaches to behavior science and especially community practice. From a social justice perspective, the field is obligated to facilitate a more progressive, inclusive approach that benefits all of humanity. From a creative altruism perspective, the field is obligated to influence contingencies that support actions to make the world a better place.

The aspirational goals that we have articulated here are accomplished by building systems that (a) support ethical practices (e.g., Brodhead & Higbee, 2012); (b) promote an ethical culture (BACB, 2014); (c) build feedback loops between service providers and the recipients of services that diffuse power differentials between them and promote ethical practices and collaboration; and (d) develop ecological systems (Bronfenbrenner, 1979) that promote social justice, creative altruism, activism, advocacy, and accompaniment (see Footnote 4). After all, the cultures of behavior scientists and practitioners, including those who work with individuals, cultures, and communities, are the result of a culmination of the contingencies experienced and created by the individuals who are members of those cultures and communities. The ethical practices that are currently our dependent variables, will ultimately become our independent variables, promoting and sustaining those practices that we develop (Skinner, 1971).

As we move forward into the less chartered territory of applications of behavior science to areas of importance in culture- and community-focused assessment, intervention, research, and practice, we assert that behavior scientists must examine their own contingencies, the interlocking contingencies, and the metacontingencies of their own cultures and communities, always taking multiple perspectives and prioritizing collaboration as a preeminent practice. We must establish and sustain a culture that supports cultural practices that help others and improve the world. And, we should do this because it is the right thing to do.

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Chapter 10

Global Warming: Analysis of Behavior and Organizational Practices as Climate Impacts Increase



Mark P. Alavosius and Ramona A. Houmanfar

Climate Change Effects

The seriousness of global climate change is widely accepted (Intergovernmental Panel of Climate Change (IPCC), 2007, 2014, 2018, 2019) as the accumulating evidence is undeniable. “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level” (IPCC, 2007). This clear statement was reported 13 years ago. Since then more extensive evidence (IPCC, 2018; National Oceanic and Atmospheric Administration (NOAA), 2019) and scientific warnings only grow starker and more urgent. Global warming impacts weather patterns leading to extreme changes in precipitation, wind patterns, droughts, heat waves, rising seas, wildfires, and the intensity of tropical storms. Along with scientific reports (IPCC, 2007, 2014, 2019), popular books (e.g., Wallace-Wells, 2019) describe the many impacts these changes have now and will have on all life on earth. CO₂ and other greenhouse emissions (e.g., methane) continue despite efforts to reduce them. Some of this is due to cultural practices, most notably burning fossil fuels and meat consumption that continue despite multinational efforts like the Paris Accord where many nations pledged to reduce emissions. Some increase is due to positive feedback loops as the warming of the planet releases trapped CO₂ and other greenhouse gases when, for example, ice and tundra melt. The climate changes are accelerating (Hansen & Sato, 2011) and will most likely continue to do so even if humans stopped all industrial/transportation/construction/agricultural emissions today.

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The pace of changes may be underestimated by scientific reports seeking consensus on the trends (Oreskes, Oppenheimer, & Jamieson, 2019). The earth continues to warm as the atmosphere changes with intensifying and more frequent climate related crises. Reasonably well-informed consumers of news reports know all of this. Those reading peer-reviewed climate research see the extensive science exploring the problem and appreciate the convergence of observations supporting the findings. Still, a primary driver of global warming is human behavior as indicated by the unprecedented increase in greenhouse gases since the Industrial Revolution. Defining global warming as a behavioral problem is sobering, as behavior science does not converge as to solutions to the problem. Humanity is threatened by a problem of its own making and the behavioral pathways ahead are much less understood than the trajectory of climate change. The accumulating evidence of wide-ranging impacts suggests features of many human behaviors that contribute to the problem and the range of responses people will make. Behavior analysts can help trace the chains of behaviors, their prevalence, frequencies, contexts of action or more to systematically reveal options for interventions, modes of conduct, opportunities and likely trajectories for what is ahead in terms of the human response to climate crises.

According to the IPCC, 2014 report,

Globally, *economic and population growth* (italics added) continue to be the most important drivers of increases in CO₂ emissions from fossil fuel combustion. The contribution of population growth between 2000 and 2010 remained roughly identical to the previous three decades, while the contribution of economic growth has risen sharply. Between 2000 and 2010, both drivers outpaced emission reductions from improvements in energy intensity.

The message is clear: As the earth's population grows and developing countries industrialize, reductions in greenhouse gas emissions achieved by some developed countries are offset by the emissions released when millions of new energy consumers (e.g., expanding population) adopt more energy-intensive lifestyles. The goal of limiting global warming to 2 °C above pre-industrial levels is likely unobtainable unless humans, worldwide, cease carbon emissions now and rapidly develop technologies to capture and safely sequester CO₂ already in the atmosphere. The existing energy infrastructure (e.g., existing or commissioned fossil fuel power plants) was recently assessed (Tong et al., 2019) to estimate the emissions committed during the assumed utilization lifetime of these installations. Emissions must approach zero by 2050 if the goal of stabilizing global warming targeted by international efforts is to be met. The estimates suggest no new fossil fuel infrastructure and early retirement of existing installations are needed to meet the goals of the Paris Accord. Further, these authors contend that early infrastructure retirements (and replacement with carbon capture and storage technologies) will most likely be in the electricity and industrial sectors.

Some popular media sources continue to proclaim climate change is a hoax. The general public in the US is segmented in terms of how people understand climate change, its causes, and more importantly, the effects this will have on humanity—but this is shifting. In recent years, a majority of Americans now recognize global

warming is happening and will have serious effects. Reactions range along a continuum from alarm with changes in climate with urgent calls for action to prevent further global warming to disinterest and apathy. Some still outright deny climate change data (Leiserowitz et al., 2018; Maibach, Roser-Renouf, & Leiserowitz, 2009). The science involved in measuring the planet's temperature and climate patterns is complex and not readily understood by those not trained in the complexities of this endeavor. Skepticism of science is widespread and promoted by various industries, organizations, and institutions perhaps threatened by evidence that reveals the externalities of their endeavors. The widespread rejection of science suggests that, despite the best efforts of the education field, even basic understanding of scientific methods is lacking. Scientific, peer-reviewed reports provide accumulating evidence from a number of disciplines that converge to show climate change is happening now, the rate of change is accelerating, and human activities (e.g., use of fossil fuels) since the Industrial Revolution are a major driver of that change. Many still do not recognize the problem nor seek to learn more, and this must be regarded as a behavior problem as well.

Stopping carbon emissions entails radically restructuring how we fuel life on earth and how we feed ourselves. Currently fossil fuels are dominant with coal, oil, and gas widely chosen over alternatives like solar, wind, biofuel, and tidal energy to power our lifestyles. Meat products are favored over plant-based diets. Some energy alternatives, notably solar, are now financially competitive with fossil fuel as solar collectors are affordable replacements to the entire infrastructure used for fossil fuel. The cost of solar photovoltaic modules tends to drop 20% for every doubling of shipped products. At the present rate, costs halve every 10 years. This suggests that accelerating adoption of solar energy, for instance by providing consumers with incentives and rate credits for installing panels, would be a wise investment in future energy security. This learning curve by which solar manufacturers become more efficient is known as the Swanson Effect (Swanson, 2006) and is based on observations of the pricing of solar panels.

There are many subsidies for fossil fuels, however, that prop up that aging industry and sustain it as an economically viable energy source for consumers. Many solar panel manufacturers are in China and current trade wars influence consumer behavior as tariffs add costs and friction to transitioning from fossil fuels. The externalities (Biglan, 2009) of fossil fuels (e.g., pollution, health impacts, etc.) are not borne by the producers sheltering them from costs associated with our consumption of their products. This insulation from costs sustains the oil and gas producers' pursuit of profits by continuing exploration of new oil/gas reserves, hydraulic fracturing of existing wells to extend their lifecycle, and feeding consumers' demand for low cost energy. Accumulation of profit in the oil and gas industry enables leaders to invest in alternatives and steer their massive engineering expertise to new directions. Current market trends appear to inevitably lead to more innovations in energy and a transition to a new cleaner energy economy. Market demand seeks lowest cost energy sources if the market is free from influence by powerful special interests.

Clean technology exists but massive transition is decades away unless radical changes are made to the existing contingencies that support the current energy system.

The oil and gas industry is well along its learning curve and seen as a mature industry now in decline. Accelerating consumers' adoption of alternative energies at a pace needed now entails "jumping the curve" (Gilbert, 2003) and some discontinuity as upstarts displace incumbents. Disruption introduces new rules in the context for production and consumption. Such disruption demands new knowledge, responsive organizational structures interacting with the receiving systems, learning processes, and culture change. The incumbents are in danger of succumbing unless they capture opportunity from the disruption. The oil and gas producers are investing in alternatives like geothermal energy, which uses similar technologies. Researchers in organizational behavior management and behavioral systems might explore this by examining the role of organizations' strategic capabilities, leadership, and enabling organization (structure, processes, and culture) in regard to capturing opportunity from disruptive innovation (Houmanfar, Alavosius, Morford, Herbst, & Reimer, 2015).

Local Effects of Climate Change

The Intergovernmental Panel on Climate Change (IPCC) reviews and summarizes research findings, interprets results, and publishes periodic reports to communicate with policy makers, business leaders, scientists, and the general public. These reports summarize scientific information on climate change and what that might mean for regions of the planet. The US Climate Change Research Project (www.GlobalChange.gov) provides multiple reports in an easily navigable format. Climate change will affect virtually all humans in some way if it is not already having an impact. Numerous reports examine global warming effects on various locations (e.g., regions of the US, low-lying island nations, coastlines, cities, etc.). A search for scientific findings will yield a variety of information sources, some of which are detailed assessments. Climate changes are clearly evident now and vary across geographic regions. The global problem is perhaps best appreciated by first detecting and understanding the local impacts and then considering how these are expressed elsewhere on the planet. This examination of local impacts helps one frame the problem and enables thinking about future directions. This framing and episodic future thinking are effective interventions to visualize the context of global warming and alter how we value future consequences (Rung & Madden, 2018a, 2018b) for ourselves and for others.

Melting sea ice is replaced by land or water, which reflect less heat, leading to acceleration in warming. Floods from snowmelt and rains break records and alter how communities store and manage water. In the past decade, the rain/snow level in the Sierra near our home has risen about 1000 vertical feet resulting in more precipitation falling as rain that runs off quickly, rather than as snow, which melts off slowly over the course of many months. Drought conditions in Reno for several

years led to water restrictions and deep concern about allocation of water. Several recent above average winters in terms of snowfall and management of water reservoirs eased drought concerns but the drought experience revealed personally how prevalent wasteful everyday practices related to water use are in our community. Long-term projections are for reduced snow in the Sierra and increased stress on water supplies (Belmecheri, Babst, Wahl, Stahle, & Trouet, 2016). This local experience is repeated around the globe, with communities contacting the realities of climate change. Some escape restrictive consequences as was our experience; others contact catastrophes.

Coastal cities see rising seawaters affecting their communities and city planners are building defenses like sea walls and pumps to hold back the coming waters. Engineering projects are planned worldwide to protect major coastal cities (Biello, 2011). Miami, New York City, Boston, and New Orleans are prime examples in the US. Agriculture worldwide is affected by droughts, floods, and changing habitats and the food supply is altered. Farmers investigate new crops and worry about invasive species. Droughts bring wildfire risks, which obliterate communities of all living things located in fire prone areas. Forests are harvested, often to protect views and property values, unless restrictions inhibit cutting trees. Developers expand communities into woodlands as buyers seek views of nature and realtors profit by selling oversized homes connected to vulnerable power grids. Fires and floods threaten infrastructure like power grids, water supplies transportation, school systems, and more. Witness the toxic overflows from mining operations, industrial farming, and storage ponds that routinely contaminate communities in the US southeast and elsewhere. Heat taxes populations, especially the frail and elderly, and threatens health and well-being across the globe.

News reports convey the casualties. Humans cannot tolerate temperature much above 120 °F for extended periods especially if humidity is high. Air conditioning will be needed across the planet to allow people to live in many places as heat waves become common. The manufacturing and distribution of air conditioners will greatly increase in coming decades and this itself will require fossil fuel use adding to the emissions causing warming. All these examples reveal something of the network of contingencies that interlock a vast ensemble of actors (consumers, producers, suppliers, etc.) and their behaviors as people organize themselves into communities. Much of this behavior adds to global warming. Changing these behaviors in ways that measurably improve the habitability of the planet for humans and other species will entail a reinvention of cultural practices. The data indicate there are only decades available to make substantial progress before catastrophic impacts overwhelm many areas of the planet.

Costs of all the devastations associated with climate change are enormous and will increase as impacts mount. This strains the reserves of insurance companies that finance risk associated with these events. Insurers worry about covering the losses and alter policies to minimize their exposure. Underwriting policies for at-risk locations (e.g., coasts, flood plains, high-fire environments, etc.) are changing to increase costs for home and business owners who now bear more liability for what is likely to come. Families, communities, nations, and global financial systems

may be overwhelmed by catastrophic costs. Those suffering now under climate related losses struggle to rebuild their lives and re-establish communities, and this need will increase in frequency and scope. Puerto Rico recently (2017) suffered catastrophic losses from hurricane Maria and struggles to rebuild. The Bahamas are devastated by hurricane Dorian as we write this chapter and recovery efforts are underway. Both of these islands were struck by category 5 hurricanes and their experiences indicate the human and financial cost of extreme climate impacts. Even though no specific hurricane can be attributed to global warming, the frequency and severity of storms such as these likely are affected by the earth's rising temperature and other atmospheric conditions (Nie, Sobel, Shaevitz, & Wang, 2018).

Conflict Multiplier

Global warming is seen as a “conflict multiplier” and militaries are gearing up for action by shoring up seaports, seeking alternative energy systems for military equipment, and modeling threat scenarios. This likely entails a range of actions from combat to quell armed conflict through police action to maintain security for humanitarian aid to victims of climate-related disasters (US DoD, 2014; United States Joint Forces Command (USJFCOM), 2010). The US Department of Defense (DoD, 2014) is collaborating with federal and local agencies and institutions to develop a comprehensive approach to the many challenges raised by climate change including work with other nations to assess and manage climate change impacts and help build their capacity to respond. Berlin Snell (2018) describes efforts by the US military to research and develop renewable energy infrastructure as it readies for the destabilizing effects of global warming. This text portrays the military as an unlikely but important ally to environmentalists.

Given recent volatility in geopolitics, armed conflict, terrorism, trade wars, population migrations, and the rise of nationalism, it is unclear how shifting international relations will alter future cooperation globally. Climate change is a global problem and is not constrained within national borders so no nation can deal with it alone. It is notable that the US is the only country openly indicating withdrawal from the Paris Climate Accords. The US government is in fact taking active steps to dismantle climate protection policies (Popovich, Albeck-Ripka, & Pierre-Louis, 2019) often at odds with states' attempts to tighten them. All other countries have now signed the Paris Accord but meeting goals for reduced emissions remains a challenge. Within the US, corporations show leadership as well as states that rise to lead responses to climate threats, develop plans for impacts, and provide resources to study innovations.

It appears that China (population 1.3 billion) is emerging as the world's leader for climate change (Engels, 2018) in both helpful and harmful ways as it is producing alternative energy sources like solar panels. China has essentially become the manufacturer for global markets and has developed the capacity to assemble and distribute a massive variety of products across the globe. China also remains the

largest producer of greenhouse gas emissions and is building new coal-fired power plants. So how it develops its economy will significantly impact global warming. The new Silk Road (Belt and Road Initiative) is a massive investment by China in land and water trade routes through Europe, Africa, and the Middle East to bring its products to market. China, with its growing presence across the globe, might emerge to lead efforts to work together with other nations and build joint capabilities to deal with the emerging threats. Global warming is a planetary problem and national boundaries do not define safe havens untouched by the collective behavior of all the earth's inhabitants.

Human responses to the many impacts of climate changes ahead will span a wide range of behaviors from outright denial and avoidance to organized attempts to prevent impacts, adapt to changes, or, failing that, suffer losses. No matter what behavior changes are made, massive efforts and expense will be required to rebuild after catastrophes and more areas of the planet will be deemed uninhabitable. Migration from devastated areas to more habitable zones is noted as plants and animals relocate due to impacts. Human migration is increasing as well. Global warming is accelerating, time is running short, and degrees of freedom are lost as delayed actions allow momentum to build. How humans organize themselves in the context of an environment of dwindling resources to maintain a growing population is the central problem that looms larger every day.

Purpose

The short summary of many reports on climate change and its impact on humanity leads to the topic of this chapter—understanding human behavior in the context of a changing environment wrought by global climate. We can ask how behavior science contributes to understanding the causes, explaining the diversity of perceptions of the problem, forecasting future trends, and possibly acting to prepare for what is ahead. Can humans change deeply established lifestyle behaviors in time to halt or slow global warming? Can humans across the globe collectively address the greatest threat to humanity and avert strife over limited resources? If not, how will humans adapt to habitats created by climate change? What will the experience be like for those who learn to live within sustainable boundaries? Notice that these questions relate to the behaviors of many individuals. The challenges occurring now and that lie ahead are of global scale such that concern blankets everyone on earth and extends to future generations. Behavior science is applicable to understanding the human response but applications to large populations are required to address the true scope of climate change impacts.

Global Warming as a “Super Wicked Problem”

Policy scientists define “wicked problems” as a category of persistent social problems that continue despite massive and prolonged efforts to solve them. Poverty, faulty education, obesity epidemics, social injustice, racism, sexism, gun violence, crime, and others illustrate these vexing issues. Ritter and Webber (1973) listed the features that thwart policy scientists and planners as they attempt to arrive at solutions. Wicked problems are typically defined in different ways by the disciplines seeking to address them. For example in the US, gun violence is understood as violence resulting from too many guns in the hands of citizens while others see “gun free zones” as defenseless areas available to criminals undeterred by unarmed victims. Solutions from reducing assault rifles in the general population to arming teachers and adding more weapons have been proposed; yet they are quite opposing solutions. Some see mass shootings as a mental health problem requiring more psychological services and secure mental institutions while others attribute it to violent video games unleashing homicidal impulses. Wicked problems are explained in numerous ways and there is no recognized sure-fire solution available to policy makers. Each wicked problem is often seen as unique and what works elsewhere is rejected as not applicable to the presenting situation. The ambiguous formulation of the problem hinders the methodologies that might measure sources of variation and test prototype solutions. They have been termed a “social mess” (Horn, 2001) as the ambiguous definitions occasion uncertainty, illogical responses, and values conflicts among those affected and those trying to solve the issue.

Technologies to help visualize the complex dimensions of these problems (e.g., the spread of a pandemic) are being developed to enable change agents to find achievable interventions and map trajectories of cultural change. To our knowledge, these interactive scenarios have not yet advanced in behavior analysis as ways to visualize complex interlocking contingencies and plan interventions to alter cultural practices. Kwakkel and Pruyt (2013) illustrate the potential by describing two examples pertaining to scarcity of natural resources (metals and water). Wicked problems persist, troubling the community, and pressure leaders to invest in interventions lacking evidence supporting their utility. The usual outcome is continued struggle with problems that maintain across generations and are regarded as too pervasive and established to eliminate.

Levin, Cashore, Bernstein, and Auld (2012) describe global warming as a special case among wicked problems. They see global warming as having all the features of wicked problem but with four additional features that further complicate solutions. They term global warming as a “super wicked problem” as, (1) time is running out, (2) those (e.g., us) seeking to end the problem are also causing it, (3) no central governance authority exists to manage the problem, and (4) existing policies related to critical behaviors discount the future. This analysis conforms in some ways to Skinner’s (1987) position when he asked why we are not acting to change the world. Levin et al. describe a forward reasoning approach by which humans organize themselves to take successive steps toward a more sustainable future. They describe

this active process as learning to constrain our future selves for the betterment of the planet and future generations. Grant (2010) has similarly described how young people might learn to appreciate “resource-light” reinforcers like arts, nature, and more simple lifestyles as alternatives to the over consumption prevalent presently. Twyman (2010) describes an interactive training method to teach young people about environmental issues. Grant’s analyses (2010, 2011, 2014; see also Chap. 12 in this volume) call for a reinvention of culture and highlights focusing on youth who are psychologically flexible as they will inherit the warming planet. Note that there is a global youth movement (Climate Strike, 2019—<https://globalclimates-trike.net>) with millions of young people rising up across the globe to advocate for action on the climate. Grant’s analyses provide a vision of the future. He depicts how behavioral principles might be applied in organized ways to shape populations to live a satisfying life with fewer resource intensive activities that now dominate consumptive lifestyles.

Incremental Pathway Forward

The future choices proposed by Levin et al. (2012) and Grant (2011) both call for constraining our consumptive behavior to levels required to live within the planet’s dwindling resource boundaries. This is a daunting initiative, which might be approached as a series of step changes toward more sustainable life on earth. Levin et al. articulate an iterative process by which humans move toward a better but unknown future. Each step yields measures of progress and furthers understanding of how humans are part of the ecosystem so that another step forward is revealed. This pathway is incremental and progressive under the proposition that human effort can make a difference. Human behavior is a driver of global warming, although “natural” forces are unleashed too, so it is plausible that human behavior can intervene and alter the trajectory. The pathways ahead might be reasoned and grounded in evidence of progress. This entails addressing the wicked definitional problem and the four features of “super wicked problems” at some points during the progression. The timeframe for effective action needs to keep pace with or surpass the accelerating warming of the planet to halt continued degradation. Humans across the globe would need to see themselves as part of the ecosystem and align efforts. This is counter to the apparent race to find and combust all available fossil fuels. Consumer demand appears insatiable and political leaders create policies to grow economic output. A central planetary governance agency would emerge, perhaps from the Paris Accord signatories, to oversee the steps and exert leadership. Finally, governments would create policies crafted to weight future consequences significantly more than they do now. These steps frame a general approach for acting to save the world with behavior science providing methods to motivate and maintain the everyday behaviors of the worldwide population toward more sustainable alternatives. Massive environmental changes are happening with more to come and these will drive behavior change. The growing realization that behavior is a key

variable to manage and preserve life during times of scarcity with dwindling resources is leading some to organize to prevent greater impacts and prepare for the increasing likelihood of catastrophic losses.

Capturing and sequestering carbon emissions is also needed. This is technically feasible as demonstrations show that gases can be collected from the atmosphere and stored safely underground. Sequestering reverses the flow of carbon generated when we burn fossil fuels and warming releases gases from trapped sources. Cleaning sufficient greenhouse gases from the atmosphere will take many thousands of installations (some estimates say hundreds of thousands of refinery-like plants are needed) to collect and contain the gas emissions. Drilling rigs now used to drill oil and gas wells might be repurposed to create underground storage. Rig technology continues to advance with directional drilling and automation improving their efficiency. Some rigs are used to drill geothermal wells and this shows extension of that industry to more eco-friendly applications. Humans need to not just stop global warming but start to cool the planet back to more livable levels. These two solutions alone (stopping emissions, sequestering gases) will radically change much everyday behavior allocated to finding, collecting, distributing, and combusting fossil fuels across the globe. Funding these changes will require massive investment in research, technology, infrastructure, and information/marketing to shift populations to this way of living. Banks currently invest heavily in fossil fuel exploration. These institutions are needed to finance the infrastructure, exploration, and marketing of alternatives. These two are not the only solutions as changes in diet, food preferences, and more will also be needed to shift food production to more viable methods. As the population continues to grow, provision of sufficient food and water will be increasingly difficult. There is a finite amount of land available for farming and water reservoirs are being depleted beyond their ability to recharge (IPCC, 2019). Massive changes in behaviors related to food, hydration, and nutrition are ahead as the population growth exceeds the planet's capacity to provide sustained sustenance.

Sticky Interventions

Leaders of organizations of all sorts (e.g., corporations, governments, institutions, religious groups, nonprofits, advocacy groups, etc.) increasingly detect the impacts wicked problems, including global warming, have on their members, and explore the responsibilities they have to their stakeholders, consumers, and society at large. In August 2019, CEOs from the Business Roundtable issued a statement about the purposes of corporations and social responsibility that expanded well beyond the corporation existing to benefit the stakeholders. The new definition emphasizes job generation, a sustainable economy, innovation, a healthy environment, and economic opportunity for all. Thus, social responsibility of these organizations was explicitly recognized (see <https://opportunity.businessroundtable.org/ourcommitment/>).

Houmanfar et al. (2015) describe the functions of organizational leaders as embracing the financial and social well-being of constituents and understanding that these functions are executed by managing the interlocking behavioral contingencies nesting the organization, its members, and consumers in a complex web. The main challenge of organizations in the remaining decades of the twenty-first century (some see 2050 as a turning point) is to cope with increasing environmental degradation that creates significant financial and social impacts. As illustrated by the recent Business Roundtable statement, social responsibility emerges as a key feature of leadership decision-making. These decisions affect consumers' behavior as the world's resources are depleted; health and education crises increase; and communities, societies, and cultures adapt to a new context. Socially significant actions in the context of global warming not only relate to leadership and management practices that affect the well-being of organizational members (e.g., safety, health, financial security, etc.) but also bear positive or negative impact on consumer practices and community well-being (e.g., education, gun ownership, cancer, safe or green driving, energy conservation, diversity-based health care, etc.). Note that corporations, like major retailers, are now implementing changes in how they sell guns and ammunition and no longer allow open carry on their premises. Seeing inaction by governments in the face of increasing gun violence in their organizations led some leaders to act to limit future carnage. Many surveillance systems track illness rates, global warming, water pollution, crime, drug use, gun deaths, and a host of other widespread social ills. These illuminate the social problems associated with cultural practices promoted by organizations. Increasingly, some are held accountable for failing to regulate their business models in accordance with social well-being and class action suits seek remuneration for losses (Stohr, 2019). Such measures of impact offer activists and advocacy organizations metrics to include when evaluating the social responsibility of organizations and their leaders.

The engagement of some business leaders in focusing on how their organizations help the human response to wicked problems is encouraging. The power of corporations is massive as they have the infrastructure, human capital, expertise, supply chains, and distribution models to touch many people. Corporations evolve to be maximally effective within some niche. Defining that niche more globally with consideration of social responsibility brings their resources to bear on addressing global warming. Levin et al. (2012) propose that "sticky interventions" are needed to change behaviors related to sustainability as related to adaptability of cultural entities or cultural practices to environmental demands over time. Corporations' engagement with global warming is useful as their investment in research, development, and deployment of solutions is vital especially when governments allocate resources to militaries gearing up for conflict.

Corporations possess the intellectual capital in terms of engineering and technology and the wealth to drive progress. As noted earlier, the leaders of the planet's energy infrastructure face increasing pressure to prematurely retire fossil fuel infrastructure and install carbon neutral and carbon capture technologies. This transition will have cascading impacts across all sorts of behaviors and will require massive shifts in organizational members' behaviors and consumer behavior. "Stickiness"

can be operationalized as the features of behavior change interventions that persist despite forces that resist or weaken them. Building interventions that demonstrate socially valid impact, attract investors, are built into existing operating models, and are protected by policies that defend against those seeking to undermine them are design considerations for behavioral interventions that make lasting global impact.

Behavior Science Community: Training, Research, and Publications

Members of the scientific community have for many decades written about humanity's struggle with living sustainably in general and halting climate change in particular. White (1967) discusses the historical foundations, values, religions, and traditions of technology and science and how these affect our place within our ecology. His analysis describes the long history through which humans acquired their view that nature exists for the benefit of humans and humans dominate the environment. Science and technological advances enabled humans to exploit the environment and created the ecological crisis. White concluded that science and technology would not overcome the crises and called for a redefinition of humanity's place as not ascendant over the natural environment but as an integral part of it. Schultz, Zelezny, and Dalrymple (2000) further explore the relation of religious beliefs with perspectives on humans' relation with the environment and develop that perspective.

Skinner (1948, 1953) considered the design of cultures and experimental communities, and articulated the power of reinforcement contingencies that might be brought to bear on social problems including issues related to sustainable communities. He came to lament that we are not acting to save the world (Skinner, 1987) concluding that the science of behavior revealed humans' unlikelihood of changing established behaviors to those needed to live sustainably, as so much behavior is selected by immediate consequences. Research in behavior analysis has continued since Skinner's (1987) lament and it is possible that recent advances in basic and conceptual analyses may lead to more optimism. His moment of pessimism need not curtail our efforts in continued search for behavior science explanations and solutions to the problems ahead.

Even though global warming and sustainability are topics of interest to many in behavior science, few behavior analysis programs offer courses or practicum in these areas, and none to our knowledge provide a specialization focused on developing personnel to create, manage, or lead behaviors related to global warming and environmental protection. Other disciplines have identified the need for competent personnel to manage the protection, preservation, and restoration of ecosystems (e.g., Day et al., 2009; Kareiva, 2013; Kareiva & Marvier, 2007), and noted that human behavior is crucial to that end. Ostrom's (1990, 2009) work to apply case study methods to explore how communities sustain practices related to consumption

of common pooled resources examined how cooperation is governed. The past decades have shown expansion of training in behavior analysis, particularly applied behavior analysis, with special needs populations, demonstrating that the field responds to current market demand. This focus is paired with reduced exploration of the breadth of topics examined in the early days of applied behavior analysis as depicted in the first decade of work published in the *Journal of Applied Behavior Analysis* (*JABA*; see also Chap. 11 in this volume). The first decade of *JABA* demonstrated interest in special populations, criminology, police work, diet/nutrition, safety, public health, behavioral medicine, industrial applications like safety, human development, families, sports, community psychology, sustainability, and more. Efforts in applied behavior analysis tightened over the following decades to explore issues related to treatment of special populations and related professional concerns like credentials for caregivers and replicable service models (see Federov, 2020 for review of *JABA* publications).

Global warming impacts behaviors involved in all human endeavors. Resilience of communities depends on how multiple elements of everyday life operate when the environment is degraded by climate-related catastrophes. The history of behavior analysis is useful for understanding the trajectory of our science and how applications define training curricula and the public's embrace of the discipline. What might limit exploring generalization of behavior analysis to topics of broad social impact, namely behavior related to global warming and the human response to it? The perception of applied behavior analysis as a clinical endeavor defines behavior analysts as service providers assessing and treating a special population as opposed to behavior systems analysts competent to manage broader community needs. What might promote generalization and innovative approaches to changes across the spectrum of everyday behavior that will be needed as the world changes? No human, ever, has lived on earth with the amount of greenhouse gases currently in the atmosphere and the temperature rising so quickly. Never in human history have people adapted to the rapid global environmental changes in which we now find ourselves. The many changes in the environment in coming decades will exert selective pressure on all biota and humans will adapt, or not. They will cooperate to solve common problems or compete for dwindling resources.

There have been moments since the Industrial Revolution in which opportunities to develop sustainable lifestyles occurred but did not lead to enduring change. In the early 1970s, the gasoline shortage in the US led to widespread concern in the US translating into action to ameliorate the threat of the US running out of fuel. Gasoline was in such short supply that consumers waited in long lines at the pumps. US car manufacturers turned to building smaller more fuel-efficient vehicles like those used in Europe and Asia. President Jimmy Carter, in a very public example, installed solar panels on the White House. US car consumers started to purchase more fuel-efficient cars including imports. Energy conservation efforts were examined and pilot tested in demonstration projects such as the Hood River Conservation Project (Hintz, 1988). Looking back, this was a moment where significant change in the trajectory of how people fuel their lifestyles might have occurred. Variations were tested but did not become established. Much of the greenhouse gas emissions that

warm the planet occurred after the 1980s as the population grew, many new energy consumers entered the global economy, and transition to a new energy source stalled.

Hayes and Cone (1977, 1981) published applied research on behavior analysis and climate change and summarized behavior analytic applications to the problem in a text on the subject (Cone & Hayes, 1980). Other behavior analysts were joining the small but growing ensemble of behavior analysts working in community applications. The moment passed however. The next President (Ronald Reagan) removed the White House solar panels and focus shifted to growing the economy. Oil and gas exploration and production increased to meet the shortage. Business as usual returned to developing advances in locating and consuming fossil fuels with little regard for emerging evidence of the externalities. Behavior analysts pursued other applications of behavior science and the topic of global warming generally faded from discourse in behavior analysis (Dwyer, Leeming, Cobern, Porter, & Jackson, 1993; Lehman & Geller, 2004; see also Chap. 11 in this volume). Advances in the oil and gas industry, most notably hydraulic fracturing and directional drilling allowed the US to reduce its dependence on foreign sources of oil and gas and become the world's largest producer. US seaports built to import fossil fuels were repurposed to export them to the world's oil consumers.

Efforts to address climate change via behavior science did not entirely extinguish, however, and periodic reports of studies of recycling, energy conservation, waste management, and similar efforts were presented at conferences or published in journals. Much of this entailed application of relatively well-known procedures to change behaviors at relatively small scales such as energy conservation or recycling in homes, work units, or neighborhoods. These studies demonstrated that replicable procedures to manage antecedent, behavior, and consequence relations are effective in changing behavior at least for a time but absent continued intervention, behaviors returned to baseline levels if interventions are withdrawn. Scaling these interventions to very large populations has not been demonstrated and the requirements to achieve this level of impact are not well understood. Considering the decades of effort to establish applied behavior analysis as the optimal treatment for people with autism is perhaps the best example of what has been effective in institutionalizing behavior analysis as a mainstream application accepted by the general public.

Climate scientists increasingly recognized that human behavior was the fundamental challenge to addressing global warming and reached out to the behavior science communities for help. Lonnie Thompson was among them and he attended Association for Behavior Analysis International (ABAI) events and published in a special section of *The Behavior Analyst* devoted to global warming. Thompson (2010) described climate science findings and related these to the options humans have to address the crisis. He articulates three stark options—act to prevent climate change, adapt to new environments, or suffer. Thompson's three broad options succinctly define response classes occurring as the environment is depleted of resources needed to sustain a growing population. The timeline for passage from one option to the next is not seen as linear. Rather, the behaviors at each way station blend as

segments of the earth's population journey from current conditions to times with more resource scarcity.

Global climate changes are accelerating but unevenly with some regions of the planet further along the path than others. For example, parts of the US are now averaging temperatures 2 °C or more above preindustrial age levels while other locations remain near that preindustrial average. New England and the US southwest are experiencing warming above average more so than the southeast. People experience local conditions and respond accordingly. This may entail preparing for storms, wildfires, droughts, floods, excessive heat, rising sea levels, and so on, depending on locale. We see reports of events elsewhere that do not match our contact with the changes and likely struggle to understand the perspective of others. Local environmental changes select variations in behaviors that might prevent future change, could help prepare for what is ahead, and perhaps build resilience to the impacts that threaten the social fabric that binds our communities (Ardila Sánchez, Houmanfar, & Alavosius, 2019). The extent of challenges is a vast array of environmental changes affecting ecosystems with resource scarcity being a common element. These will require many behavior changes as humans respond to loss of reinforcers to which they have become accustomed. A common feature will be learning to organize ourselves to live within sustainable limits and restore ecosystemic balance, if possible, to levels needed for current and future generations.

Context for Change: Individuals, Organizations, Cultures

One of the often-identified shortcomings of much of the behavioral literature on climate change is that it focuses on the influences affecting individual behavior (Abrahamse, Steg, Vlek, & Rothengatter, 2005; Dwyer et al., 1993), but does not explore as extensively the ways in which larger social systems affects individuals. Consumers can be influenced to buy solar panels or an electric vehicle if the relative cost of those versus more energy-intensive alternatives becomes more favorable. This is a matter of individual choice based on learning history and relative perceptions of immediate and delayed costs and benefits. Research on delay discounting explores factors affecting this individual behavior and discounting curves show order as to how delayed consequences diminish in value (Rung & Madden, 2018b).

But your choice is likely not a solitary action devoid of influence from any other sources of variation beyond delay. Your friends may weigh in on your choice more or less favorably; your values may shift in the direction of environmental protection after reading about climate change. You may belong to organizations and institutions that promote some purchases and discourage others. You view news reports and see the global effects similar to impacts in your region. We consume a great deal of media showing the headline stories of devastation in other areas of the planet. These many participatory factors influence your choice and you arrive at a decision to purchase. Millions of others make similar choices and collective consumption drives a chain of behaviors by many who provide the goods and services we select.

That chain is an interlocked set of behavioral events and many currently require fossil fuel to sustain them. The challenge for humanity is to organize our lives in neighborhoods, towns, cities, states, nations, and cultures by arranging influences to bear on our behaviors that sustain the environment for entire populations and future generations. This scale cannot happen unless many organizations change from business as usual and help make it happen. And, as just discussed, a panoply of organizations will be harmed if such influences are brought to bear on large numbers of people. These organizations will put their considerable resources toward preventing this from happening.

Individual Behavior

Efforts by psychologists (Lehman & Geller, 2004; Newsome & Alavosius, 2011) to analyze behaviors and choices related to environmental issues have focused on theories about attitudes, which are popular perhaps due to their familiarity to the general public. ‘Social/environmental psychology’ (Stern, 2000; Stern & Dietz, 1994; Stern, Dietz, Kalof, & Guagnano, 1995) talks about attitudes as causes of everyday behavior and these theories are commonly communicated by mass media outlets. Their face validity might be regarded as a strength of the social/environmental approach. If behavioral interventions find their way into mainstream culture, the language describing them might similarly be framed in terms accessible to broad audiences. Maibach et al. (2009) recommend this in their analysis of the segmented audiences interpreting information on climate change. Analyses of the relationships between reported environmental attitudes and ecologically impactful behaviors penetrate the cultural milieu, but this subfield of environmental psychology has little influence on the problems associated with climate change (Lehman & Geller, 2004). It is clear that research focused on the correlations between what people say and what people do is of little help for changing what is said and done (Newsome & Alavosius, 2011). More useful are clear prescriptions for how to *change* environmentally relevant behaviors. That requires identifying manipulable environmental influences on behavior.

Direct-Acting Contingencies

Behavior science seeks to understand, predict, and manage the behavior of individuals and groups that are seen as dynamic and adaptive. The foundational concept of selection-by-consequences (Skinner, 1969, 1981) shows parallels between phylogenetic variation with natural selection of genetic materials and the ontogenic selection of operant lineages. Selection by contingencies of reinforcement relates to a given operant over time in much the same way as contingencies of survival evolve species by the passing of genetic materials across generations. Human behavior is understood to be the outcome of a long lineage of organism-environment interactions

susceptible to change by environmental influence. This concept provides the basis for all of operant psychology, including its application to environmental issues.

The primary purpose of behavioral science is to identify functional relations between manipulable environmental variables and observable behaviors (Skinner, 1969, 1981, 1984). Applied behavior analysis (Baer, Wolf, & Risley, 1968) develops replicable behavioral technologies to alleviate human suffering and improve socially valid behaviors coherent with principles of behavior. Given criticisms of the social/environmental approach, behavior analysis appears well positioned to inform practical solutions to the environmental problems driven by harmful human behaviors. And, indeed, behavioral interventions have been effective in influencing domestic and industrial energy consumption, litter control, recycling, transportation decisions, and consumer purchasing behavior (Lehman & Geller, 2004). Our diets are important consumption behaviors as production of meat-based foods produces considerable greenhouse gas emissions. Eating can be conceptualized as a series of choice responses that form a temporally delayed behavioral chain. This series includes selection (choosing where and what to eat), preparation (cooking and seasoning), and consumption (chewing and swallowing). If eating is comprised of choice responses, then response requirements and environmental variables will affect the foods we select, prepare, and consume (Rafacz, 2019). With respect to healthy eating in particular, there is a large body of research that supports how altering delay, response effort, and monetary cost will impact eating responses. This research is readily generalized to applications altering diets to more environmentally friendly foods like grains and other plants.

Lawful Behavior

A predictable relationship between operants and consequent environmental changes is stated in Herrnstein's (1961, 1970, 1974) *Matching Law*, which is derived from Thorndike's (1911) *Law of Effect*. The Matching Law remains a useful theory. McDowell, Calvin, Hackett, and Klapes (2017) provide critical examination, stating, with approximation, that the probability of an individual behaving in a choice situation varies as a function of the relative rate of reinforcing or punishing consequences for different behaviors available. Understanding the "reason" for a given behavior requires the identification of relevant contingencies and through manipulation of those contingencies, behavior can be influenced. Behavior is viewed to be lawful to the extent it can always be attributed to contingencies of reinforcement at play. The behaviorist tradition suggests that behaviors, which due to their destructive outcomes (e.g., those degrading the environment) might be called "irrational," are in fact lawful and better understood as sensitivity to certain types of consequences and insensitivity to others. In this light, Americans' decisions to purchase trucks and SUVs over sedans are predictable. Consumers are insensitive to the potential cost-savings of a low/zero emissions vehicle and are not influenced by the environmental impact of this choice.

Delay Discounting

Among many conditions sufficient to produce humans' insensitivities to direct-acting contingencies, one particularly relevant to human-driven environmental problems is the decreasing strength of a reinforcer as its temporal distance from the correlated response increases (Fantino, 1969; Fantino, Preston, & Dunn, 1993; Skinner, 1938). The probability of a given response decreases as the time to reinforcement for that response increases. The strength of a given reinforcer decays as a function of delay to delivery. The reinforcing strength of a given consequence in a direct-acting contingency (as described by Malott, Shimamune, & Malott, 1992 and Weatherly & Malott, 2008) can be markedly reduced when the delay to delivery is increased by just seconds (Skinner, 1938). This phenomenon has attracted much attention in the field of behavioral economics where it is applied to analyze financial choices. Generally, the further a consequence is administered in the future, the less value or control the consequence maintains for the responding organism. This line of research is known as delay discounting.

Delay discounting has been experimentally investigated since the mid-1900s and a considerable body of evidence supports this analysis. Specifically, delay discounting is defined as, "the process by which future events are subjectively devalued by the decision maker" (Madden & Bickel, 2010, p. 3). Research suggests that sensitivity to delays in reinforcement is generalizable across a wide variety of complex human behaviors as evidenced by studies of purchasing behavior in online shopping analogues (DiClemente & Hantula, 2003; Hantula, DiClemente Brockman, & Smith, 2008; Rajala & Hantula, 2000;), environmental stewardship (Hardisty & Weber, 2009), materialistic commodities (Weatherly, Terrell, & Derenne, 2010), workplace safety (Reynolds & Schiffbauer, 2004; Sigurdsson, Taylor, & Wirth, 2013), and social policies (Plumm, Borhart, & Weatherly, 2012). Knowing about variables such as the type of consequences, framing of choices, episodic future thinking, and therapeutic experiences can influence delay discounting (Rung & Madden, 2018a, 2018b) and be organized into interventions to alter environmentally important choices.

Evidence of our insensitivity to delayed consequences is robust. Humans choose immediate rewards over larger but more delayed ones. We consume things that are immediately satisfying at the expense of delayed negative consequences of doing so. The popular book "Nudge" (Thaler & Sunstein, 2009) describes applications of this research to decisions about health, investments, environmental issues, and more. One intriguing area for further research is the effects of language describing choices on how humans discount delayed consequences, both losses and gains, related to environmental choices. Recent work (Rung & Madden, 2018a) shows that even a few words used to describe scenarios (e.g., varying the labeling of consequences) affect the rates at which they are discounted.

Relational Responding

Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001) provides further understanding of why direct-acting contingencies might fail to control behavior. Humans have the ability to derive relations among stimuli and to arbitrarily apply these relations. Derived relational responding describes the common observation of behavior with respect to relations among stimuli not previously trained. The emergence of such responses is observed as a function of other, directly trained relations. For example, a person trained to select B or C in the presence of A, will without direct training select A in the presence of B or C (called mutual entailment or symmetry) and B in the presence of C and vice versa (called combinatorial entailment or transitivity). This is clearly demonstrated in equivalence preparations (Sidman, 1994; Sidman & Tailby, 1982). Further, if A acquires some discernable function, the functions obtained among B and C will transform in accordance to their relation to A. For example, if A is trained as the *opposite* of B and C, people will readily derive that B and C are the *same* without direct training. Moreover, given direct training for the relation $A < B < C$, any function bestowed by the environment upon A will transfer to B and C in accordance with the $<$ relation. So if A is paired with an aversive that occasions an avoidance response, RFT predicts that the magnitude of the response would be greater with B and C even though B and C have never been paired with aversive directly. These predictions enjoy robust support from empirical investigations, and clearly distinguish “relational responding” from the narrower subset of “equivalencing” (Augustson, Dougher, & Markham, 2000; Barnes-Holmes, Barnes-Holmes, Smeets, Strand, & Friman, 2004).

Why is a pickup truck the number one selling vehicle in the US in 2019 when there are more fuel-efficient and useful choices for most consumers? This is a complex analysis of consumer behavior but we can speculate that social influence is highly effective in leading buyers to less than rational choices. We see others driving trucks and hear peers saying that large, powerful vehicles are “cool.” The pickup is valued for multiple reasons and emissions are not likely a big factor. Buyers who think that trucks are best might automatically derive the rule that small, efficient cars are *not* great. These thoughts likely give rise to the aversive sensations associated with social disapproval, and our buyer avoids visiting the electric/hybrid showroom. This avoidance comes at a cost both initially and over time. It may be financially better to buy a hybrid if rebates, maintenance costs, and energy costs are assessed for the expected life of the vehicle. Buying the V8 truck might be a disservice to environmentalist values. The buyer’s avoidance of the full set of considerations and choice of vehicle appears rigid, making it unlikely she would even have a conversation to validate peers’ feelings, or be willing to accept some degree of social disapproval in the service of environmental or fiscal values. The buyer’s repertoire of potential value-directed responses to present direct-acting contingencies is artificially narrowed by the rules she derives. Given relational abilities, the functional effects of most stimuli are a function of the relational responding, irrespective of the direct contingency relations those stimuli might participate in.

Appreciating the role of derived verbal relations in regulating the functions of stimuli in our environment, we suggest that manipulation of the direct-acting contingencies for purchasing behavior is necessary but insufficient. Purchasing behaviors are not simply the result of rational decisions about costs and utility. Choices are the products of the relational network that connects pickup trucks, SUVs, and hybrid vehicles to a myriad of other stimuli, which affect how we value SUVs and hybrids. Valuing products such as electric cars can be acquired and shaped gradually by successive exposures from SUVs, to fuel-efficient cars, and from fuel-efficient cars to hybrid cars, and then to electric cars. Many consumers rely on consumer reports and established records of quality and reliability of products. In short, gradual demonstration of quality and reliability of hybrid and electric cars overtime will result in gradual consumption of associated products.

The sweeping societal changes needed to prevent, adapt, or prepare for global warming must involve more than direct contingency manipulation, especially when massive scale change is needed soon. Providing subsidies to offset the purchase price of high efficiency vehicles is only part of the battle. Consideration of choice behavior in the broader context of variables is needed to scale-up solutions to change the behaviors of large populations. Efforts to alter direct contingencies complimented by educational initiatives and savvy marketing and advocacy campaigns at huge scale are the current, best methods to influence the relevant relational networks of millions of people. Informed by an understanding of arbitrarily applicable relational responding, messages can be crafted with consideration for not only what is explicitly said, but also what rules, relations, and functions are likely derived by consumers. But to reach and influence millions of people will require that hundreds of thousands of organizations be influenced to change their practices. That in turn means that our science must have an effective analysis of the influences on organizations' practices.

The Prediction and Influence of Organization Practices

The massive changes that are needed to address the problem of climate change require that virtually every organization in society change some of its practices particularly related to energy use and fuel sources. It would appear that an immediate halt to planning more fossil fuel plants is needed across the globe. The existing energy infrastructure needs to be de-commissioned and replaced with carbon-free alternatives. This is a massive change in behavior requiring high financial cost in the near term with benefits occurring at a later date. For the purpose of thinking through what changes are needed, consider the various types of organizations and how these might be categorized in search of a strategy for transitioning to a new energy economy.

One key class of organizations consists of nonprofit organizations. A large variety of organization types fall within this category making consideration of their potential contribution to a pro-environment agenda more complex than is true of

for-profit companies. Advocacy organizations are remarkably effective if they have a clear message, funding, communication outlets, and access to community leaders. Consider the massive impact of the NRA in advancing gun ownership in the US and blocking popular desire to control guns. We need similarly effective advocacy groups working to advance carbon free energy, transition to plant-based diets, and reduce greenhouse gas emissions. Biglan and Taylor (2000) describe advocacy efforts to curtail tobacco use and ponder applications to reduce violent crime. Advocacy organizations with conflicting goals also work to prevent policies that would reduce the use of fossil fuels and maximize the value of the vast assets used to find, extract, refine, and deliver fuel. The network of contingencies that link these organizations to others is likely complex and worthy of analysis (Biglan, 2009; Biglan, Glasgow, & Singer, 1990). Clarification of these contingencies and the values of key members may reveal avenues to promote efforts to promote cooperation, enhance effectiveness, and change cultures (Biglan & Cody, 2013; Biglan & Embry, 2013).

There are a wide variety of other nonprofit organizations including churches, public universities, foundations, scientific associations (e.g., ABAI), and civic organizations. These entities affect the problem by influencing their members and the leaders of organizations they contact to support efforts to affect greenhouse emissions. The slow realization in the US general public of the seriousness of global warming, and the outright rejection by some, appears highly influenced by these organizations. Altering the values of organizational leaders tilting them toward more pre-environmental stances appears to be a useful function for nonprofit organizations that educate and influence constituents.

Next, consider governmental organizations ranging from the local city councils, school districts, and various service districts to county, state, and federal levels. These entities affect the problem in at least two ways. First, many of their practices involve combustion of fossil fuels and emissions of greenhouse gases. The fleets of vehicles (e.g., cars, trucks, ships, aircraft) used by the military, postal service, police forces, and so on are massive purchases that see heavy use. The food services across these organizations provide enormous amounts of food to children in schools and workers in job sites. Just a few procurement specialists can influence the behavior of many others who consume what they purchase. Vehicles and other infrastructure burning fossil fuel can be selected with consideration of environmental impact and model commitment to wiser choices. Second, they set and manage contingencies for individuals and other organizations that both affect emissions and influence the norms that effect individual behavior. Governments set tax codes, rebates, emission standards, sanctions, education curriculum, and more that establish the context for much behavior that we could label as “citizenship.” These are vital dimensions for sticky interventions.

The last classification consists of for-profit organizations. These might be divided into: (1) those that stand to lose if fossil fuel and meat product consumption is reduced; (2) those that might gain from reductions in use, either because they sell alternative products or because the adoption of practices that would reduce use would reduce the company’s cost and improve its profits; and (3) companies that

would neither benefit or be harmed by policies that reduce such fuel/diet consumption. Analysis of how companies would benefit or be harmed by these changes would be very helpful in planning, advocating for, and implementing strategies to reduce fossil fuel use and perhaps link these to food choices in those settings. The structure of the organizations and their strategic plans and investments likely reveal how the organizations are designed to defend territories, protect intellectual property, select talent, and invest resources. Analyses to reveal if leaders value environmental resources and will potentially collaborate with other like-minded corporate leaders can create networks to develop sticky interventions that cascade through their supply chains to ultimately affect consumers. For-profit organizations can be engines for invention and distributing innovations to vast markets. The talent and wealth residing within them are likely the greatest human potential already organized to quickly advance the necessary behaviors to address global warming.

Metacontingency

Houmanfar, Rodrigues, and Ward (2010) present a five-term analysis of the selection of practices of organizations that is useful for generating empirical research on how the actions of leaders and their organizational members affecting climate change might be changed. The interlocking behavior of organizational members results in products or services that are purchased (or not) by consumers. To the extent that products are consumed and the productive processes are maintained or expanded as a result, the contingency constitutes what Glenn (2004) has called a *metacontingency*. This same contingency can account for other actions of organizations. For example, the marketing practices of a corporation are presumably selected as a function of their success in generating sales. Public relations and lobbying efforts are similarly selected by their consequences to the profits of the organization or outcomes known to be related to profits.

Houmanfar et al. (2010) note that metacontingency occurs in the context of a cultural-organizational milieu which consists of all of the contextual factors that may function as the antecedents affecting the production of a good, a service, or other organizational outcome. Houmanfar et al. (Houmanfar, Rodrigues, & Smith, 2009; Houmanfar et al., 2015) provide several examples of contextual factors such as properties of materials, resources, policies, rules, traditions, institutions, technological progress, art, other organized groups, competition, and individuals (e.g., society leaders) that are adopted and practiced at the organizational level as cultural-organizational milieu. Examples include the resources available to the organization as well as aspects of the societal infrastructure, such as the regulatory schema within which the organization must operate. In addition, they suggest that organizational leaders may conduct analyses of the results of the organization's transaction with the environment that lead to the generation of rules, policies, and changes in organizational contingencies that affect subsequent organizational actions.

Environmental demands select the interlocked behaviors of organized groups in an analogous way to how operant consequences select the behavior of individuals (Houmanfar et al., 2010; Houmanfar & Rodrigues, 2006). A for-profit organization creating a product that sells better than competitors' products is likely to achieve profits that maintain their production of the product as well as the practices that lead to the creation of the product. Elsewhere, we have described in detail the ways in which diverse practices of organizations are selected by their consequences including those related to climate change (Ardila Sánchez et al., 2019). We can expect for-profit companies to maintain and strengthen practices that have proven beneficial in generating profits. In the case of fossil fuel companies, it is understandable that they will work to prevent any public policy that threatens to reduce the use of fossil fuels, as it will reduce their profits. That in turn will motivate them to influence public opinion to support their policy objectives. Companies that will not be harmed by reductions in the use of fossil fuels can be expected to support policies that reduce their use to the extent that such reductions will improve their profits. This points to the value of seeking policies that will benefit many corporations. Cap and trade policies are examples. These policies limit ("cap") the pollution released by a company. Those companies limiting emissions below their cap can sell ("trade") permits to less effective companies who essentially buy a permit to pollute. The idea is that this policy promotes innovation in control of greenhouse gases and allows leading companies to profit from innovations and lagging companies to buy time to adopt solutions. This is not without controversy and execution of the policies is questioned as a limit on the effectiveness of this approach to reducing CO₂ emissions. Finally, there are companies such as manufacturers of photovoltaic cells that stand to gain from policies designed to reduce fossil fuels. They can be expected to work to garner support for such policies.

Operations of nonprofit organizations are captured by metacontingencies; their survival also depends on a flow of funds into them. They can be expected to engage in activities that ensure or expand their funding. With respect to climate change, we need to be concerned about the flow of funds to organizations that advocate for or against climate-affecting policies. This is itself an issue for public policy. If our goal is to influence societies to adopt policies that curtail greenhouse gas emissions and advocacy organizations are a vehicle for doing so, we also need policies that advantage these organizations. See Biglan (2009) for a more extensive discussion of policies that would strengthen these organizations.

Ultimately it is governments that adopt and enforce policies, invest in research, protect citizens, educate, and govern community resources. One can analyze the actions of governments in terms of metacontingencies. Ardila Sánchez et al. (2019) apply the concept of metacontingency and functions of the cultural milieu to examine how an island devastated by a climate event (Puerto Rico, hurricane Maria) responded to the event and struggled to rebuild. This analysis examined the three behavior options articulated by Thompson (2010). It is instructive to note how this contingency analysis helps reveal entry points for interventions in other settings similarly facing climate disasters. Unfortunately this analysis can be replicated with

other islands struck by hurricanes. As we write this chapter, the Bahamas are in search and recovery modes after hurricane Dorian.

Ruling coalitions can be voted out of office when citizens reject environmental policies as happened recently in Australia. In 2011, their Labor government adopted in a stringent carbon tax and planned to link with European cap and trade policy affecting the use of fossil fuels. Then the newly elected Liberal government repealed the policy in 2014 under pressure from the mining industry which produces the coal fueling much of the Australian economy. Currently (2019) in the US, the government is reversing many climate related policies enacted by the previous administration. Conflict among those with competing interests creates uncertainty for citizens who are exposed to media advocating for or against environmental protection. Arguments against climate protection raise job loss and economic instability as potential costs. For example, the federal government is attempting to repeal the stringent air pollution standards on automobiles in key states such as California, which requires higher restrictions on emissions than a number of other states. This is said to promote jobs but is opposed by a number of states that follow California's standards and at least four major auto manufacturers. It is to be seen how this conflict is resolved and if states are permitted to manage pollution generated by products sold in their states. It is very relevant to discussion of the role of corporations to point out that four automakers oppose lifting the restrictions. This indicates their investment in pollution control technology and is a hallmark of "sticky interventions." At the time of writing this chapter, Puerto Ricans still are struggling to rebuild after hurricane Maria. Citizens rose up against its Governor this summer in response to his administration's mismanagement and corrupt responding during their recovery from Maria. It will be instructive to see the trajectory of devastated communities such as Puerto Rico, the Bahamas, Paradise, CA and others and view the political actions, citizen efforts, corporate contributions, and more engaged with rebuilding. Will all these efforts seek to rebuild and restore previous infrastructures or look forward, per Levin et al. (2012), and adopt reasonable innovations to progress to a healthier climate and more resilient community? The role of government is crucial to enact policies and decide on the best collective course of action.

Can We be Optimistic?

This has been a challenging chapter to write as the scope of the accelerating problems ahead is truly daunting and, despite promising foundation work, it is sobering to contemplate White's (1967) assessment of human's enduring, exploitive, and damaging relation with the natural environment and Skinner's (1987) pessimism based on his understanding of human behavior. We seek advances since their laments that warrant reassessment of their stance that science and technology likely will not lead us out of the crisis. The work on language as crucial to understanding contingencies, the exploration of multilevel selection, and the importance of cultural milieu are entry points for cultural change. These are three areas that offer

opportunity to current and future behavior analysts as they confront the problem. The following section will likely be brief, and hopefully soon be elaborated by contributions of many others engaging with behavior analysis in relation to global warming.

Path Ahead

This chapter, along with some of the other chapters in this text, suggests that the behavior changes needed to prevent continued climate change by getting entire populations to reduce their consumption of fossil fuels is a herculean effort with little time to accomplish meaningful change. Eliminating fossil fuel consumption is only one facet of the population's practices that needs to be affected with shifting diets to more plant-based foods being another significant change. Vast infrastructure supports and maintains these behaviors as the designed environments that currently blanket the earth. Populations of developing nations adopt fossil fuel consumptions and meat-based diets as their cultures become more affluent. Marketing efforts seek new consumers and are effective in perpetuating consumptive practices. Engineering behavioral change associated with fossil fuel consumption and meat-based diets across the globe would be the grandest reinvention of cultural practices ever attempted. It is hard to imagine how humans can quickly organize the invention in the near future absent universal agreement on this. There is no planetary governing authority to manage the endeavor. This does not suggest that efforts should not be attempted. Even approximations to life within a world free of fossil fuels and meat products, although not sufficient to stop global warming, would put humans on a path to living within sustainable boundaries. This behavior change makes us more practiced in terms of being resilient to climate disasters that destroy existing infrastructure. As the environment continues to be depleted of resources upon which humans now rely and climate impacts damage infrastructures, other behaviors of individuals and actions of organizations will be selected. The young population living now, and next generations to be born, will acquire their behavioral repertoires by interaction with their environment and will adapt to the prevailing conditions. Perhaps this adaptation will be characterized as cooperative living with others and with nature itself; perhaps it will be survival of the strongest in the context of conflict over dwindling resources. Preventative behaviors that we adopt now will alter current practices and be resisted by those unable to flex their repertoires. These difficult changes could segue to what the next generation will do as common practice as people design communities intentionally with sustainability as a core principle (Sanguinetti, 2012).

History has shown how times of crisis can drive cooperation and creative methods to organize human behavior. For example, the Pilgrims landing in Massachusetts in 1620 composed the Mayflower Compact to govern how they would proceed as a collective in pursuit of commonwealth in their new world (Sargent, 1988). Half survived their first winter and went on to establish their colony with the help of

Native Americans. The Rochdale Pioneers (1844) were weavers in England who formed a cooperative to survive as famine threatened their families. The weavers codified their cooperative principles, which were soon replicated across England and serve today as the foundation of countless cooperatives. The history of cooperatives and the conditions that promote their emergence is worthy of study as this governance model appears particularly suitable to participative, collective action (Alavosius & Newsome, 2012). Nevin (2010) described how citizens on Martha's Vineyard organized to arrange wind power for the island. The interlocking contingencies and operating systems that maintain cooperative ventures over time (Alavosius, Getting, Dagen, Newsome, & Hopkins, 2009; Alavosius & Newsome, 2012) are ripe with research opportunities to demonstrate application to environmental issues. Deeper understanding of the drivers for organizational behaviors that promote pro-social, pro-environmental practices (Ostrom, 1990, 2009) is needed as climate crises mount.

First, behavior science contributes to developing a replicable technology of contingency management to affect the immediate consequences of individuals' behaviors that involve consumption of fossil fuels and a meat-based diet. Consequences such as data displays of the cost of fuels used in vehicles and buildings are easily provided in all sorts of formats (Wokje, Steg, Vlek, & Rothengatter, 2005). Cost of low versus high emission vehicles, what we pay to transport food and materials, and the approval or disapproval of the individuals' social circles are prominent influences on this behavior. How much longer can scientific organizations hold annual meetings to which attendees fly and in so doing generate massive greenhouse gas emissions? What consequences shift attendance in person at these conferences to participation in web-based conference meetings that do not require vast consumption of jet fuel? The technology exists for this switch but the effort and loss of social connections slows adoption of this behavior. Altering the density of reinforcers and punishers for the behaviors involved is conceptually feasible as various incentives, offsets, penalties, and delays can be organized in contingencies governing the relevant communities. The conditions to occasion this have not yet become salient, certain, and imminent but are on the horizon to expedite action to develop and prepare the resources and tool to organize this.

Manipulating antecedents and consequences (environmental variables) of eating behavior influences the selection, preparation, and consumption responses (Rafacz, 2019). Antecedent variables like changing proximity of a food items and using equivalence to teach appropriate portion sizes can shift dietary choices. Posting caloric and other health information for food has mixed results at best, and might be useful to alter responding if the information is easy to understand and especially so for individuals already motivated to respond to that information. Consequences like tangible and virtual reinforcers successfully increase healthy food selection and consumption. A number of studies combine antecedent and consequence interventions together (multicomponent) to influence healthy eating. Replications across many studies show the utility of behavior science in understanding controlling variables and design of effective behavior change procedures. The following references provide just a sample of work in this area: Epstein et al. (2001), Epstein, Paluch,

Beecher, and Roemmich (2008), Hausman, Borrero, Fisher, and Kahng (2014), Kristal, Levy, Patterson, Li, and White (1998), Loro, Fisher, and Levenkron (1979), Loewenstein, Price, and Volpp (2016), Mahon, Neufeld, Mani, and Christophersen (1984), Morrill, Madden, Wengreen, Fargo, and Aguilar (2016), Normand and Osborne (2010), Papias and Veling (2013), Rozin et al. (2011), Sigurdsson, Larsen, and Gunnarsson (2014), Sonnenberg et al. (2013), Stock and Milan (1993), Thorndike, Sonnenberg, Riis, Barraclough, and Levy (2012), Trucil, Vladescu, Reeve, DeBar, and Schnell (2015), Wansink and Hanks (2013), Winett, Kramer, Walker, Malone, and Lane (1988) and Winett et al. (1991).

Second, behavior science increasingly shows how to motivate green choices (e.g., regarding fuels and diet) by influencing people's relational networks about how these might change in the direction described above. People need to value long-term consequences of their consumption, generate rules and codes of conduct, and frame choices in terms of benefits to them, their children, and their community if they adopt behaviors that lower their carbon footprint. Persuading people to accept that their consumptive behavior has long-term harmful consequences risks influencing them to avoid any action to the problem. Relating desired changes in behavior to positive long-term consequences, such as happiness of their children, approval of friends and neighbors, and recognition from their community can be orchestrated in the cultural milieu. This is a crucial role for socially responsible community leaders and activists. The functions of media campaigns, arts, entertainment, literature, music, and more add to the value of liberal arts education of our children. Such features of culture are not just frivolous decorations. These align, coordinate, and organize movements that shape multiple response classes. It would be useful for religious organizations to take a prominent stand on the issue of global warming and shepherd their members toward action on universal human needs. Multiple organized persuasive efforts can cultivate social circles that make environmental preservation/restoration the "in" thing to do. Climate Strike is one mass movement that appears forward in reasoning and multifaceted to align disparate elements of humanity toward a more sustainable planet.

Third, behavior science can be instrumental in designing contingencies that may change the practices of leaders of organizations that involve the consumption of fossil fuels and selection of diets. These are virtually all organizations and most significant in the transportation, electricity generations, and manufacturing sectors as these generate a large portion of greenhouse gases. Agricultural practices, food distribution, packaging, and preparation to meet consumption create significant emissions. Enacting policies that accelerate innovations in these sectors will disrupt current energy methods, combust less fossil fuel, and reduce generation of gases. Policies that advance carbon capture and sequestration are also needed to lower existing greenhouse gases. As noted above, the two major ways in which we can affect these practices are through changes in the cultural milieu of organizations and changes in the relational networks of organizational leaders.

Policy Science

The scale of behavior change and rapid timeline to address the accelerating problems indicate that important work now in behavior analysis is to identify effective ways to test policies, determine factors crucial to deployment, and convey solutions to policy makers for enactment. Our proposed research methods focus on small-scale testing of behavior change procedures, replication, then larger-scale assessment for deployment systematically when procedures are understood. Research on transferring behavior principles into scalable policies would proceed at the local level, given acquiring the resources to evaluate strategies for getting policies adopted by key stakeholders are much more tractable at this level. Settings like neighborhoods, segments of work organizations, departments or colleges in universities, ABAI Special Interest Groups (SIGs), and other venues where behavior analysts have established footholds offer rapid access to test sites willing and able to examine issues related to sustainable practices with a goal of policies guiding behavior change.

Todorov (2013) articulates applications of the concepts of contingencies, metacontingencies, and selection to the understanding and transformation of cultures. A suite of possible policies and demonstration data on how these are accepted and resisted within the population would be a key result of such research. Systematic research might be resisted by those who feel that time is running out and the organizations hosting the research should push for the best policy, even if it is not the most effective or popular. This rush to intervene calls for participation of various stakeholders in research planning, design, and execution to seek consensus on the goals, methods, metrics, timelines, budget, and more. Training the next generation of researchers in behavior analysis in collaborative, cross-disciplinary research methods would enable progress. Getting any “green” policy adopted by leaders will likely have some benefit although continued examination of unintended consequences would check for harmful consequences. Per Levin et al. (2012), step changes toward a more sustainable and resilient life will alter the norms in the community and get more people to believe that change is possible (recruiting more people to the next effort). Identifying features of communities that effectively promote sustainable practices via systematic applications of behavior science is a potential method to publicize exemplary efforts and promote adoption by others (Luke & Alavosius, 2012). Identification of community factors examines the cultural milieu and seeks to learn how to accelerate other communities’ evolution to more sustainable practices. An accreditation process, along the lines of that used by the Cambridge Center for Behavior Studies (CCBS, www.behavior.org) to check the quality of behavior science application to safety in work organizations might be adopted toward accreditation of behavioral contingencies in organizations and communities related to behaviors key to sustainability and resilience. This accreditation has been pilot tested (Leeming, Hansen, Alavosius, & Reimer, 2013) in the hospital-ity sector but has yet to be implemented by an organization capable of wide-scale implementation. Using the established organizational structures available to

behavior analysts (e.g., work organizations, universities, scientific organizations, advocacy organizations, etc.) as test beds offers the fastest methods to demonstrate the utility of our approach and convey what we have to offer to policy makers.

Summary

The introduction to this chapter highlighted some of the dire consequences if we fail to address climate change. This was followed by an overview of theoretical accounts of relevant behavior of individuals and the practices of organizations. Adaption to the coming climate disasters and associated outcomes (e.g., migration, social conflicts) falls squarely on the shoulders of those living now and the next few generations as their skill sets and resources alter the current trajectory or continues the path to unimaginable devastation. The methods, ideals, findings, organized efforts, and success that the behavior analysis community shows in addressing all of the other problems discussed in these volumes, suggest that this community along with other behavioral sciences can ultimately address the biggest challenge to well-being that humans have ever faced.

The worldwide scale of complexity appears to exceed many national governments' capability to balance their national interests with humanity's interests as nationalism and isolationism are on the rise. Most effective actions are seen at local levels to address immediate threats to defined communities. It is notable when corporations' leaders accept social responsibility as part of their mission. These fragmented efforts fail to address the interconnected events causing the global problem. The 2014 IPCC report concludes,

Effective mitigation will not be achieved if individual agents advance their own interests independently. Climate change has the characteristics of a collective action problem at the global scale, because most greenhouse gases (GHGs) accumulate over time and mix globally, and emissions by any agent (e.g., individual, community, company, and country) affect other agents. International cooperation is therefore required to effectively mitigate GHG emissions and address other climate change issues... International cooperation can play a constructive role in the development, diffusion, and transfer of knowledge and environmentally sound technologies.

How we respond collectively to adapt to climate change is determined by multiple factors that shape our daily behavior. Some responses to prevent climate change are easy like adopting energy conservation practices, recycling, and other behaviors that reduce consumption of fossil fuels. Such changes in individual's behavior are relatively easy and occur almost fad-like within established behavior-changing contexts like market forces, social pressure, and fashion trends.

These are inadequate to alter the course of accelerating global climate change. Levin et al. (2012) propose small steps in a shaping process enable populations, relatively unaffected by changes now, to constrain their future selves and adopt lifestyles that are more sustainable. In some places (e.g., low-lying island nations, communities ravaged by fires and droughts, areas experiencing famines) the human

responses are much more dramatic as people struggle to survive under extreme conditions. We see resilience in the human condition; disasters portend what is ahead. Pro-social action may depend upon first-hand aversive contact with calamity to occasion organization of solutions. This is troubling for the social and behavioral sciences unless we can increase the impact of media accounts of these events and enhance empathy for those suffering.

Many solutions are suggested as scenarios for the future events—including technological gardens that feed the earth's growing population, urban designs that cool overheated cityscapes, alternative energies that power industries and communities, technologies that link peoples' action with meaningful consequences, installations that sequester greenhouse gasses already produced, and even fashion trends favorable to environmental stewardship. Geo-engineering (Biello, 2011) continues with sea walls, dikes, levees, and dams protecting communities. In the end, if meaningful and measurable positive impacts are to be made at all, we will undoubtedly require advances like these, and many more behavior changes. The path is set toward significant reinvention of how humans organize themselves to live sustainably. We hope this chapter is soon a checkpoint in the rearview mirror showing the foundations existent in 2020 leading to upcoming step changes in how humans adapt to a warmer planet.

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Chapter 11

Global Sustainability: A Behavior Analytic Approach



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Sustainability: A Behavior Analytic Approach

We enter now the *Anthropocene*, an epoch defined by human activity. To live in this time bears a connotation: an era of human dominance over nature; a nod to the awesome potential of *Homo sapiens* for collectively yielding systemic change (Crutzen, 2002; Crutzen & Stoermer, 2000). Thus far, our contributions to planetary cycles have been cumulatively destructive. Interdependent systems regulating planetary extremes are showing signs of degradation. Thousands of years of ecological carelessness have culminated in far-reaching threats to Earth's biotic livelihood. Humans have thus far feigned helpless to rewrite a still unwritten fate, but life in the Anthropocene remains unscripted—to package existence as defined by environmental catastrophe is but a choice, a tragedy of the commons that can yet be avoided.

In 1990, the Intergovernmental Panel on Climate Change (IPCC) recapped nearly five decades of environmental study with its first official report released for public scrutiny (see IPCC, 1992). Broad interest in environmental health has long waxed and waned, corresponding in large part to the happenings of global—usually political—affairs. The Gingrich-championed *Contract with America* of 1994, for instance, resulted in the rolling-back of many standing environmental protection

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policies (see Gingrich & Armeiy, 1994; see also Lynch, 2001), while the events of September 11, 2001 forced much of the public spotlight toward the combatting of global terrorism. Yet the potential of *and* for environmental perturbation—a function of accelerated change—has continuously grown, underscoring the need for action to curb pollution and reduce greenhouse gas emission. This first report by the IPCC expanded upon previous documents of similar nature, chiefly describing ongoing concerns, probable long-term threats, and options to address the effects of a changing global climate. The agency has since released four additional assessment reports, maintaining a broad focus and historic emphasis on advancing technologies and scientific practices (see IPCC, 1995, 2001, 2007, 2014).

Notably, these IPCC reports present two distinct avenues for climatic change solution: (a) mitigate the effects of a changing climate, and/or (b) promote adaptation to the outcomes too far gone for realistic or probabilistic preventative measures. More inevitabilities than options, solutions of either type present challenges of global scale. Efforts of this magnitude will be *necessarily* technological and behavioral in nature, as neither solution is alone adequate to generate sufficient change. Consider, for example, the market release of new technology: mass production of environmentally friendly “green” options will have little impact unless a sufficient proportion of the population embraces these choices *and* does so in the intended manner (e.g., reusable water bottles are of little benefit if thrown away after only a few uses). Technologies for social reformation need now keep pace with emerging development from long-standing advances of the global sustainability agenda. Across the many reports by and for environmental science—to and from government officials—social scientists have been called upon for a better understanding of behavior contributing to wasteful living, adherence to newly established sustainable practices, and the potential effects of long-term exposure to environmental pollutants. To this call, social scientists *must be willing to rise*.

As they stand, the contributions of the social sciences are reasonably robust and far-reaching. A rich literature exists examining the correlates of attitudes toward environmental preservation (e.g., O’Connor, Bord, & Fisher, 1999). Many investigators strive to catalogue the variables predicting sustainable living practices—the means by which better choices can be embraced by the general public. These are important and meaningful contributions; we cannot begin to produce broad change unless we understand the thoughts and attitudes that facilitate reformation. Yet these contributions alone will not suffice. Investigation must continue to move beyond attitudes and opinions, correlates and predictors, embracing instead an experimental approach to evaluating human behavior. It is high time our science of behavior, one grounded in empirical methodology and with an outlook conducive to widespread behavioral change, joins the global sustainability conversation.

The purpose of this chapter will be multifold. First, our discussion will work to unpack the concept of sustainability. Next, we seek to outline the unique advantages of a behavior analytic approach to understanding activity at the population level, targeting specifically contributions already made by behavioral researchers toward advancing our understanding of sustainability and/or achieving a more sustainable lifestyle. Finally, we hope to highlight some gaps in the literature and provide direction for those seeking greater involvement in ecologically focused research.

On the Concept(s) of Sustainability

Producing a concise and accurate definition of sustainability has historically proven difficult (see Toman, 1992). Literature spanning several decades and involving scientific figureheads of varying expertise has sparked debate with respect to a number of questions, namely: *what exactly are we sustaining?* For instance, a foremost discussion must focus upon the type of *scarcity* which might result from careless use of resources. Stemming from differing domains of thinking, ecological researchers disagree as to whether the population may be faced with Malthusian scarcity—a finite end to the supply of natural resources—or Ricardian scarcity—a gradual degradation of natural resources, at the end of which no viable provision can be obtained (Hall & Hall, 1984; see also Barnett & Morse, 2011). Further still, these concepts may be divided based on the nature of the commodity under interest (e.g., coal vs. oil). Synthesizing all meanings in a broadly satisfactory fashion (a complex task made more difficult given the vast array of sciences involved in sustainability research) is beyond the scope of the current chapter. Instead, a solitary understanding of the *goals* of sustainability may be a more palpable discussion.

In 1987, the report of the World Commission on Environment and Development (WCED)—known informally as the “Brundtland Report” or *Our Common Future*—outlined the tasks and goals necessary to achieve worthwhile sustainable development (WCED, 1987). From this report, we can distinguish several primary (i.e., of utmost necessity) and secondary dimensions of sustainability. Table 11.1 displays these dimensions, as summarized in part by Holden, Linnerud, and Banister (2014) and Høyer (1999). In many senses, these dimensions create a foundation upon which a working definition of sustainability might be built. The 2005 initiative of Marshall and Toffel to define sustainability synthesized these goals into a far more concise approach to defining sustainable behavior. Accordingly, behaviors of concern in ecological research are those that (a) threaten human livelihood, (b) reduce life expectancy or cause other health detriments, (c) result in the extinction of species or violation of human rights, or (d) otherwise reduce quality of life (Marshall & Toffel, 2005). Expansion of these categorizations with the assumption that these targets might impact organisms at *any time* (i.e., future generations) is a sufficient base from which discussion may proceed.

Table 11.1 Dimensions of sustainable development as outlined by the 1987 WCED report

| | |
|---------------------|--------------------------------------------------|
| Dimension placement | |
| Primary | Preserve long-term ecological viability |
| Primary | Satisfy baseline human need |
| Primary | Promote generational fairness and equity |
| Secondary | Maintain non-fiscal value of natural landscape |
| Secondary | Increase perceived value of natural preservation |
| Secondary | Invite public involvement |
| Secondary | Pursue improved quality of life |

Enter Behavior Analysis: A Science of Behavior

The potency of an effective science of behavior is such that any organism can learn via behavior analytic instruction, as is the understanding shared by *behavior analysts*. The question thus stands—in combatting the behavioral components of a global sustainability crisis, to what extent has behavior analysis lent its expertise? B. F. Skinner was often quoted for his belief that we can “save the world with behavior analysis.” Work emerged from the field which strived to do just that; gradually, behavioral scientists have conducted research with an aim toward unpacking problems of broad societal concern, as is the stated mission of those practicing applied behavior analysis (Baer, Wolf, & Risley, 1968). Yet the scope of this work has been insufficient. As the curtains on his career began to close, Skinner published a paper recording his dissatisfaction with the field as it stood, noting the lack of worthwhile progress in combatting the many grand problems plaguing the globe (Skinner, 1987). Small-scale investigation—while impactful in its own right—was no longer alone adequate, not when the potential for more was so strongly evident and so desperately needed.

In the years following Skinner’s (1987) sentiments, a growing number of behavior analytic studies have been published that overtly evaluate methods to advance global sustainability. Recent years have seen a wide range of methods and topics evaluated and addressed via behavior analytic research. Such is one aim of the current chapter—to shine light on the vast potential of behavior analysis to advance global sustainability. Literature from within the field will be examined in its historical context and for trends; review will focus on both self-identified contributions and those methods which, despite a lack of demonstrated application, may hold potential to help redefine the Anthropocene as an age of human *conservation*.

Foundations of Environmental (In)Action

Concern over human activity as it relates to environmental longevity is by no means a recent development. As early as 1763, Benjamin Franklin expressed concern over changing weather patterns in a letter to American academic Ezra Stiles (B. Franklin, personal communication, May 29, 1763 as cited in Labaree, 1959), and still others expressed concern over environmental practices centuries earlier (e.g., tenth and eleventh century efforts to conserve forest cover; Young, 1978). The turn of the twentieth century marked increased awareness of general environmental issues, including the raging debate of “conservation” versus “preservation” fueled by Gifford Pinchot and John Muir (e.g., the battle over Hetch Hetchy, which continues today). Both conservation and preservation have implications for current conceptualizations of sustainability and remain at the heart of natural resource use and theory within government entities such as the United States Forest Service and the National Park Service.

By the mid-twentieth century, the first meaningful evidence of broad-scale environmental perturbation had been observed. Work conducted at laboratories like Mauna Loa Observatory (MLO) in Hawaii during the late-1950s provided initial detection of increasing concentrations of select atmospheric gasses, chiefly carbon dioxide (CO₂; Keeling, 1978; Mook, Koopmans, Carter, & Keeling, 1983). Stark contrasts between measurements taken before the start of the industrial revolution and those at MLO provided strong evidence for the burning of fossil fuels as responsible for the dramatic change, and early modeling suggested a likely relation between elevated CO₂ levels and mean global temperature. At the time, however, too little was known about the natural fluxes of the planetary carbon cycle to draw definitive conclusions regarding the long-term trends of these gasses (Keeling, 1978).

While the public lent increasing attention to the possible influence of human activity on the *observable* environment (Rachel Carson's *Silent Spring* was released in 1962, helping to fuel a zeitgeist for early environmental concern; see also Aldo Leopold's *A Sand County Almanac*, published in 1949 and largely considered a critical milestone in the American conservation and land ethics movement), Washington focused its attention on the now-obvious health-threat posed by a polluted atmosphere. A series of amendments to the 1955 Air Pollution Control Act led to the passing of the 1963 Clean Air Act—the first move by federal legislation to actively influence air pollution in the U.S. (see Clean Air Act of 1963, 1963). The first report of the Environmental Pollution Panel (EPP) via the President's Science Advisory Committee was generated in November 1965, highlighting the growing concern over environmental pollution and its possible health and environmental effects (EPP, 1965). Within a year, the Task Force on Environmental Health and Related Problems had been assembled to generate—in greater detail than the preceding report—immediate and effective interventions to mitigate environmental detriment (Task Force on Environmental Health and Related Problems, 1967).

In 1968, only a few years after the Task Force report, Baer and colleagues published their seminal article in the newly founded *Journal of Applied Behavior Analysis*, an outlet intended as the self-titled flagship for the newly christened science of social focus. During the years to follow, events that would help to fuel a spirit of environmental concern among the greater population also provided fodder for work in this new branch of behavioral science. Ehrlich's best-selling 1968 novel *The Population Bomb* drew attention to the fantastic strain placed on the planet by our swelling populace. The 1969 publicity surrounding the fouling of the Cuyahoga River in Cleveland served as recognition of human influence, highlighting primarily the issue of irresponsible waste handling practices. By 1970, enough interest backed the movement for the declaration of the nation's first Earth Day, an expansion of the previously passed Clean Air Act, and the founding of the Environmental Protection Agency (EPA). In response to the growing concern over pollution, early behavior analytic contributions emerged, the first of which worked to create cleaner, more livable environments. Burgess, Clark, and Hendee (1971) were the foremost to formally apply behavior analytic principles to issues of ecological relevance: researchers offered inexpensive rewards in exchange for full bags of collected litter. The results, although modest in effect, inspired a wave of environmentally focused

studies from behavior analysts, all of which sought to translate easily sustained procedures for ecological study.

Through the remainder of the decade, independent reports on the interplay between human behavior and the climate were generated in still greater abundance (e.g., the principle report by *The Club of Rome*; Meadows, Meadows, Randers, & Behrens III, 1972; see also SCEP, 1970; SMIC, 1971). Behavior analytic endeavors in global sustainability expanded from litter to home energy-use reduction (e.g., Seaver & Patterson, 1976), recycling (e.g., Witmer & Geller, 1976), and eco-friendly driving practices (e.g., Hake & Foxx, 1978). International interest in global sustainability was strong by the end of the 1970s, culminating in the first World Climate Conference (WCC) in 1979. Behavior analytic research into sustainable living produced the bulk of its early work through the late 1970s and early 1980s, during which time experimentation extended to issues of more complex origin. The quasi-experimental analysis of behavior change tactics in the drought-stricken western United States by Agras, Jacob, and Lebedeck (1980) served as a first attempt to evaluate contingencies scaled for community-level change. Methods by which household and university electricity consumption could be curbed (e.g., Hayes & Cone, 1981) proved promising for widespread rollout. As things stood, the field seemed poised to carve a legitimate place for future development in the sustainability movement.

In 1985, scientists of international origin reached an agreement regarding the probable and impactful elevation of mean global temperature and a changing global climate as the result of elevated atmospheric gas levels (Agrawala, 1998). Climatologist James Hansen delivered his historic testimony before the U.S. Senate Committee on Energy and Natural Resources regarding the danger of elevated greenhouse gas emissions in 1988 and, in the same year, actions were taken that led to the founding of the IPCC. Yet by the turn of the 1990s, ecologically grounded contributions by behavior analysts were in short supply. As compared to the 13 novel studies released in the preceding decade, the field published only four experimental papers examining sustainable practices between 1990 and 1999. The focus of these few had shifted entirely to low-cost environmental manipulations intended to promote recycling—an important line of work, but one that cannot alone progress the sustainability movement.

In the years since, rates of behavior analytic contributions have been in flux. The first decade of the new millennium saw only three articles published in behavioral journals, although these hinted at the diversity of the work to follow. Manuel, Sunseri, Olson, and Scolari (2007) examined inexpensive and easily maintained methods by which cafeteria patrons could be encouraged to choose reusable utensils. A 2013 behavioral economic analysis of fuel by Reed and colleagues represented the first analysis of its kind by a behavior analyst: authors used field-standard approaches to model North American operant demand for fossil fuels (i.e., oil), in turn demonstrating a rate of consumption that parallels patterns seen in drug addiction (e.g., *inelastic* demand at high prices). From 2010 to present, 16 studies have been published focusing on a range of topics and employing cheap and easily implemented treatments—an encouraging sign for behavior analytic development.

The trend is certainly moving in the desired direction, but to truly make an impact these methods must continue to evolve. What follows is a closer examination of these studies, categorized according to target behavior and discussed with respect to intervention focus. Using our established behavioral definition for *un*-sustainable practice, we collected *empirical* literature published in peer-reviewed journals of primarily behavior analytic content (data hosted by Gelino, Erath, & Reed, 2020; see Table 11.2). Articles were coded according to target behavior and—in order to assess the scope of scientific contribution—representative works are here summarized.

An Empirical Approach to Global Sustainability

Transportation

From the bulk of behavior analytic work, we identified seven studies as having a primary aim of promoting more eco-friendly transportation; all focused explicitly on reducing fuel use via less frequent driving or through the promotion of more economical driving habits. Four of these studies—Foxx and Hake (1977), Hake and Foxx (1978), Foxx and Schaeffer (1981), and Hake and Zane (1981)—employed basic odometer monitoring as a primary dependent variable. The earliest, Foxx and Hake, demonstrated a meaningful reduction in miles driven by delivering inexpensive rewards for meeting driving reduction goals; 21 university students achieved a reduction of over 2500 miles in a four-week period, corresponding to an estimated 170 gallons of gasoline. Using similar reward deliveries, Jacobs, Fairbanks, Poche, and Bailey (1982) promoted carpool transportation in a university setting, yielding a cumulative 868 additional carpool trips and an estimated fuel savings of 620 gallons. To provide greater context for the results of these driving reduction mechanisms, authors in all articles state the economic relevance of the reward costs and generated savings—a focus on low-cost or free rewards (e.g., tour of a local mental health facility) yielded in each case results that far outweighed the cost of implementation.

Behavior analytic work in transportation was absent for several decades following, and only recently has the work resurfaced as an emphasis of behavior analytic experimentation. Venditti and Wine (2017) focused on the promotion of regular maintenance to ensure personal vehicles were running at top possible efficiency. Participants were informed of the importance of maintaining proper tire pressure and provided access to a free-for-use air pump at their place of employment. Those who received the informational briefing demonstrated significantly greater adherence to proper tire pressure. Beyond demonstrating the utility of prompting and effort manipulation to yield greater compliance with vehicle efficiency standards, the study underscored the potential for ecologically conscious business practices to generate more responsible action by employees through the implementation of relatively simple, low-cost modifications.

Table 11.2 Empirical studies related to environmental sustainability published in behavior analytic journals through 2019 (sorted by publication date)

| Citation | Target behavior | Intervention ^a |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------|
| Burgess, R. L., Clark, R. N., & Hendee, J. C. (1971). An experimental analysis of anti-litter procedures | Litter | Incentive/ reward Prompting Response effort |
| Clark, R. N., Burgess, R. L., & Hendee, J. C. (1972). The development of anti-litter behavior in a forest campground | Litter | Incentive/ reward |
| Geller, E. S., Farris, J. C., & Post, D. S. (1973). Prompting a consumer behavior for pollution control | Waste/recycling | Prompting |
| Kohlenberg, R., & Phillips, T. (1973). Reinforcement and rate of litter depositing | Litter | Incentive/ reward |
| Powers, R. B., Osborne, J. G., & Anderson, E. G. (1973). Positive reinforcement of litter removal in the natural environment | Litter | Incentive/ reward |
| Chapman, C., & Risley, T. R. (1974). Anti-litter procedures in an urban high-density area | Litter | Incentive/ reward Prompting |
| Hayes, S. C., Johnson, V. S., & Cone, J. D. (1975). The marked item technique: A practical procedure for litter control | Litter | Incentive/ reward |
| Kohlenberg, R., Phillips, T., & Proctor, W. (1976). A behavioral analysis of peaking in residential electrical-energy consumers | Energy use | Feedback Incentive/ reward Information |
| Seaver, W. B., & Patterson, A. H. (1976). Decreasing fuel-oil consumption through feedback and social commendation | Energy use | Feedback Incentive/ reward |
| Witmer, J. F., & Geller, E. S. (1976). Facilitating paper recycling: Effects of prompts, raffles, and contests | Waste/recycling | Incentive/ reward Prompting |
| Foxx, R. M., & Hake, D. F. (1977). Gasoline conservation: A procedure for measuring and reducing the driving of college students | Transportation | Incentive/ reward |
| Hayes, S. C., & Cone, J. D. (1977). Reducing residential electrical energy use: Payments, information, and feedback | Energy use | Feedback Incentive/ reward Information |
| Palmer, M. H., Lloyd, M. E., & Lloyd, K. E. (1977). An experimental analysis of electricity conservation procedures | Energy use | Feedback Information Prompting |
| Hake, D. F., & Foxx, R. M. (1978). Promoting gasoline conservation: The effects of reinforcement schedule, a leader, and self-recording | Transportation | Incentive/ reward Self- monitoring |
| Bittle, R. G., Valesano, R., & Thaler, G. (1979). The effects of daily cost feedback on residential electricity consumption | Energy use | Feedback |

(continued)

Table 11.2 (continued)

| Citation | Target behavior | Intervention ^a |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------|
| Winett, R. A., Neale, M. S., & Grier, H. C. (1979). Effects of self-monitoring and feedback on residential electricity consumption | Energy use | Feedback Self-monitoring |
| Agras, W. S., Jacob, R. G., & Lebedeck, M. (1980). The California drought: A quasi-experimental analysis of social policy | Resource use | Information Penalties/fines Prompting |
| Bacon-Prue, A., Blount, R., Pickering, D., & Drabman, R. (1980). An evaluation of three litter control procedures—trash receptacles, paid workers, and the marked item technique | Litter | Incentive/ reward Response effort |
| Luyben, P. D. (1980). Effects of informational prompts on energy conservation in college classrooms | Energy use | Prompting |
| O’Neill, G. W., Blanck, L. S., & Joyner, M. A. (1980). The use of stimulus control over littering in a natural setting | Litter | Stimulus control |
| Foxx, R. M., & Schaeffer, M. H. (1981). A company-based lottery to reduce the personal driving of employees | Transportation | Feedback Incentive/ reward |
| Hake, D. F., & Zane, T. (1981). A community-based gasoline conservation project: Practical and methodological considerations | Transportation | Incentive/ reward |
| Hayes, S. C., & Cone, J. D. (1981). Reduction of residential consumption of electricity through simple monthly feedback | Energy use | Feedback |
| Slavin, R. E., Wodarski, J. S., & Blackburn, B. L. (1981). A group contingency for electricity conservation in master-metered apartments | Energy use | Feedback Incentive/ reward |
| Van Houten, R., Nau, P. A., & Merrigan, M. (1981). Reducing elevator energy use: A comparison of posted feedback and reduced elevator convenience | Energy use | Feedback Response effort |
| Jacobs, H. E., Fairbanks, D., Poche, C. E., & Bailey, J. S. (1982). Multiple incentives in encouraging car pool formation on a university campus | Transportation | Incentive/ reward |
| Winett, R. A., et al. (1982). The effects of videotape modeling and daily feedback on residential electricity conservation, home temperature and humidity, perceived comfort, and clothing worn: Winter and summer | Energy use | Feedback Information Modeling |
| Jacobs, H. E., Bailey, J. S., & Crews, J. I. (1984). Development and analysis of a community-based resource recovery program | Waste/recycling | Prompting Response effort |
| Winett, R. A., Leckliter, I. N., Chinn, D. E., Stahl, B., & Love, S. Q. (1985). Effects of television modeling on residential energy conservation | Energy use | Information Modeling |
| Keller J. J. (1991). The recycling solution: How I increased recycling on Dilworth road | Waste/recycling | Feedback Incentive/ reward |
| Austin, J., Hatfield, D. B., Grindle, A. C., & Bailey, J. S. (1993). Increasing recycling in office environments: The effects of specific, informative cues | Waste/recycling | Prompting |

(continued)

Table 11.2 (continued)

| Citation | Target behavior | Intervention ^a |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------------|
| Brothers, K. J., Krantz, P. J., & McClannahan, L. E. (1994). Office paper recycling: A function of container proximity | Waste/recycling | Response effort |
| Ludwig, T. D., Gray, T. W., & Rowell, A. (1998). Increasing recycling in academic buildings: A systematic replication | Waste/recycling | Response effort |
| Staats, H., van Leeuwen, E., & Wit, A. (2000). A longitudinal study of informational interventions to save energy in an office building | Energy use | Feedback Prompting |
| Schroeder, S. T., Hovell, M. F., Kolody, B., & Elder, J. P. (2004). Use of newsletters to promote environmental political action: An experimental analysis | Other practices | Information Modeling |
| Manuel, J. C., Sunseri, M. A., Olson, R., & Scolari, M. (2007). A diagnostic approach to increase reusable dinnerware selection in a cafeteria | Other practices | Information Prompting Response effort |
| Bekker, M. J., Cumming, T. D., Osborne, N. K. P., Bruining, A. M., McClean, J. I., & Leland, Jr., L. S. (2010). Encouraging electricity savings in a university residential hall through a combination of feedback, visual prompts, and incentives | Energy use | Feedback Incentive/ reward Prompting |
| O'Connor, R. T., Lerman, D. C., Fritz, J. N., & Hodde, H. B. (2010). Effects of number and location of bins on plastic recycling at a university | Waste/recycling | Response effort Stimulus control |
| Hirst, J. M., Miller, J. R., Kaplan, B. A., & Reed, D. D. (2013). Watts up? Pro AC power meter for automated energy recording: A product review | Energy use | Product review |
| Reed, D. D., Partington, S. W., Kaplan, B. A., Roma, P. G., & Hursh, S. R. (2013). Behavioral economic analysis of demand for fuel in North America | Other practices | Behavioral economic |
| Frazer, P., & Leslie, J. (2014). Feedback and goal-setting interventions to reduce electricity use in the real world | Energy use | Feedback Goal setting |
| Camargo, J., & Haydu, V. B. (2016). Fostering the sustainable use of common-pool resources through behavioral interventions: An experimental approach | Resource conservation | Feedback Information |
| Miller, N. D., Meindl, J. N., & Caradine, M. (2016). The effects of bin proximity and visual prompts on recycling in a university building | Waste/recycling | Prompting Response effort |
| Pandey, N., Diller, J. W., & Miller, L. S. (2016). E-mailed prompts and feedback messages to reduce energy consumption: Testing mechanisms for behavior change by employees at a green university | Energy use | Feedback Prompting |
| Clayton, M., & Nesnidol, S. (2017). Reducing electricity use on campus: The use of prompts, feedback, and goal setting to decrease excessive classroom lighting | Energy use | Feedback Goal setting Prompting |
| Desrochers, M. N., & Mosher, H. (2017). Evaluation of an informational and behavior change program to increase students' self-reported energy conservation | Energy use | Feedback Goal setting Information |

(continued)

Table 11.2 (continued)

| Citation | Target behavior | Intervention ^a |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------------------------------------------------|
| Fritz, J. N., Dupuis, D. L., Wu, W. L., Neal, A. E., Rettig, L. A., & Lastrapes, R. E. (2017). Evaluating increased effort for item disposal to improve recycling at a university | Waste/recycling | Prompting Response effort |
| Jadro, B. V. (2017). The use of an onboard diagnostic device to provide feedback on driving behaviors related to fuel economy | Transportation | Feedback Goal setting |
| Schultz, N. R., Kohn, C. S., & Musto, A. (2017). Examination of a multi-element intervention on college students' electricity consumption in on-campus housing | Energy use | Feedback Incentive/ reward Prompting |
| Venditti, G. A., & Wine, B. (2017). Effects of decreased response effort and task clarification on proper tire pressure | Transportation | Response effort |
| Kaplan, B. A., Gelino, B. W., & Reed, D. D. (2018). A behavioral economic approach to green consumerism: Demand for reusable shopping bags | Other practices | Behavioral economic |
| Szczucinski, D., Gelino, B. W., Cintron, C. J., Becirevic, A., & Reed, D. D. (2019). Increasing appropriate composting in high-traffic university settings | Waste/recycling | Information Prompting Response effort Stimulus control |

^aPrimary intervention presented coding difficulties in that, often, treatments were broadly classifiable according to multiple categories (e.g., stimulus control vs. prompting). We attempted to simplify the coding process by using direct wording of authors wherever possible

Waste Disposal

The choices we make with respect to how we handle our waste will have lasting impacts. We flagged 11 articles from among the greater body of literature as focusing on sustainable waste management, all of which evaluated the ability of simple *nudges* (see Thaler & Sunstein, 2008) toward more active consumer recycling. Interventions targeting a wide range of demographics were conducted in office settings (e.g., Austin, Hatfield, Grindle, & Bailey, 1993; Brothers, Krantz, & McClannahan, 1994), neighborhoods (e.g., Jacobs, Bailey, & Crews, 1984; Keller, 1991), university buildings (e.g., Ludwig, Gray, & Rowell, 1998; Miller, Meindl, & Caradine, 2016; O'Connor, Lerman, Fritz, & Hodde, 2010), university dorm halls (e.g., Witmer & Geller, 1976), and storefronts (e.g., Geller, Farris, & Post, 1973).

Of the methods employed, none required any notable cost for continued upkeep. For instance, four articles evaluated the effects of recycle bin relocation, thereby assessing the role of effort to disposal and proximity to other waste receptacles in promoting adherence to responsible waste management. Six articles used prompts or informational signage to encourage more frequent and compliant recycling by study participants, and only two studies involved the delivery of direct monetary compensation. Witmer and Geller (1976) used flyers and small, inexpensive raffle and competition rewards to promote recycling on a college campus. Similarly,

Keller (1991) offered the purchase and delivery of a grocery store gift card of modest value to a local homeless shelter if two local neighborhoods were able to meet recycling goals. All studies thereby demonstrated sustained, marked increases in recycling via simple and cost-effective procedures.

Energy

The curbing of energy use has been thus far the most fruitful area of sustainability-focused research in behavior analytic experimentation. We identified 21 articles as having a focus on eco-friendly energy practices, all of which were working toward a meaningful reduction of electricity or fuel-oil consumption. Studies proposing potential interventions evaluated efficacy in university residence halls (e.g., Bekker et al., 2010), residential locations (e.g., Kohlenberg, Phillips, & Proctor, 1976), office settings or university administrative buildings (e.g., Staats, van Leeuwen, & Wit, 2000), and classrooms (e.g., Clayton & Nesnidol, 2017); one additional study assessed an intervention to reduce cumulative everyday energy use (i.e., pledges to keep certain devices powered off more frequently; Desrochers & Mosher, 2017). The majority of these works were published prior to the year 2000, with only nine original studies published in the last 20 years having a focus in energy-use reduction.

Research in this area embodies a wide range of behavior analytic methods and principles. Seaver and Patterson (1976) achieved modest reductions in household heating oil consumption by mailing feedback slips containing information on past and present fuel consumption and the difference in monetary terms to customers following oil deliveries. Reductions in oil use resulting from feedback delivery averaged 31 gallons per household, with some participants saving over 50 gallons—a figure indicative of substantial savings if generalized to the greater community. Similarly, Kohlenberg and colleagues (1976) used feedback and incentives to reduce household electricity use during times of peak energy demand. Participants' living spaces were fashioned with a lightbulb that would shine to signal periods of electricity consumption exceeding 90% of the preceding 2 weeks' average. Paired with a rebate scaled to the degree of electricity use reduction achieved, feedback delivery consistently curbed energy use during times of peak consumption. More recently, work in this area has shifted toward examination of modern assets as change agents for sustainable behavior. Pandey, Diller, and Miller (2016) used e-mail as a medium for prompts and feedback to reduce electricity consumption by occupants of administrative buildings on a college campus.

From this bulk of energy-concerned works, several studies demonstrate relatively unique applications of behavior analytic technologies. Van Houten, Nau, and Merrigan (1981) examined the use of feedback—the amount of energy used in the preceding week—and modulated response effort in the form of delayed door opening to discourage wasteful elevator rides. Door opening times ranging from 16 to

34 s resulted in significantly fewer elevator trips and a subsequent savings of 32.9 kWh/day in the target setting. Such extensions of the literature that produce easily implemented procedures are instrumental to curbing energy use on a global scale, particularly if human reliance upon nonrenewable and pollutive sources of energy is to continue.

Resource Conservation

Whether through overuse or pollution, human activity poses a threat to natural resources. In the area of resource conservation, the literature review revealed ten investigations self-labeled as having interest in ecological responsibility. Among these, two—Agras et al. (1980) and Camargo and Haydu (2016)—were focused on reducing irresponsible resource consumption via simple prompts and variations on information delivery. For example, the latter of these employed a virtual fishery game in which respondents could catch fish to be exchanged for real-world money. Periodically, players were prompted with messages concerning the rate of fish reproduction and the dwindling resources remaining; those that received informational messages demonstrated more sustainable practice (Camargo & Haydu, 2016).

The remaining works in this category attempted to address refuse litter via a mix of behavior analytic methods. These studies primarily worked to incentivize the *cleaning* of already-deposited litter, often capitalizing upon inexpensive incentive delivery systems to generate the greatest rate of cooperation. For instance, Hayes, Johnson, and Cone (1975) used a probability-based payout system (e.g., *marked item*) to incentivize litter collection. Practices such as these can be readily administered on a large scale to generate meaningful improvements to ecosystems for which habitability is threatened by human influence.

Education & Other Sustainable Living Decisions

Sustainable decision making faced by the everyday consumer inevitably extends well beyond the easily categorized behavior thus far discussed. The pervasive nature of ecological responsibility is one that demands a more informed populace—one that can recognize the potential detriments of poor choice and skeptically evaluate the benefits of supposed eco-friendly practices (or misinformation campaigns). In politics especially, a voting body more aware of the probable outcomes of various propositions can establish momentum for a comprehensive environmental protection plan. The full scope of the applications of effective education on environmental responsibility is far too broad for effective summary, but here we take this as an umbrella category for the less obvious, day-to-day decisions that separate the average consumer from the everyday sustainability warrior.

Of the literature reviewed, we recognized three studies as having some emphasis on the promotion of sustainable decision making in everyday contexts. Flagged works focused primarily on generating more interest in reusable products—cafeteria dinnerware (Manuel et al., 2007) and shopping bags (Kaplan, Gelino, & Reed, 2018)—to prevent excessive waste. Alternatively, Schroeder, Hovell, Kolody, and Elder (2004) examined the use of newsletter prompts to increase environmentally driven political action by business leaders for whom the local natural environment was essential for business operation. Six weeks of newsletter delivery containing models for political outreach resulted in a significant proportion of sampled individuals contacting political or organizational leaders (46% of the experimental group). Extension of these techniques could have far-reaching implications should they continue to show efficacy in generating pro-environmental political action.

The View from the Bottom: Recapitulation, Reevaluation, and Redirection

In considering the literature highlighted in this review, there are notable trends present. For instance, as has been indicated, these procedures mostly embody low-cost, low-effort approaches to generating behavior change. Much like the *nudges* discussed by Thaler and Sunstein (2008; see also Simon & Tagliabue, 2018; Tagliabue & Sandaker, 2019), the interventions discussed here are socially valid—a foremost priority of applied behavior analysis—and easily maintained environmental modulations. Such is a critical basis from which to develop a global package for sustainable living, particularly when considering the general societal preference for pull motivation, or encouraged compliance that does not feel forced (as opposed to the more easily recognized push motivation; e.g., bans, fines).

To produce meaningful change without resorting to aversive tactics—as, again, embodied by the *nudge*—is to seamlessly integrate sustainable and renewable practices into the lives of those who might otherwise fight to preserve their familiar comforts. However, greater attention is needed in a number of areas to fully address change in favor of a more conducive environment for sustainable living. We shift now toward discussion of viable next steps for producing greater contribution to global sustainability.

Systems Level Analysis

Although there are clearly behavior analytic interventions that have shown to be effective at increasing sustainable practices at the individual level, these interventions alone will not be enough to affect climate change and other anthropogenically influenced environmental detriments (e.g., species extinction) in a meaningful way.

Thus, behavior analysts need to be thinking about broad-scale changes including targeting behavior of corporations and yielding change at the cultural level. Encouragingly, there is a growing literature in behavior analysis on cultural phenomena (e.g., see Seniuk, Cihon, Benson, & Luke, 2019). Although a full discussion of these concepts is beyond the scope of this chapter, we highlight two concepts that could be beneficial for impacting sustainable practices in cultural systems.

Macrocontingencies Macrocontingencies are “operant behavior governed by individual contingencies [resulting in] ... a cumulative effect of social significance” (Glenn et al., 2016, p. 19). In other words, the cumulative effect of many people’s behaviors can have a positive (or negative) effect on socially significant outcomes. For instance, if “50% of the world’s population restrict their diet to a healthy 2500 calories per day and reduce meat consumption overall [it is estimated that] at least 26.7 gigatons of emissions could be avoided from dietary change alone” (with those emissions being the product of permanent behavior change and an accumulation over 30 years from 2020 to 2050¹; Project Drawdown: Solutions, 2019). Thus, if many people ate fewer calories and less meat, the cumulative effect could result in a significant decrease in carbon emission. One means for this type of change is by taking evidence-based units shown to be effective for changing individual contingencies, known as evidence-based kernels (e.g., Embry & Biglan, 2008; Luke & Alavosius, 2012), and disseminating them to a larger population. This might be done, for instance, by requiring that federal policies mandate school cafeteria environmental arrangements or visual feedback to students (i.e., evidence-base kernels) that promote plant-based food choices during lunch.

Metacontingencies The metacontingency describes a “contingent relation between (1) recurring interlocking behavioral contingencies having an aggregate product and (2) selecting environmental events and conditions” (Glenn et al., 2016, p. 13). This concept highlights situations wherein behavior of one or more individuals is interdependent on—and thus, directly connected to—another individual’s behavior in order to create a product or intended effect, which is then selected by the actions of an external environment.

As it relates to sustainability, the overfishing of sharks—a direct outcome of shark finning—may serve as an example. In order to create the aggregate product (i.e., shark fins), there are recurring interlocking behavioral contingencies operating on, for example, individuals employed in the shark fishing industry. Each employee, with their varying roles and responsibilities, plays an integral role in providing the given product, which is then purchased by consumers in the external environment (i.e., a cultural consequence). Thus, in order to impact such a metacontingency, the behavior of policymakers and other regulatory bodies may be of keen interest as a target. To have a more widespread effect on the use of sustainable fishing practices,

¹For reference, the United States was responsible for the release of approximately 6.5 gigatons of CO₂ in 2017 (EPA, 2019).

such an intervention should not focus on the fishers or a singular fishing company; rather, it should focus on the antecedents and consequences for the policymakers and regulatory bodies who could write the policies and regulations that are needed for effective behavior change at the systems level.

With these considerations in mind, those who want to target sustainable practices should consider who is best to target in the system (e.g., policy makers) and the contingencies in place for those people (e.g., elections, funding, regulations) that will promote or hinder sustainable practices or kernels. Large conglomerate organizations are among the greatest threats to global sustainability—changing the patterns and demands of their consumers may well be the most viable option for forcing adaptive outcomes (e.g., the servicing of power grid infrastructure to support widespread “green” energy use; greater availability of meat-alternative or vegan-friendly food choices). This approach does present barriers. Namely, it is more difficult to impact the environment of the people who can make the biggest change in the system. However, other chapters in this book, including Chaps. 8, 16, and 17, provide additional guidance for that work.

Targeted Behavior Change

Further, our efforts should be guided by those more versed in the environmental impacts of behavior. Referring to our historical analysis, empirical work has in large part followed the general buzz of sustainability discussion. Behavioral researchers should accept a leading limitation in our foray into environmental studies—we typically have no training in environmental studies. “Recycling” has long been a hot topic of environmentally conscientious observers, yet the extent to which an improved recycling cooperative is likely to yield a meaningful difference in carbon emissions is all but unknown to the prototypical behavior analyst. Of perhaps greater concern—are recycling efforts yielding *any* meaningful change? Might we be better off allocating our efforts toward, say, promotion of more efficient driving practices? Moreover, are there sufficient systems in place to ensure efforts are met with comparable outcomes? If 90% of Americans took the time to sort their plastics from their papers, this might be wasted effort if only a small fraction of those materials avoids a landfill. An ever-resolute focus on everyday behavior is the cog upon which all other research in the system depends, but our literature review suggests efforts by behavioral scientists might be more impactful if informed by the extant literature of other physical and social sciences.

We must now rely upon those who have laid the groundwork and allow the efforts of others to inform and guide our own unique expertise. As behavior analysts continue considering novel approaches to promoting sustainability, we implore them to give time toward prioritization of sustainable development. Many such hierarchies of sustainable development—lists outlining the most impactful habits with respect to carbon footprint—are available for use when planning interventions. As a starting point, we offer reference to the work of Hawken and colleagues in their 2017 novel

Drawdown. Together with a body of environmental scientists, Hawken outlines a plan for curbing carbon emissions and increasing sustainable development on a community scale. Often unconsidered infrastructural deficits, for instance inefficient tactics for refrigerant (e.g., chlorofluorocarbons, or CFCs) disposal, receive their due spotlight for a continuing role in planetary system change. Let us collectively stick with what we know best and consult with others when solutions move beyond our plane of expertise.

Along these lines, behavior analysts should be making efforts to delve into interdisciplinary, collaborative efforts. We need to now leverage partnerships with others to produce more meaningful, more impactful studies that cut to the core of a targeted issue. This may require reinterpretation of research methods: alternative designs are suited for alternative circumstances (e.g., Biglan, Ary, & Wagenaar, 2000; see also Flay et al., 2005). Combining the expertise of those grounded in public policy, Earth sciences, renewable energies, ecology, conservation sciences, or a similar domain with the principles and concepts of behavioral science is likely to yield far more impactful research than what has been observed to date.

Necessarily interwoven with improved selection criteria and a fruitful systems analysis, behavioral empiricists should consider the efforts required by everyday individuals to produce lasting change. Maintenance of intervention effects is a leading concern, but what we propose here focuses greater attention on the role of the previously discussed “nudge.” Behaviors of interest—within the domains highlighted by groups like Hawken and colleagues—should be those that require the *least* effort from the organisms upon which change is hinged. For example, a common target for sustainable development is energy consumption by the everyday household—how might we curb unsatisfactory electricity use? Historically, efforts have pursued reduced energy habits as a means of reducing carbon footprints. Yet with systems adapting to support the gradually increasing demand for renewable energies, efforts might instead promote transfer from nonrenewables to clean, albeit potentially more expensive sources of energy. Such a change would be a summative low-effort response by the household, one which would require little ongoing effort to maintain, but would decrease said household’s carbon footprint.

Of course, not all behaviors are well-suited for such a frame. Water consumption, for instance, is a domain that requires immediate intervention without room for shortcut; selecting a detergent-free dishwashing soap—a choice that could lead to significantly lower effort public water treatment—might serve as a viable target for intervention. Too, infrastructure must catch up to social development before many at-present complexities can be resolved with straightforward methods. Purchase of zero-emission electric vehicles is practical primarily for those who commute short distances—a limitation of battery capacity—and for those with access to a readily available charging source within range of their typical vehicle stationing location. (We also note that battery assembly presents its own complication given the dependence on externally sourced precious metals.) Ultimately, understanding and promoting practices such as these could serve as a vital step toward systems level development, in that greater societal demand often yields more progressive effort

(see Lin, Tan, & Geng, 2013; see also Cohen, Lobel, & Perakis, 2015; Coombs, Green, Richards, & Walsh, 2001).

Conclusions

Behavior analysis has—at present—a respectable body of literature documenting the efficacy of long-standing principles to bring about more sustainable living. These interventions span a relatively wide berth of targetable behaviors, not limited to energy conservation, waste handling, and resource conservation. As a next step, future research might seek to address areas of sustainability that have thus far remained understudied. Dietary change and political action are critical behaviors to understand but are largely absent from behavior analytic sustainability literature, and thus may embody meaningful targets for future work (the former having an already robust body of research in other areas of ABA; see Rafacz, 2019; see also Bachmeyer, 2009).

Additionally, research should continue to evaluate the ability of novel behavioral procedures—those that have not yet been applied to behaviors of environmental relevance *or* applied on a community scale—to bring about meaningful change (e.g., establishing more eco-friendly driving practices via implementation of procedures described by works like Van Houten, Nau, & Marini, 1980 and Van Houten & Nau, 1983). Further, new work should be ever focused on the “bigger picture:” that research must be capable of informing policy, or should itself be an evaluation of potential policy-driven effects. Our most important work may well be that which yields results directly scalable for policy use or community intervention. Such a shift in research focus may necessarily involve, in some cases, sacrificing hallmark features of behavior analytic intervention. Direct observation of behavior becomes far more difficult when studies are scaled to community levels, and so behavior analysts must be making use of the various methodological tools at their disposal (e.g., interrupted time-series experiments; Biglan et al., 2000). Behavioral economic measures, particularly those suited for use in traditionally difficult-to-measure circumstances (e.g., hypothetical purchase task; see Roma, Reed, DiGennaro Reed, & Hursh, 2017) may also be looked to as means of exploring possible policy effects.

More broadly, future research should also seek to address the limitations of the current literature review. The suggestions offered here embody only those informed by works published by behavior analytic journals, but this by no means encompasses all behavior analytic scholarship (i.e., that published outside flagship journals; e.g., DeLeon & Fuqua, 1995; Geller, Erickson, & Buttram, 1983). Truer still, the methods of generating said literature can certainly be improved upon; alternate keywords and a more expansive database list would likely yield a greater body of work. The list presented here is thus a demonstration—a representation of the field as members of other sciences are likely to observe. Readers might also turn to existing quantitative analyses of the literature, such as that presented by Osbaldiston and Schott (2012).

To revisit the concerns expressed by Skinner (1987), the field indeed seems to have *begun* to meet the call to action, but much work remains. Behavior analysis embodies the practices and rigor required to produce truly impactful methods for promoting sustainable change on a global scale, but the broad translation and assessment of these methods with behaviors of environmental concern is a necessary first step. To this end, behavior analysis has only begun to generate a meaningful body of literature, and so the task falls to the newest generation of behavior analysts. As the climate continues to warm and planetary systems change, the need for behavior change will grow ever more dire. Solutions must be capable of addressing issues on two fronts: climatic change will force adaptation, while mitigation efforts proceed in preventing a fall to ruin. Rising to the call and meeting the challenges ahead is the only approach we can take should we hope to avert catastrophic outcome. As a species we may have entered the Anthropocene, but the dice have not yet been cast. With equal contribution from all sciences—physical and social—we can yet rewrite expectations for the generations to come.

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Chapter 12

Can Stories Influence Sustainable Behavior?



Lyle Grant and Melanie Forrest

Stories or narratives are a central part of our lives. Some stories, in the form of myths, are believed to have originated in prehistory and passed down through memorized songs and chants even before the appearance of a written language. Stories entertain young children, teach them how the world works, and provide a platform for learning language. Stories are the basis for historical knowledge, sacred religious beliefs, practical wisdom, much of advertising, entertainment, and persuasion, all of which give people a collective basis for a shared culture.

The possibility that stories might be understood in terms of behavior analytic principles has been heightened by the insight that stories make use of establishing operations (Michael, 1993) to motivate reading or listening to stories (Grant, 2005, 2007b; Hine, 2018). This recognition has many implications for research and conceptual analysis (Critchfield, 2018). One of these is that narratives need not be considered as a separate realm, as Meichenbaum (1993) has suggested, but can be encompassed within the domain of functional analysis and in doing so can provide another level of analysis, in a storied context, for understanding behavior. Narratives are widely discussed in political and economic discourses (Haidt, Graham, & Joseph, 2009), which can now be more readily understood in behavioral terms (Snyckerski, Laraway, Gregg, Capriotti, & Callaghan, 2018).

In one sense, the idea that stories change behavior is nothing new. Educators have used Aesop's fables, created in ancient Greece, for centuries to impart intelligent and ethical behavior to adults and children (Aesop, 2002). Biblical stories have provided the basis for ethical behavior in Western culture. Darwin's (1859) *On the Origin of Species* presented a factually documented story of how organisms change over time, a narrative that continues to have a profound influence. More recently, an experimental literature has accumulated showing stories can change behavior (e.g., de Graaf, Sanders, & Hoeken, 2016). For example, stories can be effective in

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changing empathetic behavior (Kidd & Castano, 2013) and improving the social behavior of autistic children (Chan & O'Reilly, 2008).

Our specific concern here is to consider the possibilities for influencing environmentally sustainable behavior through stories. Both Michaels (2011) and Korten (2015) have suggested that stories drive decisions people make about the environment and that in the current era an entirely economic story has come to govern both individual and collective decision-making. The dominant economic story, or master narrative, has elevated economic motives, especially those important to the wealthy and to large corporate interests, above stories of environmental health and sustainability, resulting in an inability to address the climate crisis, among other harmful effects. Behavior analysts generally have proceeded with the working premise that in order to solve societal problems, it is necessary to change behavior. Many of those who see stories as central to human life would agree with this general premise, but with the amendment that the behaviors we need to change are the stories we tell ourselves about our lives, our world, and the problems we face. In this chapter, one of our purposes is to examine how stories are implicated and ought to be implicated in changing behavior to solve societal problems.

Understanding how stories can assist in solving any problem requires some knowledge of how stories ought to be defined and the functional relations that play a role in stories, so we will first address these issues. We initially define a story using Todorov's (1977) general-purpose template, then exemplify it in the story of ozone-depletion crisis. We describe the behavior-analytic concept of a story establishing operation (Grant, 2005). We then consider the idea, increasingly popular in psychology that people form a story-based autobiographical self-concept that influences their behavior, a concept that can be altered through therapeutic reauthoring. We explain how stories can mislead, and how the influence of a narrative is governed by the principles of story coherence and fidelity. Finally, we examine how stories can promote pro-environmental behavior, including explicitly recognizing the control stories exert over behavior, the specific influence of the money-and-markets story, the application of cultural reauthoring to reorient society toward sustainability, integrating narrative communication as an essential part of science, employing fictional narratives to illustrate the consequences of sustainable and unsustainable practices, and teaching students skills in narrative literacy.

What Are Stories?

The dictionary definition of a story is "an account of incidents or events" (Story, n.d.). Stories describe real or imagined events, establishing causal chains among those events. As William Cronon (1992) observed of historical writing, "...we configure the events of the past into causal sequences--stories--that order and simplify those events to give them new meanings" (p. 1349). Individual facts unconnected from one another lack what we call meaning, significance, or importance. We have to turn to a story to connect events and facts. As Danto (1985) described it:

To ask for the significance of an event, in the historical sense of the term, is to ask a question which can be answered only in the context of a story. The identical event will have a different significance in accordance with what different sets of later events it may be connected. (p. 11)

In behavioral terms, stories describe functionally connected sequences of a person's behavior, together with establishing operations, discriminative stimuli, and behavioral consequences so as to tie those behaviors to their environmental contexts. This means of describing behavior differs from the way the behavioral sciences typically describe behavior, as discrete measurable units in order to determine verifiable functional relationships. The scientific approach can describe and derive the abstract relationship between behavior and its consequences. Yet that approach is not useful for describing, for example, the historical sequence of events that led to the beginning of World War II. The task of historians who examine past events in lived time (or real time) is to nominate and submit evidence for a particular functional account of past behavior not subject to experimental analysis. Stories, both historical and personal, are valued as important because they are situated in a nonabstract lived-time context that affects us collectively and individually. This importance extends even to fictional stories provided that they plausibly depict events of the sort that are similarly implicated in our collective and personal lives. As Swartz (1979) observed: "To the extent that psychological methods obscure significant facts of individuality, or empty behavior by isolating events from their full life context, literature can supply the necessary corrective" (p. 1027).

Todorov's Story Framework and an Example

Stories are more than descriptions of a sequence of causally linked events and behaviors. In particular, there has to be an initiating event that disturbs an existing order and sets other events in motion. Todorov's (1977) definition of a story incorporated this initiating event in his equilibrium-based approach:

The minimal complete plot consists in the passage from one equilibrium to another. An "ideal" narrative begins with a stable situation which is disturbed by some power or force. There results a state of disequilibrium; by the action of a force directed in the opposite direction, the equilibrium is re-established; the second equilibrium is similar to the first, but the two are never identical. (p. 111)

Grant (2007b) described (a) the initial state of equilibrium as "baseline equilibrium," (b) the event that induces disequilibrium as a "disruptor," (c) the set of actions to restore equilibrium as an "antidisruptor," and (d) the second state of equilibrium as "final equilibrium." For example, consider a story of the depletion of Earth's ozone layer, which we will cover in a highly condensed form here. Situated in the stratosphere, between eight and 50 km above the Earth's surface (McElroy & Fogal, 2008), the ozone layer is thickest at the equator, tapers along the middle latitudes, and is thinnest at the poles. It plays an important role in absorbing ultraviolet

radiation and thereby protecting plant and animal life from a variety of harmful effects of excessive radiation, including human skin cancer. Instruments had been devised to measure the ozone layer in the late 1920s and early 1930s. Interest in the layer was heightened in 1974, when two chemists, Sherwood “Sherry” Rowland and Mario J. Molina, proposed a theory consisting of three main ideas: (a) chemicals called chlorofluorocarbons (CFCs), widely used in aerosol spray cans and in refrigeration, were being released into the lower atmosphere; (b) the CFCs rose over a period of years to the upper atmosphere, the stratosphere, where the ozone layer is located; and (c) the CFCs were split apart by the strong ultraviolet radiation in the stratosphere, releasing chlorine atoms, which in turn reacted with and removed the ozone molecules. This model of ozone depletion quickly had a powerful impact: “The revelation that mundane items like hair spray could destroy the Earth’s ozone and increase cancer rates produced a media firestorm” (Oreskes & Conway, 2010, p. 112).

What is now known as the ozone war then ensued. On one side were scientists, citizens, and politicians who favored restricting CFCs and on the other were CFC manufacturers, who funded their own research and a public-relations counternarrative to portray CFCs favorably. As Dotto and Schiff (1978) described: “The industry challenged the theory every step of the way. They said there was no proof that fluorocarbons even got into the stratosphere, no proof that they split apart to produce chlorine, no proof that, even if they did so, the chlorine was destroying ozone” (p. 225). “Industry representatives and other skeptics doubted that ozone depletion was real, or argued that if it was real, it was inconsequential, or caused by volcanoes” (Oreskes & Conway, 2010, p. 125). Yet in 1976, the National Academy of Sciences, a nongovernmental organization of scientists, published a report that “concluded that the fundamental features of the Rowland/Molina theory were substantially correct” (Dotto & Schiff, 1978, p. 260). By 1978, the U.S. banned CFC use in nonessential products and, as a result, “U.S. production of CFCs for aerosols fell by 95%” (Benedick, 1991, p. 24), even as European countries resisted curtailing production of or even labeling CFC content in products. Yet over time, government panels led to incremental reductions in CFCs. In 1984, the British Antarctic Survey reported an area of severe ozone depletion over Antarctica. This ozone hole further supported Rowland and Molina’s theory. The effort to ban the use of CFCs shifted over time to an international stage, where complex negotiations ensued. These culminated in the Vienna Convention for the Protection of the Ozone Layer in 1985 and the Montreal Protocol in 1987, in which the world’s major manufacturing nations agreed to ban CFC production. In 1995, Rowland and Molina were awarded the Nobel Prize in chemistry for their work on the ozone layer, along with Paul Crutzen, a Dutch scientist who had also done early work on ozone depletion. A more recent report supplied evidence that the Montreal Protocol’s ban on CFCs, initiated 19 years earlier, showed that the ozone layer had begun to heal (Solomon et al., 2016).

The story of the discovery and ongoing repair of the ozone hole is one of the most important success stories of our time. It represents the triumph of a fact-based narrative over counternarratives funded by CFC manufacturers. The story revealed that human activity is capable of severely damaging the environment, that science is

able to detect such damage, and that scientists and governments can coordinate their work to solve this type of problem. In this story, *baseline equilibrium* refers to the conditions that prevailed before Rowland and Molina's recognition that CFCs could harm the ozone layer, when CFCs were being produced in increasing large quantities, with no one aware of their possible destructive effects. The *disruptor event* consisted of the publication of Rowland and Molina's theory that CFCs had harmful effects on the ozone layer. This disruptor event sent both the community of atmospheric scientists and the CFC manufacturers into a state of disequilibrium in which the scientists and later governmental agencies sought to determine the empirical support for the ozone-depletion theory. In parallel, CFC manufacturers were also thrown into a state of disequilibrium, challenging and casting doubt on each of the three propositions of ozone-depletion theory with their counternarratives. From the scientists' perspective, these activities of the manufacturers were *antidisruptors*: they sought to return to conditions of baseline equilibrium in which CFCs were considered safe and could continue to be manufactured profitably. During the period of ozone-war disequilibrium, there were several subplots such as the specifics of proving or disproving the theory involving the chemistry of the stratosphere, as well as the intricacies of the often-delicate international negotiations (Benedick, 1991) that led to studying the problem and setting up a framework that eventually led to curtailing CFC production. A significant step toward *final equilibrium* occurred after the international agreement of the Montreal Protocol, when CFCs were banned and replaced by nonharmful substitutes in aerosol products and refrigeration. The recent discovery that the ozone layer is in a process of recovery from damage indicates progress toward a state of final equilibrium, in which the ozone layer's condition is completely restored, will eventually be achieved.

The story of ozone depletion had scientific findings at its core yet the narrative of how it motivated scientists and others to work to ban CFCs was a story of the effects and implications of scientific findings, not science itself. There are a huge variety of stories in day-to-day life, including news reports, conspiracy theories, tales told by family and friends, ancient fables, and cultural myths. Stories can be used to motivate people to worthy achievements but can also be misused to motivate people to pay attention to occurrences that are based on factual inaccuracies or otherwise undeserving of attention (Grant, 2007b). It is important to recognize that stories are both wide-ranging and ever-present.

Behavior Analysis and the Story Establishing Operation

Behavior analysis has only recently interpreted stories using its concepts and principles, and as Critchfield (2018) has emphasized, identification of the functional properties of stories awaits empirical work. It has nonetheless been proposed that the concept of a story establishing operation is important in stories (Grant, 2005; Himeline, 2018). An establishing operation is an event that elevates the reinforcing effectiveness of some behavioral consequence and evokes behavior that

consequence has previously reinforced (Michael, 1993).¹ In a story, the onset of the disruptor is an establishing operation that increases the reinforcing effectiveness of the outcome of the story. For example, in the ozone depletion story, the publication of Rowland and Molina’s theory functioned as an establishing operation that increased the reinforcing effectiveness of a restored ozone layer and evoked investigative behavior that had been previously reinforced by successfully solving scientific problems. In nontechnical terms, we might say that once people learned of Rowland and Molina’s theory, they were thrust into a state of dramatic tension, suspense, and uncertainty about how the problem would be resolved, and about how the story would end. Many scientists who followed the story and participated in it were strongly motivated to study the problem further and were rewarded as they successively obtained more incremental data, ultimately bringing the story to a successful conclusion. Many nonscientists who followed the story were similarly motivated to voluntarily cease using CFCs: Consumers rapidly adopted the use of roll-on deodorants, replacing CFC aerosols (Vigdor & Londergan, n.d.).

Table 12.1 illustrates the relationship between Todorov’s analysis of stories and that of behavior analysis. During baseline equilibrium, motivational conditions are absent. In the ozone depletion story, this represents the period of stability prior to Rowland and Molina’s theory when CFCs were manufactured and used without any awareness of their harmful effects. The disruptor event, Rowland and Molina’s theory, disturbed the state of baseline equilibrium and also functioned as an establishing operation that motivated both scientific and consumer behavior. The onset of the disruptor induced a state of disequilibrium, which at the behavioral level consisted of scientific, industry, and consumer behavior evoked by the disruptor event: Scientists intensified their study of CFCs while industry representatives sought to disparage the idea that CFCs were depleting ozone. Table 12.1 also includes the problem-based story structure, which cognitive psychologists have applied to narratives.

Table 12.1 Relationship between Todorov’s System, a behavioral system, and a cognitive (problem-focused) system for analyzing stories

| Todorov’s system | Initial equilibrium | Disruptor | Disequilibrium | Final equilibrium |
|-----------------------|---------------------|----------------------------------|--------------------------------------------|-----------------------------|
| Behavioral system | Pre EO setting | Story EO onset | Attempts at reinforcement | Story outcome reinforcement |
| Problem-focused story | Preproblem | Problem is posed and goal is set | Attempts to solve problem and achieve goal | Problem resolved |

EO establishing operation

¹ The story motivating operation increases the effectiveness of the outcome of the story, but it may be better to say that the motivating operation creates an effective reinforcer because the disruptor event both creates possible outcomes of the story and establishes their effectiveness as a reinforcer. A story does not have an outcome before the story’s protagonist, under the influence of disruptor event and a motivating operation, behaves so as to achieve some reinforcing outcome.

The recognition that stories are built-in motivational devices is a key contribution behavior analysts have brought to the understanding of narratives. The motivational features of a story can be understood by comparing the way we react to raw historical data, which White (1978) called *the unprocessed historical record*, to our reactions to a story. If, for example, people looked only at the names, dates, and facts of the ozone depletion story, it would be boring, un compelling, and unable to allow us to understand the issue. However, when the unprocessed historical record is fashioned into a story with an establishing operation and a conflict between the forces of the disruptor and antidisruptor, people become able to see that ozone depletion was a compelling threat with the potential for disastrous consequences.

Your Story: The Autobiographical Self and Reauthoring

The story has come to assume a preeminent place in psychological conceptions of the self and how autobiographical stories influence behavior. Although stories by themselves lack the objectivity that is characteristic of scientific observation, analysis, and the derivation of principles, they have to be relied upon because they are the only way to describe what is called *lived time*. Bruner (1996) drew the distinction between two types of knowledge as follows:

There appear to be two broad ways in which human beings organize and manage their knowledge of the world, indeed structure even their immediate experience: one seems more specialized for treating of physical “things,” the other for treating people and their plights. These are conventionally known as *logical-scientific* thinking and *narrative* thinking. (p. 39)

Bruner (2004) went on to assign considerable importance to narrative thinking, contending that “We seem to have no other way of describing ‘lived time’ save in the form of a narrative” (p. 692). As we have seen, this is the same conclusion historians arrived at in their field: It is possible to provide a chronology of historical events, but only a narrative “succeeds in capturing the sense of *lived time*” (Bruner, 2004, p. 692). He further observed:

The heart of my argument is this: eventually the culturally shaped cognitive and linguistic processes that guide the self-telling of life narratives achieve the power to structure perceptual experience, to organize memory, to segment and purpose-build the very “events” of a life. In the end we *become* the autobiographical narratives by which we “tell about” our lives. (Bruner, 2004, p. 694)

Bruner and others who see everyone as autobiographers open the door to suggest that we actively alter our own narratives. We come to see ourselves as protagonists, usually heroes, in the stories that pattern our lives.

The sense of self as a character in an ongoing set of life stories arises in much the same way as other types of awareness are generated. According to Skinner (1969), the verbal community generates basic awareness “by asking ‘What are you doing?’ or ‘Why are you doing it?’ and reinforcing our answers appropriately” (p. 244). These questions induce the listener to make causal connections between events and

behavior and these connections are part of the foundation for generating stories. Even repeatedly asking “What did you do today?” usually compels the listener to tell a connected story, not merely an itemized list, which commands attention because it incorporates the drama of a story establishing operation. The verbal community does not stop there, but goes on to insist on answers to questions like “What kind of person are you?”; “What do you want from life?”; and even “What’s your story?.” This question-and-answer process similarly leads to answers in the form of a story rather than lists of adjectives, nouns, or behavior frequency measures, which further generates an awareness of one’s self as a character in unfolding stories and may lead us to plot those stories in particular ways. Bruner (2004) explained:

My second thesis is that the mimesis between life so-called and narrative is a two-way affair: that is to say, just as art imitates life in Aristotle's sense, so, in Oscar Wilde's, life imitates art. Narrative imitates life, life imitates narrative. “Life” in this sense is the same kind of construction of the human imagination as “a narrative” is. It is constructed by human beings through active ratiocination, by the same kind of ratiocination through which we construct narratives. (p. 692)

Regarding the self as a character in autobiographical stories has found practical use in various psychotherapeutic methods based on writing narratives (Hunt, 2000; Pennebaker & Seagal, 1999; White & Epston, 1990; Wright & Chung, 2001) in which individuals with behavior problems write stories about their lives. Authoring narratives has been found to have a range of benefits, even extending to improvements in physical health (Pennebaker & Seagal, 1999). Autobiographical writing provides an opportunity for rewriting or reauthoring key life stories. Hunt (2000) explains

that if the way we have been authored by others has left us with self-narratives which are oppressive or inappropriate, then speaking them or writing them differently may provide a means of re-formulating self in such a way that we become more comfortable with ourselves. (p. 101)

Rewriting life stories can also externalize people’s problems by placing them within stories rather than being assigned to the entity of an immutable self. This separates people from their stories and, according to White and Epston (1990), allows people “to experience a sense of personal agency; as they break from their performance of their stories, they experience a capacity to intervene in their own lives and relationships” (p. 16). When you become the author of a story rather than a static character, the plot, supporting characters, and the outcomes of the story become more-or-less alterable, affording a sense of freedom to restructure and reinterpret life stories.

Sternberg (1995, 1998) viewed each individual’s concept of love as a story that is variously plotted as a business story, a fantasy, a horror story, a pornographic story, or even as a gardening story of attention and nurturance. Problems in relationships occur when partners carry very different stories of love with them. To solve problems in relationships, “we need to become conscious of our love stories and replot the endings” (Sternberg, 1998, p. 220). He elaborated:

Once we understand the ideas behind the stories we accept as our own, we are in a position to do some replotting. We can ask ourselves what we like and what we don’t like about our

current (or past) story, and how we would like to change it. We then ask ourselves what we could do to replot the story. Replotting may involve changing stories or transforming an existing story to make it more adaptive. (Sternberg, 1998, p. 221)

From a behavioral perspective, replotting or reauthoring would entail a backward-looking behavioral assessment of the existing stories in which people envision themselves as protagonists, explicitly recognizing which establishing operations motivate behavior, which behaviors are motivated, which values or reinforcers are involved, and what possible outcomes the story has. Reauthoring would then involve considering alternative narrative paths one's life might take with different establishing operations, behaviors, and reinforcing outcomes. For example, in writing his utopian novel *Walden Two*, B. F. Skinner (1948) did this on a grand scale, assessing the existing culture and literally reauthoring it, proposing a society in which the motivation to work to accumulate material goods was moderated in favor of motives in the visual and performing arts.

Problems with Narrative: When Stories Mislead

Problems with narratives arise for several reasons. First, in order to make the narrative more dramatic, storytellers often distort the relative magnitude of the establishing operation by rhetorically exaggerating both the relative placidity of baseline equilibrium and the impact and importance of a disruptor event (Grant, 2007b). The latter of these is frequently seen in news stories in which climate scientists are pitted against climate deniers, an X versus Y format that creates an establishing operation of dramatic controversy, yet conceals the longstanding scientific consensus on climate change. This process can also work in reverse, by rhetorically minimizing the impact of an establishing operation by exaggerating the variability of baseline equilibrium and diminishing the impact of the disruptor. For example, climate change deniers often insist that there have historically been huge variations in temperatures, attempting to portray an overall condition of baseline disequilibrium that lessens the dramatic impact of the current rise in temperatures. This claim, however, neglects the rapid rise in temperatures during the industrial revolution (Marcott, Shakun, Clark, & Mix, 2013).

Second, many concrete narratives are presented as examples of a more general idea or concept in the absence of any counterexamples or a larger pool of more representative experience. A single narrative can be persuasive, but it can also be a biased sample that leads to errors of overgeneralization. For example, it has become routine for climate change deniers to suggest that dramatic current instances of cold weather disprove overall climate change, despite a massive scientific database containing thousands of measured temperature instances over time. Li, Johnson, and Zaval (2011) showed that people's belief in and concern over the climate crisis was greater depending on their perception of the current day's temperature, which

seemed to function as an establishing operation to increase or decrease climate change mitigation as a reinforcer.

Third, dramatic attention-grabbing stories can be easily manufactured, without a factual basis, and structured in such a way that disproving them is either impossible or very time-consuming. Conspiracy theories manufacture dramatic establishing operations by alleging that powerful clandestine forces are acting to achieve some nefarious outcome, based on a veneer of circumstantial evidence, and endow adherents of the theory with the belief that they possess status-enhancing special knowledge. False-flag incidents have been used throughout history to create establishing operations to provoke war, and undocumented assertions of false-flag operations have also been used to give the appearance of dramatic conspiracies. During the ozone wars, those who opposed regulating CFC emissions suggested that ozone depletion was due to volcanic emissions, a claim disproven by work showing that volcanic emissions are largely dissipated by rainwater before they reach the stratosphere (Tabazadeh & Turco, 1993). Likewise, in 2013, Donald Trump, later elected as U.S. President, declared global warming a hoax invented by the Chinese in order to “make U.S. manufacturing non-competitive” (Schulman, 2018), without any factual support. Nonetheless, even when narratives are clearly identified as fictional, they can remain influential (Green & Brock, 2000).

Narrative Coherence and Fidelity

Taking narratives seriously as a source of influence, persuasion, and behavior change means understanding which of their features are important. Within logical-scientific thinking, adhering to research methodology principles determines which findings are influential. The analogous principles that make stories influential are story coherence and story fidelity. A story with narrative coherence is one that “hangs together” (Fisher, 1989, p. 47), is internally consistent, takes into account all known facts, addresses alternative interpretations and counterarguments, and is told by and portrays believable characters that indeed act characteristically, reflecting a consistent set of values. For example, the counternarrative to the ozone depletion story failed on many of these counts: The CFC proponents were not believable because they were paid by the industry and generally lacked the credentials of the scientists who sought a CFC ban; they could not address the specifics of the chemical changes occurring in the stratosphere; and they were inconsistent, altering their story as new evidence appeared. In the narrative of the climate crisis, deniers have often personally attacked the character and motives of climate scientists (Milman, 2017) to undermine the coherence of the global-warming story.

Stories with narrative fidelity are ones that “ring true with the stories they [readers/listeners] know to be true in their lives” (Fisher, 1989, p. 64). The behavioral principle underlying narrative fidelity is stimulus generalization: generalizing from the features of old stories we know to be true (or that faithfully represent reality, in

the case of fables and other useful fiction) to new stories we encounter. The story of ozone depletion had a mixed reception in terms of its narrative fidelity. On the one hand, it lacked narrative fidelity because people did not have experience with stories of human activity causing problems in the stratosphere that are undetectable by human senses. Yet on the other hand, by the 1970s people had considerable experience with human-generated atmospheric pollution in cities, lending narrative fidelity to the ozone depletion story. To achieve narrative fidelity, it was necessary for people to generalize from their narratives of directly experienced forms of industrial pollution to a narrative of sensory-undetectable alterations in the stratosphere.

Narrative fidelity poses a problem for accepting the narrative of the climate crisis: People do not have any history with stories of a changing climate because such changes have not taken place within anyone's life span. Lack of a narrative history of exhaustion of material commodities also makes it difficult for people to accept inevitable future peaks in the supply of nonrenewable natural resources (Grant, 2007a). People do have extensive personal histories of changes in the weather, but those narratives are ones of natural, relatively short-term cyclic variations in weather, which leads people to generalize from those weather experiences and misclassify climate change as due to those cyclic variations (Houser, 2018).

Successfully negotiating the practicalities of everyday life requires accepting stories on the basis of their narrative coherence and fidelity even when those stories have no immediate direct empirical support. We learn as children to trust the stories our parents, teachers, doctors, and other believable people tell us without fact-checking. Yet as adults people can continue to accept stories on the basis of narrative coherence and fidelity when direct empirical evidence supporting the story is poor in quality or absent, or even when direct empirical evidence refutes the story. If, for example, someone sees the world entirely from an extremist political lens (i.e., sees people's behavior reinforced entirely by political outcomes), the story that the climate crisis is a hoax perpetrated by scientists with political or research-funding motives (Douglas & Sutton, 2015) "hangs together" better than the scientific story that the climate crisis is due to human carbon emissions and "rings true" insofar as it is consistent with other stories the climate-crisis denier believes. Because only some of the factors that give a story narrative coherence and fidelity are based on direct empirical evidence, narrative coherence and fidelity can lend support to conspiracy theories and other nonevidence-based narratives. We will return to this issue in discussing narrative literacy.

How Can Narratives Promote Sustainable Behavior?

Narratives are diverse and encompass everything from what we tell about ourselves to metanarratives that operate on a cultural level. Therefore, applying narratives to solving the problems of sustainability is necessarily equally diverse.

Making Stories Apparent and Recognizing Their Influence

Part of the difficulty with personal and cultural narratives is that they are so ubiquitous and ingrained that their influence goes unrecognized. Michaels (2011) points out that overarching cultural narratives motivate “political, religious, economic, aesthetic, intellectual and relational pursuits. We take these cultural stories so for granted that we’re hardly conscious of them. We simply accept them as reality – the way it is and the way it always has been” (p. 8). McLean and Syed (2015) point out the irony of these pervasively influential narratives being invisible: “Since they are everywhere, they are hard for the majority to see” (p. 327). In our own time, we are positioned to see master narratives in history only because they differ substantially from our own experience. During the Middle Ages in Western culture, for example, a master narrative consisting of religious stories of the nature and purpose of life dominated the culture such that people were unable to imagine alternative modes of existence. (Particular religious narratives that assign humans dominion over other life forms and the Earth itself remain influential despite their harmful environmental effects relative to alternatives (Koger & Winter, 2010)). Past cultural narratives of the nature of the roles of males and females have similarly dominated people’s lives largely without any substantial awareness of possibilities for gender equality until people began to see them as an anomaly of history in the late twentieth century. Minority groups are also situated to perceive oppressive and maladaptive cultural narratives in a way that the majority cannot. As a minority within the cultural landscape, behavior analysts are uniquely, though not enviably, positioned to see how narratives of personal agency, the necessity of the punitive control, and the reification of abstractions are all ingrained cultural features recalcitrant to change because they act invisibly without explicit consideration of alternatives.

The past 30 years have seen a recognition that cultural stories, master narratives, and myths operate to influence human behavior. To build a sustainable society, an important first step is to make the existing overarching master narratives visible and apparent so that they can be deliberately compared to sustainable alternatives. This process of reflection on and identification of cultural narratives is akin to the recognition of personal narratives that are central to various forms of narrative therapies.

Recognizing the Money-and-Markets Master Narrative

McLean and Syed (2015) proposed that master narratives are:

culturally shared stories that tell us about a given culture, and provide guidance for how to be a “good” member of a culture; they are a part of the structure of society. As individuals construct a personal narrative, they negotiate with and internalize these master narratives—they are the material they have to work with to understand how to live a good life. For many individuals whose lives fit in with societal structures, these master narratives are functional and unproblematic. Others, however, may need to construct or adopt an *alternative* narrative, which at minimum differs from, and at maximum resists, a master narrative. (p. 320)

Both Michaels (2011) and Korten (2015) have suggested that we live in an age in which an economic master narrative has come to dominate and control the major domains of human behavior in a way that is historically unprecedented. Michaels (2011) points out that our era is characterized by a monoculture in which a master *economic* story has become so pervasive that its influence has overwhelmed and subordinated all other stories we tell about ourselves and others. The economic story she refers to is essentially the narrative of neoliberalism, the story that an ideal society will emerge when everyone vigorously and narrowly strives for economic gain and the culture is structured as a marketplace to make those gains possible. The economic story's drama centers on money, "how to get it, make more of it, spend it, grow it, or keep it, whether that looks like consumerism, commercialism, or materialism" (Michaels, 2011, p. 9). At the level of the individual, the economic story portrays people as entirely self-interested beings who seek maximized rewards at minimal effort and cost. In behavioral narratological terms, we see ourselves in a story in which we are motivated by money, where the ideal final equilibrium is a state of wealth and material possessions, and disruptors are anything that detracts from our quest for wealth. For example, as discussed earlier, during the ozone wars U.S. Secretary of the Interior Donald Hodel opposed regulating CFC emissions and instead favored a "program of personal protection for individuals worried about ultraviolet radiation: reliance on broad-brimmed hats and sunglasses as a preferred alternative to more governmental regulation" (Benedick, 1991, p. 60). Hodel's position was an example in which an economic master narrative prioritized the CFC marketplace over human health. In that corporate economic narrative, the damage to the ozone layer was better addressed by wearing hats and sunglasses rather than by disrupting profits by regulating CFC emissions.

Michaels (2011) provides many similar examples of the way in which economic stories and values have subordinated noneconomic stories and values including personal relationships, our relationship to the natural environment, civic engagement, physical and spiritual health, education, and the creative arts. For example, Michaels points out that in the past, work relationships between employers and employees were based on a presumed reciprocity in which companies were committed to their workers in exchange for hard work and loyalty. Yet this traditional practice of valuing employees has been replaced by bleak and entirely market-driven practices in which employees are quickly discarded (Cappelli, 2000), which in turn has effects on the quality of life and the stability of both families and entire communities.

According to Michaels (2011), in the economic master narrative people see themselves in a story in which final equilibrium consists entirely of economic outcomes. As the dominant narrative of our time, the economic story has transformed employees into expendable market commodities, shifted human compassion and connectedness to the sphere of economic competition, turned communities into extensions of corporate activity, relegated health care and well-being to insurance-company concerns, diminished education as a business concerned only with preparing students to be vocational actors in markets, and harnessed human creativity entirely for economic purposes.

Like Michaels, David Korten (2015) sees the economic system as a powerful cultural story that has come to motivate wealth-seeking behavior at the expense of the other important facets of life. Korten identifies the story of neoliberalism as an impediment to the development of a sustainable society. He adopts the language of indigenous cultures in calling central cultural narratives *sacred*, “to refer to what is most important, most essential to the well-being of the community and its members, and therefore most worthy of special respect and care” (Korten, 2015, p. 22). He contrasts the “sacred money-and-markets” story, basically Michaels’ neoliberal economic story, with a “sacred life-and-living-earth” story. Within the sacred money-and-markets story, money becomes the “defining purpose of individuals,” affluence is the “fair and just reward,” poverty is “a consequence of laziness,” and “inequality and environmental damage are a regrettable but necessary and unavoidable cost of growing the GDP” (Korten, 2015, pp. 24–25). Further, people are seen as “by nature individualistic competitors” through whom “the invisible hand of the free market channels the individual and corporate drive for profit to choices that maximize economic growth and thereby the wealth and well-being of all” (Korten, 2015, p. 25). For Korten, the ultimate outcome of the sacred money-and-markets story is the creation of a world unwaveringly fixed on the creation of endless growth, a “global suicide economy” with “no concern for the consequences of life” (p. 29). Ecological economists, among others, have reached a similar conclusion: Because we live on a planet of fixed natural resources, endless growth is not sustainable (Daly, 1973).

Cultural Reauthoring for Sustainability

Having identified economics as the master narrative of our time, both Michaels (2011) and Korten (2015) have proposed what can be described as *cultural reauthoring* as a narrative solution equal to the problem. Just as personal therapeutic reauthoring replaces the establishing operations that motivate individual behavior, cultural reauthoring alters the motivational basis for a society’s collective behavior as well as personal behavior. Despite the appeal of the concept of cultural reauthoring as a scaled-up counterpart of personal therapeutic reauthoring, work in narratives and their reauthoring has been centered “almost entirely on personal stories, which remain largely decontextualized from the more distal structures of society” (McLean & Syed, 2015, p. 323). The general-audience books of Michaels and Korten are highlighted here because they have explicitly cast cultural change for sustainability in the framework of a narrative, unlike many historical manifestos and treatises calling for change. Korten (2015) insists that master narratives rise above other types of discourse such that, “We cannot act coherently as a society without a shared framing story. It defines our shared values and priorities, the questions we ask, and the options we consider” (p. 34).

In many respects, Michaels’ (2011) version of cultural reauthoring takes the form of reintroducing a greater variety of narratives into people’s lives. Anticipating

that her point of view might be dismissed as idealistic, she points out that “as little as thirty years ago, these alternative stories – now derided as idealistic – were objective realities. Today’s ‘idealism’ used to be the norm” (Michaels, 2011, p. 133). One remedy she proposes involves the development of Havel’s (1989) *parallel structures*, forms of social and economic organization that exist alongside the monoculture, but in a way that serves people in a way the monoculture does not. Ironically, the concept of parallel structures originated as a reaction to the oppressiveness of life in Eastern Europe under communism, which like the current monoculture, suppressed alternative narratives. As examples of parallel structures, Michaels (2011) cites the slow food movement, Christopher Alexander’s pattern language, and Marshall Rosenberg’s nonviolent communication. Advocates of nonviolent social change have employed *constructive noncooperation*, another example of a parallel structure, to advance their agendas in the face of oppressive regimes. Mattaini (2013) has outlined how constructive noncooperation functions using behavior-analysis concepts.

Korten’s (2015) solution to the unsustainability of the sacred markets-and-money story is a cultural reauthoring in which that story is replaced by a *sacred life and living earth story*, one in which “time is life” and money is merely a medium of exchange. The purpose of communities becomes to “maintain the conditions essential to the life of its members” and the purpose of institutions is “to provide all people with the opportunity to make a healthy, meaningful living in a balanced co-productive relationship with Earth’s community of life” (p. 30). As concrete examples of behavior motivated by this story, Korten cites the voluntary simplicity (for more information, see Elgin, 1993), small-house, and urban agriculture movements.

In describing a “living Earth” and a “living universe” Korten (2015) seeks to elevate the Earth and the universe from background settings to actors in a grand story. In some respects, this represents the outlook of animists, “who recognize that the world is full of persons, only some of whom are human, and that life is always lived in relationship with others” (Harvey, 2005, p. xi). During much of the modern era, animism had been dismissed as “primitive” and seen as alleging a “‘belief in spirits’ or ‘non-empirical beings’ and/or a confusion about life and death among some indigenous people, young children, or all religious people” (p. xi). Conferring the status of personhood on the inanimate world may seem unusual, but less so when the pragmatic consequences are concerned: “While it may be important to know whether one is encountering a person or an object, the really significant question for animists of the ‘new’ kind is how persons are to be treated or acted towards” (Harvey, 2005, p. xi).

Narratives are centered on the motivations, actions, and outcomes of actions that accrue to characters. Once living status is conferred on the Earth and the universe, they become characters rather than part of the background. As a background setting, the Earth can be used for whatever purpose, but with it or its constituents as characters, the Earth becomes either a party in a mutually respectful interchange or the subject of an assault. Animism may have arisen in prehistory as a coevolved belief system: Attributing personhood to animals and inanimate object encouraged a sustainable use of resources that avoided local shortages due to wasteful consumption

and overexploitation. In contemporary society most people do not live in any close connection with the natural environment, so people are usually isolated from the conditions that gave rise to animism or other practical philosophies that discouraged environmental exploitation and damage.

Incorporating Narrative Communication as an Integral Part of Scientific Work

As the sciences have evolved into increasingly technical disciplines, many scientists have little time to work outside the confines of highly specialized communities and consider it someone else's job to communicate whatever practical implications their work has (Bauer & Jensen, 2011). This problem is compounded because the peer-review process within which scientists work is adversarial, making scientists reluctant to communicate firm conclusions about their work without qualifying them in a careful way that makes them seem irresolute to a wider audience (McBean & Hengeveld, 2000) accustomed to bombastic, yet factually impoverished counternarratives.

As we have emphasized, the ozone depletion crisis was resolved due to the influence of a narrative of the way CFC manufacturing destroys the ozone, yet during their ultimately successful campaign to ban CFCs, Rowland and Molina's efforts to advance the narrative often came under fire: "By calling for political action, they became targets for critics who suggested that scientists maintain a limited role in courtrooms" (Roan, 1989, p. 118). Yet for his part, Molina opposed this view:

[Scientists] say "I'm just going to do clean, pure science. If it has some kind of application whatsoever, I'm going to step back and do something else." I think that's very wrong.... After all, society is funding all of this. But it's still a very common attitude. Even more so with environmental issues, because there you have to take a stand. It's not just a matter of practical use but avoiding disastrous effects. (Roan, 1989, p. 121)

Because of their motivational power, narratives would seem to be one means of communicating scientific findings to a wider public audience in issues pertaining to sustainability. Yet even apart from the general scientific reluctance to engage in advocacy, narratives have an especially poor reputation in science. Scientists regard stories as "baseless and manipulative" and dismiss them with maxims like "the plural of anecdote is not data" (Dahlstrom, 2014, p. 13614). Within behavior analysis, stories are considered a form of verbal report, which are often summarily dismissed as a substandard type of data, although more recently some (Grant, 2007b; Himeline, 2018; Snyckerski et al., 2018) have advocated using narratives in persuasive communications.

Despite these suspicions about the narrative, they have to be understood as only part of a larger reality that there is no escape from using narratives for the purpose of persuading people regarding scientific findings:

... narratives represent the dominant form of science communication non-expert audiences are receiving. Therefore, questioning whether narratives should be used to communicate science is somewhat moot. A more relevant question would be: How should narratives be used to communicate science appropriately because of their power to persuade? (Dahlstrom, 2014, p. 13616)

Because of the power of narratives to make the world comprehensible and to persuade, in the end, one narrative or another will prevail for any issue that rises into public awareness. The real question then becomes: Will the narrative that becomes the master narrative be one carefully based on the best empirical evidence available or will it be a narrative based on profitability or some dogmatic outlook? Scientists who avoid narrative discourse would be akin to historians who saw their job as publishing primary-source factual documents and asking their readers to assemble their own story based on those historical sources. This isn't done among historians because readers need a story to make the primary sources comprehensible and to motivate the audience to make contact with the historical factual record. The same is true for scientific facts: For them to have an influence on public opinion and public policy, they need to take the form of a story. These considerations led Dahlstrom (2014) to conclude that "the plural of anecdote is engaging scientific communication" (p. 13618).

Fully embracing the story as a communication device for scientific facts means making a translation from scientific data to a narrative. One implication of this is an emphasis on characters in scientific stories. Whereas in science individuals are nowhere to be seen in reports, in effective narratives likable, trustworthy, and knowledgeable characters come to the fore. Corner and van Eck (2014), for example, suggest that the IPCC (Intergovernmental Panel on Climate Change) change its current approach

to show the (many) human faces of the IPCC—the scientists who give their time and valuable expertise—and tell their personal stories. ... in the absence of personal stories or a compelling narrative of collective endeavor, the debate on the trustworthiness of climate science has become reduced to an arid statistical debate about the percentage of scientists who accept human induced climate change. The debate is missing the story that really would engage, excite and inspire people: the story of individual scientists and their own passion for their science. (p. 14)

Another implication is translating the probabilistic language of science to the facts demanded within narratives. For example, in 2010, 255 members of the National Academy of Sciences wrote a letter in which they stated that "science never absolutely proves anything" (Gleick et al., 2010). Although these scientists urged action to address the climate crisis, Oreskes and Conway (2010) found "their care and nuance 'intellectually scrupulous and admirable,'" yet also found that "being so philosophical about the 'factual' nature of climate change doesn't serve public communication" (p. 687). In this case, the abstraction of the impossibility of certainty, while almost certainly true, does not translate well into a narrative arena, where there is a low bar for making causal connections among counter-narrativists concerned mainly with making it appear that climate change is controversial. The irony

is that the scientific data supporting human-caused climate change far exceeds what the counternarratives have to offer.

Fictional Worlds and Cultural Reauthoring

Historically, the narratives in fictional literature have played an important role in social persuasion. As one example, Harriet Beecher Stowe's (1852/2006) novel, *Uncle Tom's Cabin*, had a major impact in turning public opinion in the United States against slavery and played a role in inciting the Civil War (Reynolds, 2011). Similarly, Upton Sinclair's (1906/2006) novel *The Jungle*, led to sanitary reforms in the food and meat-packing industries (Parmenter, 1983). As a final example, Edward Bellamy's (1888/2008) novel, *Looking Backward*, had an important impact in inspiring economic reforms in the United States (Roemer, 1983).

The human problems addressed in these fictional treatments differ from those of the climate crisis because Stowe, Sinclair, and Bellamy described current problems that confronted people of their time, whereas the problems of climate change are weighted in the future. Because climate change is a deferred problem, narrative fiction is even more suited to characterizing the problem because its effects are in an elusive future. Although climate science is grounded in empirical research and has shown that human-caused warming is taking place, it is a discipline that makes use of models that project future events often in abstract statistical form that fails to provide an impression of what it would be like to live in a world that elevated temperatures have deteriorated or destroyed. Fictional portrayals of such futures provide a flesh-and-blood accompaniment to climate modeling needed to allow people to confront the future consequences of current behavior. As Mehnert (2016) describes:

As writers are overcoming the challenges of representing climate change, they do not only offer narratives that provide insight into the personal and emotional contours of climate change, but also shape our very idea and understanding of this invisible crisis. Climate change is no longer "out there," but turned into an intricate part of the characters' as well as readers' reality. (p. 228)

Utopian treatments have generally fallen out of favor, but an exception is B. F. Skinner's (1948) *Walden Two*, which made use of the fictional narrative format to portray a society in which pursuit of the arts displaced material consumption, a continuing impediment to sustainability. Dystopias can serve to motivate avoidance behavior and educate as well. Addressing recent literature for young adults and children, Quibell (2015) writes:

I'm sure we all know that sometimes, it's ridiculously hard to learn from textbooks in geography lessons. It's hard to wrap your head around all the facts and statistics and keywords about climate change. And then you read something like *Breathe* by Sarah Crossan or *The Last Wild* by Piers Torday and you just totally *get it*. You completely understand how serious everything is, how badly we need to do something. I mean, who wants to live in a bubble? (para. 15)

Selecting the Genre of the Climate-Change Story

As White (1978) emphasized, a story can be told in several different literary genres, as a tragedy, comedy, farce, heroic triumph, romance, etc. Currently, the way in which these traditional literary plots are anchored to functional relationships awaits empirical study and is an important frontier in behavioral narratology. The urgency of the problem makes it necessary to come to some tentative observations. For many, if not most, environmentalists, the story of the climate crisis is clearly a slow-motion tragedy in which corporate interests have seized control of the political process and communication channels to prevent any effective action to reduce rising levels of atmospheric carbon dioxide. A working premise inherent in this view is that if the story is told as a tragedy with catastrophic consequences, people will recognize the scope and magnitude of the problem and be forced to act. An apparent downside of this approach is that, among people who agree that the story is indeed a tragedy, many consign it to a set of response-independent problems over which they have no control, and center their attention on aspects of their lives they can influence. Michael Mann wrote that there is “danger in overstating the science in a way that presents the problem as unsolvable, and feeds a sense of doom, inevitability, and hopelessness” (quoted in Crist, 2019, para. 19).

Emplotting the story as a comedy, farce, or satire might seem to trivialize the problem, yet these genres may help people perceive aspects of the story that other genres fail to reveal. For example, in the ozone wars, once it was hinted that the best approach to an ozone-damaged atmosphere was to wear hats and sunscreen, cartoonists and others told the story as a farce or comedy that illustrated that the priorities of the CFC manufacturers and their political allies had become so misaligned that they acquired comedic elements. Those opposed to authoritarian political regimes have turned to comedic plotting as a means of nonviolent resistance (Mattaini, 2013). Boykoff and Osnes (2019) explored the use of comedy to raise awareness about the climate crisis, acknowledging that “While comedy may provide relief amid anxiety-producing evidence as an emotional salve and tool for coping”, it may also “serve to bridge difficult topics and overcome polarized discussions by entertaining in non-threatening ways” (p. 155).

Viewing the climate-change story as an ongoing David-and-Goliath challenge, with the lingering possibility that organized resistance on the part of climate scientists and ordinary citizens might triumph over powerful corporate interests, is likely an essential part of framing the climate-change story. It combines the scientific data with an empowering establishing-operation foundation, drawing on an ancient motivational genre. This genre operated in the ozone-wars story, in which a small group of scientists enlisted public support and eventually succeeded in overcoming corporate influence. Each of the genres has relative advantages and disadvantages and it may be that all of them in concert are optimal. Certainly, part of the solution is that people are motivated and see themselves as actors in a dramatic challenge against formidable odds in which they become determined to succeed.

Narrative Literacy

Wineburg, McGrew, Breakstone, and Ortega (2016) examined the ability of students to assess the quality of online information, much of it in the form of narratives, summarizing their results as “bleak” (p. 4) and expressing concern that “democracy is threatened by the ease at which disinformation about civic issues is allowed to spread and flourish” (p. 5). They found the students were poor at discriminating online narratives that were news stories from those that were advertisements and were also deficient in recognizing the quality of evidence that supported online narratives. Although false news stories are nothing new, the online environment has widened access to poor-quality narratives such as conspiracy theories that are not supported by evidence (Burkhardt, 2017). Both Jolley and Douglas (2014) and van der Linden (2015) found that exposure to climate-change conspiracy theories diminished people’s motivation to engage in pro-environmental behaviors. van der Linden (2015) found that people who watched a conspiracy-theory video were less likely to accept the scientific consensus over climate change, sign a petition to reduce global warming, or volunteer for climate-change mitigation efforts. In general, when weak facts are embedded within a story, people are less likely to challenge the story with counterarguments relative to presenting the weak facts by themselves (Krause & Rucker, 2019).

Teaching narrative literacy nonetheless poses some unique challenges. As discussed in connection with the principles of narrative fidelity and coherence, people learn to accept stories from their parents and other trusted authorities from early in childhood without factual verification. While formally untrue, myths and other forms of fictional literature contain kernels of wisdom that render their strict factual basis beside the point. The challenge for a pedagogy of narrative literacy is to teach students to discriminate among different types of stories they encounter in day-to-day life, with special emphasis on dismissing strongly motivating narratives that are factually unsupported or statistically unrepresentative of the larger universe of narratives. Narrative literacy should encompass teaching (a) the basic structure of a story and its functions in motivating the behavior of the audience, (b) identification the storyteller’s motivation and incentives, (c) specification of the story’s context, dramatic event, actions motivated by the event, and consequences (i.e., baseline equilibrium, disruptor, antidisruptor, and final equilibrium), (d) description of the story’s proposed causal sequences, (e) assessment of the story’s coherence and fidelity, (f) evaluation of the story’s representativeness, that is, whether the baseline equilibrium and disruptor events of the story have been selected to create drama and motivation rather than accurately representing normal human experience, (g) assessment of the empirical evidence for the story, valuing hard scientific and observational evidence and discounting circumstantial evidence, (h) separation of the facts within a story from the story itself and evaluating if the evidence for the story can be better accounted for by alternative stories, including more prosaic stories less likely to capture our attention, (i) a willingness to suspend judgment, not accept one narrative from among others when definitive evidence is lacking, (j)

evidence-seeking as an essential feature of narrative inquiry, and (k) evaluation of the extent to which stories appeal to us merely because they confirm our existing biases and narratives rather than being based on evidence. Narrative literacy shares much with the field of critical thinking, but because the motivational features of narratives have the power to mislead and command inappropriate attention, it merits standing as a separate subdiscipline.

A theme in this chapter is that changing a narrative has the power to profoundly change both individuals and the course of cultural evolution. In the absence of narrative literacy, the master narratives people adopt will be more likely to be attention-getting and other manipulative stories, stories based on weak evidence, and stories that appeal to us because they are consistent with the master narratives that are consistent with our existing reinforcers.

Conclusion

The behavioral sciences are still in the process of coming to terms with the ways in which stories influence our behavior. Although narratives have been used since ancient times to influence behavior, that influence has been considered a rhetorical art. A systematic scientific account of stories has considerable promise for promoting desirable behaviors, and here we have suggested some ways in which this general enterprise might allow us to develop an environmentally sustainable culture.

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Chapter 13

Challenging Violence: Toward a Twenty-First Century, Science-Based “Constructive Programme”



Kathryn M. Roose and Mark A. Mattaini

“Something is terribly wrong”¹ (Paul Farmer)

Current levels of violence indicate that something is, indeed, terribly wrong in contemporary societies. In this chapter, we consider the full range of violent behavior—interpersonal, collective, structural—and the deep connections among them (Rylko-Bauer & Farmer, 2016), and explore promising science-based possibilities for challenging that violence by relying on cultural systems analysis. The most critical social issues, including violence but also climate change, economic injustice, and other violations of human rights, are all deeply interlocked; each contributes to the others. Therefore, as elaborated in this chapter, success in reducing one can support decreases in the others as well.

The behavioral literature on violence and responses to that violence is large and rich (see, for example, Peter Sturmey’s, 2017 encyclopedic *Wiley Handbook of Violence and Aggression*). The ecological approaches suggested in this chapter draw extensively on that literature, organized within a behavioral systems conceptual framework (Aspholm & Mattaini, 2017; Mattaini, 2013). The analyses and recommendations here are also consistent with public health recommendations developed to contribute to the United Nations 2030 Sustainable Development Goals (Kjaerulf et al., 2016), and with extensive current social science research on inequality, poverty, human rights, and social policy (Brady & Burton, 2016).

¹Farmer, 2003, p. 142.

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Twenty-First Century Violence

Current societal struggles include interpersonal (including street and intimate partner violence), collective (including political, gang, and combat violence), and structural violence. According to McEvoy and Hideg (2017), globally at least 560,000 persons died violently in 2016, including about 385,000 in intentional homicides and 99,000 in armed conflict. Perhaps of most concern, although not immediately visible to those living in more privileged and stable conditions, 21% of the world's population live in "fragile states" in which violence is ever-present (Kjaerulf et al., 2016).

Interpersonal Violence

Global rates of intimate partner violence and familicides are reported unevenly, but the World Health Organization (2017) estimates that nearly "one third (30%) of women who have been in a relationship report that they have experienced some form of physical and/or sexual violence by their intimate partner in their lifetime" (n.p.). More than a third of homicides of women are committed by intimate partners. The Bureau of Justice Statistics reported that the rate of rape/sexual assault in the U.S. in 2017 was 1.4 per 1000 population (Morgan & Truman, 2018); other data suggest substantially higher rates, with most instances unreported. The National Sexual Violence Resource Center indicates that "one in three women and one in six men [experience] some form of contact sexual violence" over a lifetime (Sable, Danis, Mauzy, & Gallagher, 2006; Smith et al., 2017).

Mass killings have recently increased, and despite remaining rare, are of particular concern in the U.S.; there were 41 in 2019, a record high (Associated Press, 2019). While definitions vary, the definition used by the Associated Press is four or more murdered in a single event. There were, however, 418 mass *shootings* (events in which at least four persons were shot (Gun Violence Archive, 2020). Importantly, it appears that around 20% of mass shootings have roots in domestic violence (Everytown for Gun Safety, 2018). Such events also occur worldwide, as do mass stabbings and other attacks with multiple victims, although rates are often difficult to document accurately. Other forms of interpersonal violence, including assaults, robbery, and kidnapping, are also highly variable around the world (Kjaerulf et al., 2016).

Collective Violence

Collective violence includes gang violence, political violence including terrorism, and military combat.² The global rate of terrorist acts has increased in recent decades, although such attacks remain rare except in areas of high instability (National Consortium, 2018). In the U.S., the Government Accountability Office reports that between the attacks on September 11, 2001 and the end of 2016, there were 85 terror attacks resulting in 225 deaths, 53% by radical Islamic extremists, the remaining 47% by far-right extremist groups or persons. In 2018, however, nearly all reported attacks were committed by the far right. Rich and rigorous cross-national research has been done in this area (Chenoweth, English, Gofas, & Kalyvas, 2019; U.S. Government Accountability Office, 2017). Culturo-behavioral systems analysis has not yet turned to these issues (with the one exception of a special issue of *Behavior and Social Issues* (Mattaini & Nevin, 2003)).

Gang violence is an important but complex issue. In 2012, the U.S. Federal Bureau of Investigation estimated that some 33,000 violent street gangs, motorcycle gangs, and prison gangs were criminally active in the U.S. (FBI, 2012). Subsequent to that report, annual gang surveys were discontinued, in part due to concerns about precision and biases often built into such estimates. Defining “gangs” with clarity is difficult as use of terms and functions are highly variable and ecologically contextual, and gang involvement results from many forms of economic and social disenfranchisement (Brumbaugh-Smith, Gross, Wollman, & Yoder, 2008). Klein and Maxson (2006), looking at gang phenomena across nations, describe gangs as “‘interstitial’ social organizations that emerge as alternative sources of order in areas—such as urban slums—where the state’s authority was deficient” (Hazen & Rogers, 2014, p. 2,³). Both location and historical period complicate definition; Central American gangs and drug cartels associated with gangs, for example, are dramatically different from the block by block “cliques” currently found on the South Side of Chicago, which in turn are dramatically different from what gangs in the same neighborhood looked like in the 1990s (Aspholm, 2016).

Structural Violence

Structural violence is the most enduring and damaging of all forms of violence, contributes to all forms of violence so far discussed, and is arguably the most difficult to address. Perhaps the most notable writer and practitioner in the area of structural violence is Paul Farmer, an inspirational and data-grounded physician and anthropologist. Rylko-Bauer and Farmer (2016) explain:

²Military combat is beyond the scope of this chapter, although it is an area ripe for cultural analytic study.

³Quoting Thrasher, 1927/2013, n.p.

Structural violence is the violence of injustice and inequity—“embedded in ubiquitous social structures [and] normalized by stable institutions and regular experience” (Winter & Leighton, 2001: 99). By structures we mean social relations and arrangements—economic, political, legal, religious, or cultural—that shape how individuals and groups interact within a social system ... These structures are violent because they result in avoidable deaths, illness, and injury; they reproduce violence by marginalizing people and communities, constraining their capabilities and agency, assaulting their dignity, and sustaining inequalities. (p. 47)

Structural violence in developed countries is realized in long-lasting structural poverty in inner cities in which housing, education, and economic opportunities are concurrently constrained (Wilson, 2016), and in the life-threatening struggles of the homeless and marginalized that lead to severe illness, incarceration, and premature death (Holtzschneider, 2015). Privileged groups draw on the labor and resources of the global poor, producing damaging social and climactic externalities that most impact those least able to protect themselves. As Farmer (2003) notes, “Poverty is not some accident of nature but the result of historically given and economically driven forces” (p. 20). Such a reality is unsustainable and destabilizing, producing “pent-up anger born of innumerable indignities, and of great and irremediable ones” (p. 25). Both cultural systems theory and global history indicate that such injustice can evoke resistance and induce powerful counter-control, potentially resulting in greater societal instability (Chenoweth & Stephan, 2011; Mattaini, 2013).

Ecologies of Violence

There are clear connections among types of violence. There is mounting evidence that exposure to conflict violence increases rates of intimate partner violence (Morris, 2014; Rieckmann, 2014). Intimate partner violence often accompanies and correlates with male-to-male street violence (Kiss, Schraiber, Hossain, Watts, & Zimmerman, 2015). Overall, violence of one type often contributes to a broader ecology of violence, and such ecologies can accelerate violence of all types over time (Rylko-Bauer & Farmer, 2016). Such integration suggests that effective responses need also to be ecologically framed.

Violence is shaped and maintained by practices within complex interlocking individual, family, community, and cultural systems (social, economic, political, educational, institutional), all of which dynamically and continuously influence each other. Outcomes of efforts to produce ecological change are commonly unpredictable, and have often been disappointing. Accumulating evidence indicates that as societies become more reliant on threats, punishment, and coercion to control violence and populations, such responses propagate widely, producing aversive ecologies of distress, distrust, and individualism, all of which support the expansion of cultures of personal, collective, and structural violence (Rylko-Bauer & Farmer, 2016).

Cultural Responses to Violence

The most common and often the most politically acceptable approaches to reducing violence (whether interpersonal, collective, or structural) are to retaliate, imprison, or coerce compliance. Behavior science has demonstrated that such aversive strategies are generally counterproductive, whether at an individual or collective level (Chenoweth & Stephan, 2011; Nevin, 2003; Sidman, 2001). Aversive and coercive consequences often produce immediate desired effects, reinforcing further coercion (Alber & Heward, 2000; Sidman, 2003). However, the initial effects of coercion have been shown to be short-lived, and the intensity of the undesirable behavior of the coerced is likely to escalate in a battle for countercontrol (Miller, 1991; Patterson, 2016). We can do better.

Cultural analytic science offers the possibility of more effective approaches to reducing all types of violence through the construction of *ecologies of justice*. Similar suggestions are increasingly being recommended by other disciplines and community organizations (e.g., Alexander, 2019). Shifting to this approach, however, will require a collective recognition that, indeed, something is terribly wrong—and a further recognition that there is something we as cultural analytic scientists, professionals, and community members can—and should—do about it (Mattaini, 2006; Mattaini & Nevin, 2003).

Ecologies of Justice

Constructing alternative ecologies of social and environmental justice is a promising approach grounded in behavioral systems science. The 2030 Agenda for Sustainable Development (Kjaerulf et al., 2016) explicitly explores this strategic option for reducing violence, especially under Goal 16, “Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels” (p. 16). Behavioral systems science offers unique guidance for this kind of shift, originating with Goldiamond’s (1974/2002) *constructional approach* to behavior change within interlocking systems. How might such reconstructed cultures be created?

For answers, we turn first to a globally honored, self-described scientist who (a) successfully introduced an integrated set of specific practices within varying societies, (b) persuasively demonstrated that a carefully designed set of specific practices can dramatically shift cultural ecologies and thereby reduce violence (domestic, religious/collective, and structural), and (c) clarified some of the obstacles that must be overcome in this process, all within the paradigm of a *constructive programme*. There is currently no better example of a scientifically oriented, intentional effort for constructing a humane and sustainable society—even with all of its historical limitations (Schell, 2004).

A Cultural Systems Example: Gandhi's Path Toward the Constructive Programme⁴

Gandhi understood nonviolent action as a real, if embryonic, science (Dear, 2002; Schell, 2004). In his autobiography he states, "I simply want to tell the story of my numerous experiments with truth... my life consists of nothing but those experiments" (Gandhi, 1983, p. 122). He further noted that "I am but a humble explorer of the science of nonviolence" (Gandhi, 1999b). Gandhi believed that "undreamt of and seemingly possible discoveries" (Gandhi, 1940, p. 134) could emerge from this scientific stance, adding that "there is a wide scope for research and experiment in this field" (Gandhi, 1940, p. 376)—a deeply ecological field, explored in complex, highly challenging real-world struggles.

Gandhi proved largely correct. As data have accumulated, it is clear that nonviolent action for social change can be very powerful; even in cases of severe injustice, nonviolent methods have proven durable, and in most cases substantially more effective than violence (Chenoweth & Stephan, 2011; Schell, 2004). Gandhi's nonviolent activism began in South Africa, where he spent 20 years fighting for the rights of the disenfranchised. When he returned to India, he was welcomed as a national hero for his work earning equality for Indians abroad. In India, he became acutely aware of the condition of his country under British rule, including extreme poverty and a repressive regime severely restricting the rights of Indians. As a result, Gandhi launched his first nonviolent campaign against the British, calling for a day of prayer and fasting. This collective action effectively shut down the nation, followed by a march of protest with millions participating. The British government responded aggressively, arresting leaders and killing peaceful demonstrators. Gandhi then transformed the Indian National Congress (a political party) from a party of upper-class Indians to a nationalist movement (Mishra, 2018) by encouraging them to adopt the strategy of *satyagraha* (roughly, "truth power") in pursuit of freedom.

The years 1920 and 1921 were a period of widespread civil disobedience led by Gandhi. However, in 1922 when some of Gandhi's followers killed 21 police officers in a demonstration in Chauri Chaura, Gandhi suspended the *satyagraha* movement. By this time, over 50,000 Indians were in prison relating to Gandhi's movement. When he suspended the campaign, the prisoners were released, but Gandhi was arrested. Before sentencing, Gandhi (1999a) stated, "non-cooperation with evil is as much a duty as co-operation with good" (p. 384). Gandhi was given the maximum sentence of 6 years but was released after 2 years due to failing health. During this time he started working on what would become his *Constructive Programme*.

Gandhi (1945) believed that nonviolent action could be a "full substitute" for violence (p. 3), and that civil disobedience was useless without shaping and sustaining an alternative, more just reality. Nonviolence was not defined by the absence of

⁴We retain here the British spelling, as Gandhi's *Constructive Programme* is distinctively and widely labeled in that way.

violence, rather it was action guided by truth and love toward positive social change (Dear, 2002). For this purpose, he wrote the *Constructive Programme* which he described as “the truthful and non-violent way of winning *Poorna Swaraj*” (Gandhi, 1945, p. 2), or “complete independence by truthful and nonviolent means” (p. 5). Gandhi’s *Constructive Programme* prioritizes the construction of a healthy society, with improvements across multiple interlocking dimensions of daily life, all of which he viewed as indispensable for the final goal (see Table 13.1). These practices would interlock to create an ecology of justice and communal well-being.

Table 13.1 The *Constructive Programme* (all direct quotes from Gandhi, 1945 [in public domain])

| | |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Communal Unity | Gandhi notes that everyone involved agreed on the need for some form of unity among the Indian population across all fissures and barriers, but asserts that what was required was “unbreakable heart unity” (6) that specifically transcended religion and political structures, which functioned as “a platform for wrangling and sharing the crumbs of power that may fall from rulers whoever they may be” (7) |
| 2. Removal of Untouchability | Gandhi argues that commitment to equality of <i>Harijans</i> (<i>dalits</i>) needed to be viewed not in terms of political necessity, but rather as indispensable for constructing a just society, which must be just for all |
| 3. Prohibition | Gandhi viewed dealing with “the curse of intoxicants and narcotics” (8) as highly detrimental to society. Others have noted another dimension involved here, namely that the British supplied much of the liquor used in India, and therefore that the purchase of liquor, like other British goods, supported the continuation of the empire |
| 4. Khadi | Often viewed as the most romantic element of Gandhi’s programme, he described the production and use of homespun material instead of British cloth as “the beginning of economic freedom and equality of all” (9). This emphasis had both direct implications for withdrawing economic support from the empire and growing indigenous and local economies, but also of leveling down society, reducing the symbols of social class and caste |
| 5. Other Village industries | Believing most human needs could be provided by village industries and craftsmen, Gandhi believed a commitment to such industries would further support independence and local economies that could eliminate “pauperism, starvation, and idleness” (13) |
| 6. Village sanitation | Gandhi was deeply disturbed that “instead of graceful hamlets dotting the land, we have dung-heaps” (13). He regarded this serious public health risk as largely the result of neglect by those in power. He discusses the need for universal health education in a separate section; here he is emphasizing the responsibilities of those in power |
| 7. New or basic education | An important dimension of the constructive programme added later than some of the others, and with direct contemporary applicability, was the need for an alternative form of education for children. Gandhi recognized that the colonial system established beliefs, values, and practices that supported the continuation of that system, and that an alternative, indigenous form of liberatory education was essential to self-rule |
| 8. Adult education | In addition to teaching basic skills like reading and writing, Gandhi was clear in this section on the need for what we now would call political education and consciousness-raising for adults who were thoroughly indoctrinated to the enormous power of the empire |

(continued)

Table 13.1 (continued)

| | |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9. Women | This section demanded that women, who were “in the position somewhat of the slave of old who did not know that he could or ever had to be free,” (16) be viewed and treated as “equal partners in the fight for <i>Swaraj</i> ” (17). Gandhi was explicit and insistent about the need for men to change their behavior toward women, treating them as “honoured comrades in common service” |
| 10. Education in health and hygiene | Beyond the need for village sanitation discussed earlier, in this section Gandhi emphasizes the need for universal health education, with a focus on giving people power over and responsibility for their own health and survival |
| 11. Provincial languages | Similar to recent campaigns to support the use of survival of indigenous languages to support survival of native cultures, here Gandhi advocated that traditional languages be actively preserved and used as a means of bridging gaps between classes and sustaining the beauties of regional Indian cultures |
| 12. National Language | Gandhi insisted that Hindi (including Hindustani and Urdu variants), the language understood by the largest number in India, be the language of education and governance, rather than English, the language of colonization |
| 13. Economic equality | Seeing economic equality as the “master key” to self-rule, Gandhi insisted both on “levelling down of the few rich in whose hands if concentrated the bulk of the nation’s wealth on the one hand, and levelling up of the semi-starved naked millions” (20). Clearly he is dealing here with concerns of the income and wealth disparities that continue to be major problems in contemporary societies globally |
| 14. <i>Kisans</i> | <i>Kisans</i> , the peasantry that constituted the vast majority of Indian society at the time, were one of several groups on whose inclusion Gandhi insisted |
| 15. Labor | Gandhi believed strongly in the potential of labor unions to give voice, to provide mutual support, and to contribute to governance outside established and self-interested political parties |
| 16. <i>Adivasi</i> | “ <i>Adivasi</i> ” is a term Gandhi invented to denote indigenous people of the hills (hill tribes) who were largely excluded from influence. Gandhi here insisted that service to these groups “is not merely humanitarian but solidly national, and brings us closer to true independence” (24), an argument that has reemerged in the insistence that social service should be offered with recognition that if one is suffering, all are suffering |
| 17. Lepers | Gandhi noted that “what the leper is in India, that we are, if we will but look around us, for the modern civilized world” (24). He therefore made a strong argument for service to, and inclusion of lepers in the new India he envisioned |
| 18. Students | Although Gandhi noted his close relationships with students, and their importance for the future, he was quite concerned that “the lure of the current [colonial] education, though it is false and unnatural, is too much for the youth of the country,” (25) as it provided a route to career and privilege while drawing them away from the people. He therefore provides a more detailed 11-point program for this group to prepare them to contribute to the movement |
| The place of civil disobedience | Gandhi believed that if all parts of the constructive programme were universally observed, full self-rule would be inevitable. At the same time he was enough of a realist to recognize that not all would do so. Under these circumstances he noted that disruptive campaigns of civil resistance would also be necessary |

The final item in Gandhi's discussion of his *Constructive Programme* is civil disobedience. Because a complete commitment to nonviolence and social justice is unlikely within any large group of individuals seeking independence, "it is necessary to know the place of Civil Disobedience in a nation-wide non-violent effort" (Gandhi, 1945, p. 30). Specifically, civil disobedience may be used to address a local wrong, as a way of evoking local consciousness or conscience, or as a component of a larger effort. But still, "Civil Disobedience without the constructive programme will be like a paralyzed hand attempting to lift a spoon" (p. 31).

According to biographer John Dear (2002), Gandhi's legacy "boasts the first widespread application of nonviolence as *the* most powerful tool for positive social change" (p. 17). While components of the programme (as expected) proved difficult to implement, his model of constructive noncooperation has been used in many successful resistance campaigns (Schell, 2004). And, although it may appear that extreme injustice requires an extreme solution (e.g., violent uprising), rigorous historical research demonstrates that nonviolent options are on average significantly more effective (Chenoweth & Stephan, 2011).

A Twenty-First Century, Science-Based Constructive Programme

Constructive Noncooperation

One of the main challenges with violent uprisings is that the best possible outcome is rarely more than the absence of the defeated party rather than the presence of a more suitable partnership. The worst possible outcome is escalation of further violence. A crucial alternative is constructive noncooperation. According to Mattaini and Atkinson (2011), "At its heart constructive noncooperation involves the construction and sustainment of a new, self-reliant and self-determining culture within the shell of—and in resistance to—structural oppression" (p. 9). Next, we briefly describe eight constructive noncooperation strategies with promise for reducing violence (see Table 13.2). As an example, in his 2016 dissertation, Robert Aspholm identified many reinforcers built into contemporary gang (clique) culture on the South Side of Chicago:

Gangs provide marginalized young people with a place in the human web; a powerful form of family and even love for those who have never experienced them; important—if limited—economic opportunities and supports; and a viable means of resistance to the psychological trauma associated with poverty, racial denigration, economic exclusion, and physical insecurity. (p. 3)

Critically, current analyses indicate that potential reinforcers associated with gang culture can also emerge from involvement in activist groups working for social justice (Mattaini & Aspholm, 2016; Stephan & Thompson, 2018). Such activist groups have demonstrated power for change around the world, resisting oppression and potentially constructing a more just society (McCarthy & Sharp, 1997).

Table 13.2 A Twenty-First Century Constructive Programme to challenge violence

| Strategic goals for challenging violence | Potential systemic supports |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Global expansion of youth activism for social justice and sustainable cultural practices | <ul style="list-style-type: none"> • Construction of local and global electronic and in-person networks of youth activists • Construction of networks of support for youth activism within multiple social sectors (e.g., religious institutions, nongovernmental organizations, local community organizations, businesses, media, and others) • Development of accessible educational programs for youth emphasizing social justice, consciousness-raising, and the dynamics of advocacy, civil resistance, and movement building |
| 2. Support within cultural systems for respectful action and inclusion | <ul style="list-style-type: none"> • Incorporation of state-of-the-science diversity and inclusion education in business, government, education and service systems, with emphasis on relational responding • Media campaigns supporting effective bystander action to interrupt damaging and support alternative behavior • Research to rigorously track progress in this area within organizations and communities |
| 3. Reliance on evidence-based educational practices within educational organizations and cultures | <ul style="list-style-type: none"> • Evidence-based academic and nonacademic education initiatives • Elimination of zero-tolerance policies and disproportionate discipline • Addressing implicit bias in schools and with law enforcement |
| 4. Expansion of transformative justice approaches, including in educational and justice systems | <ul style="list-style-type: none"> • Integration of circle and conferencing approaches as alternatives to school suspension and expulsion • Testing of innovative restorative approaches for intimate partner violence • Advocacy supporting integration of community-grounded transformative practices into campaigns to reduce incarceration |
| 5. Systemic action to moderate global climate change and support resilient practices | <ul style="list-style-type: none"> • Inclusive participation by business, political, educational, media, and social systems to develop specific and realistic goals for effective action • Establish realistic contingencies and metacontingencies supporting those goals, with attention to relational responding • Establish effective local, state, national and global tracking systems designed to impact cultural practices at each level |

(continued)

Table 13.2 (continued)

| Strategic goals for challenging violence | Potential systemic supports |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. Broad expansion of genuinely fulfilling and environmentally sustainable and resilient lifestyles | <ul style="list-style-type: none"> • Construction of alternative cultures emphasizing lifestyles based on resource-light aesthetic challenges and pleasures in resistance to consumerist practices • Advocacy for work-time reductions • Exposure to natural environments |
| 7. Widespread cross-sector action to increase income and resource equity while ensuring systemically structured support and accompaniment for survivors of economic violence | <ul style="list-style-type: none"> • Advocacy encouraging opinion leaders (media, political, religious) to raise public awareness of the risks associated with economic inequities • Expanded translational and implementation research within behavior science • Embed accompaniment practices into community systems guided by recipient voices, partnered with activists and service providers |
| 8. Systemically supported integrity in public life | <ul style="list-style-type: none"> • Mass education on the prevalence of “fake news” and strategies to determine the validity of news stories • A systemic commitment to sharing verified, unbiased information • Challenges to disinformation and advertising motivating resource-intensive consumption |

As you explore each of the strategic possibilities listed, see to what extent you can map cultural systems dynamics that define existing conditions, the changing dynamics if the strategy were successful, and the contingencies, metacontingencies, and resources required from multiple outside systems that might be required to achieve the desired changes. Refer to Chap. 3 of this volume for further guidance in doing so.

Global Expansion of Youth Activism for Social Justice and Sustainable Practices

Given the goal of expanding youth activism as a means for reducing violence, we focus here on three promising systemic supports. *Developing local and global in-person and electronic networks of youth activists* has the potential to leverage considerable power for reshaping communities and societies through a progressive process of “escalating liberation” (Sharp & Raqib, 2010, p. 38). In-person networks are demonstrably more resilient and able to withstand pressure to withdraw than are less intimate networks, as “one fire kindles another” (Deming, 1971, p. 254). Face-to-face contingencies are often powerful, and connections with diverse social networks can further “feed ... strategic capacity” (Ganz, 2009, p. 17). Increased use of new technology to support activism is demonstrating its own kind of power (Carty, 2015), although such technologies have in some cases proven vulnerable to interruption or to tracking by opponents (Chenoweth & Stephan, 2011; Mattaini, 2013).

Organized activism often faces considerable resistance from existing community systems comfortable with the existing, even if structurally violent, homeostatic situation. In such cases, *constructing networks of support for youth activism within multiple social sectors* can be extraordinarily important. The current (2020) Black Lives Matter movement shows tremendous promise—more so if widespread community support emerges and can be sustained. For example, positive media coverage, physical and resource support from religious groups and community agencies, and consultation from established activists can often counter resistance from networks and players attempting to frame activism as dangerous or criminal (Mattaini, 2013). Shifts in equivalence relations (from {protest \approx extremism} to {protest \approx democratic action}) and other such shifts in relational responding are central to social change—and to blocking it.

Finally, *development of accessible educational programs for youth* emphasizing social justice, consciousness-raising, and the dynamics of advocacy, civil resistance, and movement building can prepare young people for activism, and incidentally assist in developing interconnected youth and experienced activist networks. Young people experiencing violence (of whatever kind), or who live in marginalized communities, often do not recognize the oppressive dynamics present until given opportunities to explore them (Atkinson, 2012).

Support Within Cultural Systems for Respectful Action and Inclusion

Recent years have seen frequent and highly publicized examples of a range of discriminatory practices, harassment, and violence motivated by gender and gender identity, race, ethnicity, religion, politics, and other increasingly tense divisions. The Federal Bureau of Investigation (2017) reported 7175 hate crime incidents in 2017, the third consecutive year of increased numbers. Disproportionate outcomes are prevalent for minorities in healthcare and mental health treatment (Smedley, Stith, & Nelson, 2002), education (Rudd, 2014), and criminal justice (Smith, Levinson, & Robinson, 2014), driven by implicit bias, among other contributors. These inequities and others have been termed *structural racism*, “a system in which public policies, institutional practices, cultural representations, and other norms work in various, often reinforcing ways to perpetuate racial group inequity” (Lawrence, 2004, p. 11), resulting in structural violence.

Incorporation of state-of-the-science diversity and inclusion education in business, government, education and service systems, with emphasis on relational responding may be an effective systems intervention to address this need. Current practices are often designed to “check the box” for state and/or federal mandates (e.g., sexual harassment trainings). However, as bias becomes better understood as relational responding, researchers have suggested targeting it as a general process, rather than intervening on biases toward specific groups (Levin et al., 2016). Recent examples of diversity and inclusion trainings that address relational responding provide a foundation for evidence-based diversity and inclusion education. For example, Acceptance and Commitment Therapy/Training (ACT)-based interventions

have shown promise in reducing stigmatizing attitudes by weakening the relational networks influencing bias (Hayes et al., 2004; Masuda et al., 2007) and racial prejudice (Lillis & Hayes, 2007).

Media campaigns supporting effective bystander action to interrupt damaging behavior and support alternative behavior may also contribute to systems change. A recent example is the #metoo movement that arose in 2017. Women used the hashtag #metoo on social media if they had been the victim of sexual assault or harassment so the enormity of the problem could be seen. On the day the hashtag was introduced on Twitter, it was used over 200,000 times; on Facebook it was used in 12 million posts in the first 24 h. The effects on participants and bystanders alike were swift. An initial New York Times article traced the firing of at least 200 prominent men as a result of the movement (Carlsen et al., 2018), and a small-scale study by the Society for Human Resource Management found that a third of 1000 executives surveyed indicated that they had changed their behavior as a result of the #metoo movement (Greenfield, 2018). Movements such as Black Lives Matter have evoked considerable media attention to systemic oppression and police violence against black individuals. These types of media and social media movements influence strong social pressure with the potential to evoke bystander action.

No intervention is complete without a plan to monitor the effects—and yet attention to such evaluations in areas of diversity, harassment, and interventions in those areas are currently uncommon. Once interventions have been specified, it will be important that researchers *rigorously track progress in this area within organizations and communities*, make modifications when necessary, and scale-up when effective practices are identified (Biglan, Ary, & Wagenaar, 2000; Mattaini, Jason, & Glenwick, 2016).

Reliance on Evidence-Based Educational Practices

From kindergarten through high school, we spend over 2000 days of our young lives in school. *Evidence-based academic and nonacademic education initiatives* are needed to give children the education and skills they need to be successful. Not only is education a significant protective factor against violence and delinquency (Foshee et al., 2011), students are captive audiences during school hours creating a potential for students to be taught a wide range of prosocial behaviors that may serve an additional protective function. The PAX Good Behavior Game and School-wide Positive Behavioral Interventions and Supports (SWPBIS) are evidence-based interventions that target intentional teaching of prosocial behaviors, self-regulation, and social and emotional learning. Substantial research has shown the positive impacts of these school-wide and classroom behavioral interventions including reductions in problem behavior and exclusionary discipline and improved academic achievement (Embry, 2002; Horner, Sugai, & Anderson, 2010).

Research indicates the *elimination of zero-tolerance policies and disproportionate discipline* in schools would have a positive impact on rates of violence and incarceration. The American Psychological Association found that zero-tolerance

policies “not only fail to make schools safe or more effective in handling student behavior, they can actually increase the instances of problem behavior and dropout rates” (Farberman, 2006, n.p.). Further, these policies disproportionately affect children of color, aligning with a larger problem of disproportionate discipline in schools. Students who experience suspension and/or expulsion are more likely to drop out of school, commit crimes, and be involved with the juvenile justice system (U.S. Department of Health and Human Services, 2001) giving this phenomenon the name “school to prison pipeline” (Wald & Losen, 2003). SWPBIS has shown promise in reducing but not eliminating the discipline gap between minorities and their white peers (McIntosh, Gion, & Bastable, 2018). The restorative approaches described below, with the educational initiatives just discussed may offer better, empirically supported options.

Addressing implicit bias in schools and with law enforcement would be a valuable enhancement to the preceding systems change. Research has indicated that the achievement gap and disproportionate discipline, including disproportionate contact with law enforcement are impacted by implicit bias (Gregory, Skiba, & Noguera, 2010). The strategies described above for addressing bias in terms of relational responding (Levin et al., 2016) may be effective additions to school staff and law enforcement training.

Expansion of Restorative and Transformative Justice Approaches

Restorative and transformative justice approaches offer less punitive, and in many cases more powerful strategic responses than those commonly used in school and community settings. The common term *restorative justice* indicates that the goal is to bring relations back to a stable condition within relationships and settings; recently the term *transformative justice* has become widely used to encourage new, more desirable and just outcomes.

Integration of circle and conferencing approaches into existing academic settings has considerable support, often as alternatives to suspension, expulsion, and detention (Mattaini & Holtschneider, 2018; Riestenberg, 2012). Such alternatives range from student juries to the use of restorative and accountability circles. Preference here should be for approaches that bring those affected (or a subset of them) into a single circle in which all, victims, offenders, and organizational or community members have significant voices in resolving the current issue. Unlike the more coercive jury-style approaches, circles help to both develop accountability arrangements and reintegrate youth into the school community. Data for these approaches appear very promising, but at this time should still be regarded as tentative (Fronius, Persson, Guckenburg, Hurley, & Petrosino, 2016).

Community level restorative/transformative approaches for situations of intimate partner violence hold promise, but caution is required until these approaches are further refined and studied (Fulambarker, 2013; Ross, 2006). Zarling and colleagues have initiated an ACT-based approach that has produced promising data in

terms of reductions in assault and recidivism (Zarling, Bannon, & Berta, 2017; Zarling & Berta, 2017).

Finally, a third valuable and relatively well-established systemic emphasis is *advocacy supporting integration of community-grounded restorative practices* in efforts to reduce incarceration. Communities are deeply involved both in criminal behavior and responses to it. As is the case with schools, there are substantial data indicating the potential of restorative approaches in this sector (Bouffard, Cooper, & Bergseth, 2017; Dandurand, 2016).

Systemic Action to Moderate Global Climate Change and Support Resilient Practices

Resource scarcity is a known contributor to worldwide violence. In the Toolkit and Guidance for Preventing and Managing Land and Natural Resources Conflict, Grzybowski (2012) writes, “The exploitation of high-value natural resources, including oil, gas, minerals and timber has often been cited as a key factor in triggering, escalating or sustaining violent conflicts around the globe” (p. 3). While behavior change at any level is welcome and helpful, the consensus among scientists and researchers aligns with a 2014 Intergovernmental Panel on Climate Change report, “Effective mitigation will not be achieved if individual agents advance their own interests independently. Climate change has the characteristics of a collective action problem at the global scale...[i]nternational cooperation is therefore required” (Pachauri & Meyer, 2014, p. 5).

This issue may be addressed most effectively by large-scale systems change including *inclusive participation by business, political, educational, media, and social systems to develop specific and realistic goals for effective action*. These include the regulatory solutions suggested by Grant (2011) and shifting contingencies for businesses to incorporate financial incentives for reducing environmental impact and/or financial penalties for organizational practices that are damaging to the environment. One problem with such financial contingencies is that they can often be evaded (Biglan, 2009). Such large-scale systems change may however be heavily influenced by grassroots movements insisting on global change.

Establishing realistic contingencies and metacontingencies supporting those goals, with attention to relational responding is promising strategy. Skinner (1987) famously wrote about the utility of behavior science for addressing large-scale problems and the failure of society to embrace it. In a response to Skinner, Dixon and colleagues emphasize “behavior science has been limited by failing to translate post-Skinnerian theoretical advances and laboratory discoveries that emphasize derived stimulus relations to scaled-up, impactful, and evidence-based technologies for use by members of the society” (Dixon, Belisle, Rehfeldt, & Root, 2018, p. 242).

Alavosius, Newsome, Houmanfar, and Biglan (2016) provide an example of a man buying a new car. As they describe, “His purchasing behaviors are not simply the result of rational decisions about costs and utility” (p. 519). His purchasing behavior is influenced by a network of relational responding based on social

influence, his perception of his own identity as influenced by his values, and even by the media. Alavosius and colleagues therefore recommend that “efforts to alter direct contingencies should accompany educational initiatives and savvy marketing and advocacy campaigns on a huge scale to influence the relevant relational networks of millions of people” (p. 519). Thus, a potential exists to target relational responding to evoke decision-making that is more in line with sustainable outcomes.

Establishment of effective and accessible local, state, national global tracking systems will be required to track progress over time and expand planning related to increase the incidence of practices supporting advances in the climate change and sustainability areas culture-wide. Much more information on climate change, sustainability, resilience, and potential culturo-behavior science responses is found in Chaps. 10, 11, and 12 of this volume.

Broad Expansion of Genuinely Fulfilling, Environmentally Sustainable, and Resilient Lifestyles

Consumerism promotes structural violence (Rylko-Bauer & Farmer, 2016). Niwano Peace Prize awardee Sulak Sivaraksa has written extensively on the subject, lamenting the seemingly pervasive connection between buying and happiness, and stating, “[t]he deterioration of the community as a significant social, economic, and political system is both a cause and a consequence of consumerism in the contemporary world” (Sivaraksa, 2002, p. 54).

The construction of alternative cultures emphasizing lifestyles based on resource-light aesthetic challenges and pleasures in resistance to consumerist practices has potential to address this crisis, shifting valued action from consumerism to environmentalism. This may include individual behaviors such as choosing a fuel-efficient car, or larger-scale coordinated efforts such as a community coming together to move to solar power. Lyle Grant (2011) points to evidence that “climate change is driven by larger cultural factors or metacontingencies (Glenn, 1986, 1991) that elevate economic growth over the longer term well-being of the planet and its inhabitants” (p. 245). Grant cautions against relying primarily on green buying, which can misdirect the burden of the heavy lift to the individual, instead of to larger ecological systems including “corporate interests that motivate consumption and profit from it” (p. 246). Moving to specifics, he provides four classes of potential approaches to reduce climate change and support resilience: consumption-based, culture-based, regulatory, and dissemination. More information related to encouraging alternative, sustainable lifestyles through narrative is found in Chap. 12 of this volume.

Advocacy for work-time reductions can also have an impact on climate change and resilience. Work-time reduction trades material wealth for the wealth of time (Schor & White, 2010). A Swedish study indicated that a 1% overall decrease in working time could reduce energy use by 0.7% and greenhouse gas emissions by 0.8% (Nässén & Larsson, 2015). Another study found that the U.S. could significantly reduce carbon emissions by reducing the traditional work week to a standard

European work week averaging about 30 h (Rosnick & Weisbrot, 2006). In terms of violence, this strategy could have two layers of effects by reducing environmental impact while offering more high-quality time to support healthy lifestyle choices and cultural practices as outlined throughout this chapter—and thus potentially reduced levels of violence.

Exposure to natural environments is widely considered to be essential for our health (e.g., Jackson, Daniel, McCorkle, Sears, & Bush, 2013; Selhub & Logan, 2012). Further, such exposure, particularly at the cultural level, reduces air and water pollution (Wakefield, Elliott, Cole, & Eyles, 2001), moderates extreme weather patterns (Jesdale, Morello-Frosch, & Cushing, 2013), and increases access to fresh foods (Litt et al., 2011). Research has shown a correlation between access to green space and levels of physical activity (Cohen et al., 2007; West, Shores, & Mudd, 2012) and decreased levels of stress and anxiety (Bratman, Hamilton, & Daily, 2012; Ward Thompson et al., 2012).

Access to natural environments and other forms of environmental privilege raise issues of inequity worldwide. Environmental hazards are greater in communities of low socioeconomic status and high racial/ethnic diversity (Chakraborty, Maantay, & Brender, 2011), contributing to health disparities (Jennings & Johnson Gaither, 2015). The environmental justice movement analyzes these inequities and strives for a more equitable distribution of green spaces and the associated health benefits—one way to challenge structural violence.

Cross-Sector Action to Increase Income and Resource Equity

The impacts of economic inequities are demonstrably severe for marginalized people and groups (Rylko-Bauer & Farmer, 2016), but also for the well-to-do (Biglan, 2015), and for overall social and cultural stability (Brady & Burton, 2016). Recognition of these realities is not widespread among the general population and increasing such awareness clearly requires *science-grounded advocacy directed toward opinion leaders* (e.g., key media, political, nongovernmental organizational, and religious figures). Advocates and targeted opinion leaders can draw on existing behavior analytic work, including early work on public policy advocacy (Fawcett et al., 1988), and persuasion (Mattaini, 2013). Shifts in contingency networks (see Chap. 3) and efforts to transform collective relational responding with the goal of changes in public policy required to address economic inequities offer two possibilities.⁵

A second essential systemic direction is a substantial *expansion of translational and implementation research within the behavior science community to address collective relational responding* that support, or could challenge, biases and commitments to inaccurate understandings of the social and natural world (Dixon et al., 2018). Behavior science offers unique tools for understanding how implicit bias and

⁵The Chapters 16 and 17 in this volume offer additional guidance in this area.

false opinions are formed, why they are difficult to change, and how those difficulties might be overcome.

Moderating economic inequalities is a critical cultural goal. In the meantime, however, survivors of economic-structural violence require opportunities to access supports necessary to meet universal human rights (including those for adequate food, shelter, medical care, education, and opportunities for work and other contributions). Those who are struggling often require extended accompaniment including case/care management centering attention on recipient voices (Farmer, 2013) to functionally access those rights. Shifting collective relational responding related to survivor populations is essential if action to remediate inequities is to achieve political success. Finally, behavior analysts can assist in bringing survivors into networks of collective leadership for developing workable, satisfying, and sustainable community strategies (Briscoe, Hoffman, & Bailey, 1975; Mattaini & Holtzman, 2018).⁶

Systemically Supported Integrity in Public Life

In our current climate of political unrest, the media (traditional and social media) hold a significant role in the worldwide discourse. Americans' access to news 24 h a day results in more constant and intense influence from public figures. This close contact and the divisions between political parties have the potential to incite emotional behavior, up to and including violence. Politics have specifically been linked to violence, with a CBS News poll finding that 73% of responders indicated that the tone of political debate in the U.S. encourages violence (De Pinto, Backus, Khanna, & Salvanto, 2017). Mass media are commonly being used to spread untruths for the purposes of affecting politics and inciting public unrest. Research has shown that readers are easily deceived, with one study indicating that more than 80% of fake headlines were categorized as accurate by readers. The reinforcement derived from consuming information that confirms prior belief is strong, and serves as a barrier for fact-checking, resulting in the acceptance and spread of false information, and thereby in increased upset, outrage, and further divisions (Tsipursky, Votta, & Roose, 2018).

Related strategies that may combat this phenomenon are *mass education on the prevalence of "fake news," and strategies to determine the validity of news stories*, and *a systemic commitment to sharing verified, unbiased information meant to inform and not to ignite violence* among news and social media outlets. Large organizations are becoming more sensitive to this concern, and are taking steps to address it. For example, YouTube made news by announcing they would suppress promotion of videos with misinformation and conspiracy theories to counteract extremist content and fake news (Wakabayashi, 2019). Meet the Press, in devoting

⁶Additional guidance for behavioral advocacy, activism, and accompaniment can be found in Chapters 16 and 17 in this volume.

entire show to climate change, announced that they would not include climate deniers, with host Chuck Todd stating, “The science is settled” (NBC News, 2018).

An additional support may be *challenges to disinformation and advertising motivating resource-intensive consumption*. The era of social media has increased consumption as celebrities and “lifestyle bloggers” are paid to promote products that influence legions of fans to consume. However, the social sustainability movement is gaining steam, with influencers supporting reductions in plastic and other trash, vegan lifestyles (Forgrieve, 2018), tiny house living (Bahney, 2018), and other sustainable practices. Both social media and traditional media are powerful tools. Government, commercial, and private organizations use media (e.g., print, audio and video commercials, billboards) to promote behavior change; commitments to integrity and sustainability can promote culturally healthy, and less violent, societies.⁷

Conclusion

Something is, indeed, terribly wrong: many people and groups live out their lives embedded in ecologies of violence. Hope however lies in an emerging scientific capacity to construct ecologies of justice, which by their nature concurrently challenge and resist interpersonal, collective, and structural violence. We have outlined a possible data-supported twenty-first Century constructive programme to operationalize such a shift; there is clearly much more scientific work to be done, both conceptually and experimentally. We can, however, draw on emerging science and partnerships with other disciplines including public health, social work, public policy, and urban planning among others, to accelerate progress toward sustainable ecologies of justice.

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⁷For additional strategic guidance related to this challenge, refer to Chap. 10 in this volume.

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Chapter 14

A Behavioral Community Approach to Community Health and Development: Tools for Collaborative Action



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Overview of Chapter

It is important for researchers, scientists, and practitioners to continue to advance behavioral community approaches for addressing community health and development issues. In behavioral community science, applied behavior analysis (ABA) offers an important perspective to address socially important problems and goals across a range of issues. Through multidisciplinary collaboration with researchers who serve as boundary-spanners, behavioral community research and science has been integrated into other fields. There are several disciplines including community psychology, public health, and prevention science, which at times have supported behavioral community approaches using a behavior-analytic perspective.

Throughout an evolutionary process of selection, behavioral community scientists continue to focus on the dimensions of ABA (e.g., applied, conceptually systematic, generality; Baer, Wolf, & Risley, 1968, 1987). It is important to recognize the contingencies of reinforcement that may control behavior, including our own (Bogat & Jason, 2000). For example, many behavioral community researchers have acquired federal funding. However, group designs and quasi-experimental designs are often required to demonstrate scale sufficiently to warrant external funding. In these cases, single-subject study designs may be at best nested within a broader group design (as multiple case studies), which to some may challenge the analytic criterion. As Baer et al. (1987) noted, “Perhaps the important point is that convincing designs should be more important than ‘proper’ designs” (p. 320). Often,

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behavioral community research must balance optimizing as many of the core dimensions of ABA as possible, while knowing that, at times, some dimensions are less feasible or appropriate for the context. Fawcett, Mathews, and Fletcher (1980) challenged the field of behavior analysis to ensure that interventions are “contextually appropriate.” Behavioral community scientists are adept at translating behavior-analytic language and concepts into framings that are more acceptable, understandable, and promotable by other disciplines and the general public. Some examples include the distillation of evidence-based kernels (Embry & Biglan, 2008), the actively caring for people movement (Geller, 2016), nurture effects (Biglan, 2015), Pax’s Good Behavior Game (Embry, 2002), and Olweus’ Positive Behavior Supports for Bullying (Ross & Horner, 2009).

In this chapter, behavioral community approaches, interventions, and technologies are introduced within the area of community health and development. Efforts supported by the Center for Community Health and Development with the Department of Applied Behavior Science at the University of Kansas are featured to demonstrate an evolution and scaling of behavioral community research and application. Additionally, resources, frameworks, and tools developed to guide the implementation of behavioral community research and practice in community health and development are presented. However, first, the chapter explores the influence of behavioral community science and research within ABA and other disciplines supporting an integrated behavioral community approach.

History of Community Health and Development in ABA

A plethora of issues continue to plague the health, development, and well-being of society. Some of the problems that persist and are difficult to address include violence, poverty, educational disparities, climate change, food insecurity, war, racial injustices, substance abuse, and healthcare. Many of the societal challenges faced by communities often relate to social and structural determinants of health or broader underlying factors such as economic disparities or racism. A fundamental premise of ABA is the focus on addressing issues of social significance, which is critical for contributing to systematically examining and addressing large-scale issues of social importance. At the root of the science of behavior is understanding the phenomena of interest in terms of behavior and environment interactions.

Based on a behavior-analytic perspective, issues from the individual to community level can be systematically examined to achieve positive and desirable behavioral outcome(s) by modifying environmental conditions. The behavior-analytic framing of problems is important because it reduces victim-blaming through the recognition that an individual or group of people are not the problem to be fixed; rather, the problem resides in the environment in which people and groups behave (Fawcett, 1991). A focus on the ecology or environment permits reframing the problem in ways that those in communities who are most impacted by an issue can contribute to the collaborative problem-solving process. To this end, a

behavior-analytic perspective is important for understanding how to improve the health, development, and well-being of individuals and communities.

Community Applications of ABA

In ABA, there is longstanding interest in the use of the “science of behavior” to address community health and development issues. A brief history of behavioral community research within ABA and related subdisciplines provides a context (i.e., setting events) for addressing community health and development. Community applications of ABA were influenced by the major events and historical context of the 1960s. During the 1960s, there was a confluence of societal challenges including social, economic, and racial injustices, which were further exasperated by changes in the community mental health services and the return of veterans from the Vietnam War. Behavioral community technologies addressing community health and development issues were needed.

B. F. Skinner and other pioneers in ABA had a commitment to community development and contributed to improvements in related socioeconomic conditions including education, poverty, and employment. For example, in 1966, a group of behavior analysts participated in the Office of Economic Opportunity Conference on Applications of Operant Techniques to the Job Corps (Rutherford, 2009). Some of the behavior analysts attending included Israel Goldiamond, Jack Michael, Todd Risley, B. F. Skinner, Roger Ulrich, and Montrose Wolf (Rutherford). The Office of Economic Opportunity, which administered several programs including the War on Poverty, VISTA, and Head Start, began in 1964 as a result of the Economic Opportunity Act (Myers-Lipton, 2006). As demonstrated by participation in the Office of Economic Opportunity Conference, applied behavior scientists have contributed to shaping community-level policies, practices and programs through multidisciplinary approaches.

Milestones in the Era: Early Contributions to Community Health and Development in ABA The 1960s were also a critical period in the development of ABA. From best accounts, in 1959 the field of ABA was initiated, or at least the foundational publications that gave impetus to the extension of the subdiscipline from the experimental analysis of behavior (Morris, Altus, & Smith, 2013). Between 1960 and 1990, alongside the development of ABA there was continued advancement in behavioral community technology and research to address community issues (Jacobs, 1991). In the 1960s and 1970s, the dissemination of behavioral community research was supported through the establishment of the *Journal of Applied Behavior Analysis (JABA)* in 1968 and *Behaviorists for Social Action Journal (BFSAJ)*; later renamed *Behavior Analysis and Social Action [BASA]* and then *Behavior and Social Issues [BSI]*. A seminal article, “Some Current Dimensions of ABA,” published in the first issue of *JABA*, notes the importance of contributing to not only the analysis of individual behavior, but also to addressing problems of social significance to meaningfully impact society (Baer et al., 1968).

Behavioral Community Research Publications in JABA

Between 1968 and 1991, one indicator of behavioral community research was an increase in articles published in *JABA* focused on the community setting. Fawcett et al. (1980) offered seven key dimensions to guide behavioral community technology: (1) effective, (2) inexpensive, (3) decentralized, (4) flexible, (5) sustainable, (6) simple, and (7) compatible. The dimensions for behavioral community technology remain applicable to guide behavioral community research.

In 1991 (Geller, 1991), *JABA* published special sections focused on behavioral community interventions. The section demonstrated the breadth of behavioral community applications including in the areas of AIDS prevention, smoking cessation, marijuana use, cancer, recycling, and road safety. Fawcett (1991), Jacobs (1991), Miller (1991), and others presented challenges with facilitating behavioral community research. To help address the challenges, Fawcett (1991) summarized 10 values that guided his work, recommending their adoption to support effective behavioral community research. Figure 14.1 summarizes values to guide both community research and action (Fawcett, 1991) and equitable approaches for participatory (Fawcett, Francisco, & Schultz, 2004) and community-engaged research.

Northup, Vollmer, and Serrett (1993) conducted a 25-year review of *JABA* articles and concluded at that time there was an overall increasing trend in published research in the community setting. Based on visual inspection of the graphs, it is estimated that in 1968, less than 10% of the published articles in *JABA* were in a community setting compared to approximately 20% by 1991 (Northup et al., 1993). However, in 1992, there was a decrease with 10% or less of the publications in *JABA* in community settings. Additional research is needed to further explore more recent trends of behavioral community research and publications in behavior-analytic outlets.

Network for Behavioral Community Scientists: Behaviorists for Social Responsibility

In 1978, behavioral community researchers established Behaviorists for Social Action (BFSA), now Behaviorists for Social Responsibility (BFSR), as a special interest group in the Association for Behavior Analysis (ABA). BFSR is the oldest special interest group in ABAA, which is indicative of the importance of addressing community and societal issues. According to Rakos (2019, May), “the first [BFSA] meeting attracted behavior analysts who shared an interest in applying their behavior-analytic expertise to promoting progressive social change.”

The journal, *BSI*, which is affiliated with BFSR, has a broad societal focus and commitment to promote issues related to social justice, human rights, and sustainability (Luke, Roose, Rakos, & Mattaini, 2017). In the inaugural issue of the *BFSAJ*, Morrow (1978) suggested it was an ethical concern if the science of behavior was

| Values Guiding the Work of Understanding & Improving Community Health and Development (and related disciplines) (Fawcett, Francisco, & Schultz, 2004) | Guiding Values for Community Research & Action for Behavioral Community Approaches (Fawcett, 1991) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Improvement in community health and development involves the population as a whole and not only individuals at risk. (Public Health) | A. Community research and action interventions should contribute to change and improvements |
| 2) Community health and development requires changes in both the behaviors of large numbers of individuals and the environment and broader conditions that affect health and development. (ABA) | B. Experimental research should examine the effects of modifiable environmental events on behavioral outcomes of importance. |
| 3) Issues are best determined, prioritized, and addressed by those most affected in the community. (Community Psychology) | C. Use descriptive research to provide information about the behavior-environment relationships of importance to communities. |
| 4) Improvements in health and development outcomes require attention to broader social determinants of health, including income disparities and social connectedness. (Public Health, Community Psychology) | |
| 5) Community health and development outcomes are influenced by multiple and inter-related factors that require multicomponent or comprehensive interventions as single interventions are likely to be insufficient. (Public Health, Prevention Science) | D. Ensure the selected research setting, participants, and measures are appropriate for the community problem. |
| 6) Conditions and factors affecting community health and development outcomes are often interconnected and related to multiple outcomes. (Public Health, Prevention Science) | E. Community action should occur at the level of change and timed to optimize beneficial outcomes. F. Community interventions should be replicable and sustainable. |
| 7) Behaviors affecting health and development occur across multiple people and settings, which requires engaging diverse groups and people in places and across multiple sectors of the community. (ABA; Community Psychology) | G. Use replicable measurement systems that record both the behavior and environment relationship, including changes in or with actors from the community |
| 8) Community health and development requires collaboration with others and among multiple parties. (Community Psychology) | H. Develop collaborative relationships with participants. |
| 9) Collaborative partnerships, including with intermediary or support organizations and funders, serve as catalysts for change to help convene, broker, and leverage resources that support community change and improvement. (Community Psychology) | I. Results of community research and action should be communicated to stakeholders and the public. |
| 10) Support organizations build capacity to address what matters to people in the community over time and across issues of concern. (Community Psychology) | J. Develop capacity to disseminate effective interventions and provide support for change agents. |

Fig. 14.1 Guiding values and evaluation questions for community research and action

not aiding in improving social conditions, including the displacement of truth (i.e., fake news), war, racism, and poverty. The second concern the journal supported was assuring the integration of behaviorism with other disciplines. Luke et al. (2017) examined the publication trends of *BSI* since its inception in 1978 to 2017. Between 1978 and 1988, the most frequent topics of publications were political science/policy making, collective violence, and communities. Whereas, from 2007 to 2016, the topics related more to behavioral theory, environmental sustainability, and criminal behavior (Luke et al., 2017), with modest publications specifically in the areas of community health and development.

Challenges with Behavioral Community Research in ABA

There were a few factors Hawkins, Greene, and Fuqua (1995) and others identified that challenged and consequently impacted the trajectory of behavioral community research in the late 1990s and 2000s. It was noted that research methods and designs highly regarded in ABA may have been insufficient to experimentally examine some complex societal issues (Hawkins et al., 1995; Jacobs, 1991). For instance, Fawcett (1991) suggested that behavioral community researchers consider mixed methods, including single subject and group designs to examine complex community behavioral outcomes. Additionally, the methodological publication standards of *JABA* restricted some behavioral researchers from publishing in journal outlets associated with the field. Some of the methodological challenges of behavioral community research were fundamental premises of the approach, including sharing control of the intervention with community partners and recognizing and responding to other competing contingencies (e.g., policies, community priorities). The implications were that a subset of behavioral community researchers branched out and published or affiliated with other fields and subdisciplines. Research most often published in the disciplinary literature may suggest a narrow application of behavioral community science, which is important for the field to further examine. However, it is also plausible that as new generations of scientists are trained in multidisciplinary behavioral community approaches, they may become involved in the environments (i.e., fields, jobs) in which their scholarly and professional behaviors are reinforced, which may not be solely in ABA.

The call that *BSI* and *BFSR* answered aligned with what Skinner (1987) later referred to as the uncommitted in his seminal article “Why We Are Not Acting to Save the World.” Skinner (1987) noted, “we [the uncommitted] are scholars, scientists, teachers, and writers for the media” (p. 8). The uncommitted represent those who should have a neutral base and thus can be objective in guiding behavioral community research and action. However, even for those who valued remaining uncommitted, through selection by consequences, there were environmental contingencies operating within institutions including securing funding and ensuring scholarly productivity in a “publish or perish” dichotomy, which often presented a conflict for behavioral community researchers.

Integration of Behavioral Community Research with Other Disciplines

The contributions of a behavior-analytic perspective have been recognized and integrated into other fields that address community health and development, including community psychology, prevention science, and public health. Through a multidisciplinary perspective, behavioral community approaches benefit from the strengths across the diverse, but complementary fields. Figure 14.2 summarizes some guiding

| Applied Behavior Analysis | Community Psychology | Prevention Science | Public Health |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Person-environment interaction Applied/socially important problems Action-oriented Behavioral focused Effective interventions Generality Socially valid | Social justice and power Sense of community and empowerment Prevention-orientation Ecological perspective Action-Oriented | Prevention oriented Risk & protective factor focused Ecological perspective Effective interventions Public health orientation Dissemination and scaling | Population-level focus Epidemiological perspective Social determinants of health focused Prevention-oriented Health promotion focused Effective intervention implementation Dissemination & diffusion |

Fig. 14.2 Guiding principles for behavioral community science integration across disciplines

values and considerations across the four disciplines. There are commonalities across some of the fields, such as a prevention-focus or commitment to addressing socially important problems. There are also distinctions particularly regarding how problem behaviors are analyzed and the levels at which they are addressed. For instance, in prevention science and public health a more epidemiological approach to analyzing problems is used based on systemically identifying risks. Prevention science and community psychology both focus on examining multiple levels of the ecology (e.g., individual, community) to inform appropriate interventions. Whereas, public health also recognizes the importance of ecological approaches, but promotes systemic interventions and population-level impact. The distinctions across the fields become the integrated strength of the behavioral community approach.

Behavioral Community Research in Community Psychology

In 1965, community psychology in the United States evolved from the Swampscott Conference, particularly as there were emergent issues related to how to support mental health needs in the community. Community psychology offered an expanded approach for comprehensive community mental health centers in response to legislation mandating community mental health services and deinstitutionalization (Watson-Thompson et al., 2015). Community psychology was also influenced by the socio-political events of the 1960s, including the Vietnam War and Civil Rights Movement.

Between the 1970s and 1990s, there was recognition and support for the integration of ABA and community psychology within both disciplines. Since the

mid-1970s, behavioral community psychology has evolved as a subspecialty in community psychology and ABA (Bogat & Jason, 2000). In the book *Behavioral Approaches to Community Psychology* (Nietzel, Winett, MacDonald, & Davidson, 1977), an introduction to behavioral community psychology as a subdiscipline emerged. At that time, applications of behavioral community research were present in the areas of juvenile justice and offending, drug and alcohol abuse, education, and unemployment. In 1977, Lenny Jason challenged community psychologists to be more intentional in collaborating across the fields of behavior analysis and community psychology in the development of behavioral community technology. During the 1980s, the application of behavioral community psychology was disseminated through publications, including books (e.g., Glenwick & Jason, 1980) and a special issue of the *Journal of Community Psychology* (Glenwick & Jason, 1984). According to Bogat and Jason (2000), “the field of behavioral community psychology has emerged...as a subspecialty of community psychology and ABA. It attempts to understand and change community problems through the application of behavioral theory and technology” (p. 101).

In the late 1970s, there were efforts to integrate behavioral community approaches across professional associations through the development of special interest groups (SIGs), including in behavioral community psychology. Several prominent behavioral community scientists including Lenny Jason, David Glenwick, Scott Geller, Dick Winett, and Stephen Fawcett were interested in building a bridge between the behavioral and community spheres of engagement (Fawcett, personal communication, July 24, 2019). In 1977, the Community Research SIG was developed within the Association for Advancement of Behavioral Therapies (now the Association for Behavior and Cognitive Therapies) (Fawcett, personal communication). Through the SIG the Behavioral Community Research Network Directory was developed. Between 1978 and 1993, the Behavior Community Psychology area in ABA was also organized. However, with the emergence of BFSA during this same time period, there was insufficient support for two SIGs with similar interests.

Through the 1990s and 2000s, there has been less recognition and systematic use of the term behavioral community, or intentionality in maintaining the subspecialty area within the disciplines. Yet, training and support for an integrated behavioral community approach continues to be of interest in community psychology (see Suarez-Balcazar, Francisco, & James, 2019). In 2015, at the Society for Community Research and Action meeting, the professional association for community psychologists, a roundtable discussion session, “Where Do We Go from Here: Is there Still a Place for Behavioral Community Psychology” (Watson-Thompson, Fawcett, Francisco, & Stewart, 2015) was facilitated. Some concrete recommendations emerged from the discussion such as supporting consistent key search terms across the disciplines when publishing behavioral community research to make the identification of the work more systematic. Additional recommendations were to support special sections or issues in journals to promote behavioral community research that may be now more diffused across disciplines. Additionally, it was recommended to develop behavioral community SIGs across the disciplines, and to support interaction across the SIGs. Some of the recommendations also align with practices

identified by BFSR in the Matrix Project. The goal of The Matrix Project (BFSR.abainternational.org) is to advance behavior-analytic research and application of social issues through a systemic approach that identifies the contingencies across systems or sectors (Mattaini & Luke, 2014).

Values of Community Psychology Influencing Behavioral Community Approaches There are some core values and principles of community psychology that influence behavioral community approaches. The vision for the Society for Community Research and Action (2019) is to “have a strong, global impact on enhancing well-being and promoting social justice for all people by fostering collaboration where there is division and empowerment where there is oppression.” Figure 14.2 summarizes some of the values and principles of community psychology.

In community psychology, it is important to develop a sense of community and belonging through the authentic participation of residents and groups, particularly those who are most impacted by an issue. The distribution of power, even in developing, implementing, and disseminating interventions is critical to community psychology. The engagement of individuals and groups supports both self- and collective efficacy. Self-efficacy refers to an individual’s sense of influence over their own conditions. The self-help paradigm promoted in community psychology to address a range of problems is related to enhancing self-efficacy. Collective efficacy relates to a group’s belief that they can work together to achieve a desired outcome (Bandura, 1997). Through a behavioral community approach, residents and local groups are empowered to participate in the problem-solving process.

Geller (1991) challenged behavior analysts to consider how our science may contribute to better understanding concepts, including empowerment and belonging, which have social validity in other disciplines. According to Geller (1991, 2016), empowerment and belonging/ownership are antecedents to actively caring. For instance, Geller (1991) proposed that empowerment (i.e., belief that you can make a difference) can be increased by providing frequent rewards and feedback for participation in desired processes, or by providing opportunities to set group goals and achieve “small wins.” Additionally, Geller indicated that involving intervention or change agents from the community also increases the ratio of reinforcement (i.e., number of people who can deliver a reinforcer) when engaging in the desired target behavior, which is important for scaling community-level interventions.

Community psychologists focus on building the capacity of individuals and groups in communities to come together to address their own self-identified problems and goals. It is important to consider how to continuously enhance the community capacity, or collective skills, capabilities, and resources of residents and groups to come together to address community-identified issues of importance (Watson-Thompson, Keene-Woods, Schober, & Schultz, 2013). The engagement of those in the community, or natural to the environment, in problem-solving supports program generalization and makes it more likely that behavioral community interventions can be sustained.

In behavioral community approaches, it is important to identify change agents or those who can help to bring about change and improvement in the community.

Individuals and groups may serve as targets (i.e., behavior is targeted for improvement) or agents (i.e., assist in bringing about improvement) of change. For community-level interventions, it is important to consider the multiple ecological levels where change may need to occur. Based on a socioecological approach, the intrapersonal (i.e., individual), interpersonal (e.g., family, peers), organizational, community, and broader societal or macro (e.g., policies, cultural norms) levels should be examined in considering targets and agents of change, as well as types of intervention (McLeroy, Bibeau, Steckler, & Glanz, 1988). To support empowerment and capacity-building through participation, consider how those most affected by the problem or goal may serve as targets and/or agents of change, including marginalized individuals and groups. Based on the issue, participation and inclusion should be examined, at a minimum in regard to age (e.g., youth, seniors), abilities (e.g., individuals with disabilities), race and ethnicity, gender, orientation and identity, economic status, educational status, and other characteristics that may often result in marginalization.

Social justice is another core value in community psychology. Social justice relates to ownership and collective responsibility with and for the community, including those who may be most vulnerable or disenfranchised. In community psychology, two forms of social justice have been identified, including distributive and procedural justice (Fondacaro & Weinberg, 2002). Social justice focuses on distributive justice through the equitable allocation of resources, which may include human, geographic and natural, economic, information and education, and technological resources. Whereas, procedural justice relates to the democratic process for assuring voice and power, including through participation in the process of decision-making (Fondacaro & Weinberg, 2002). Critical to social justice is empowerment, including in developing, implementing, and evaluating the intervention, as well as balancing the distribution of power across ecological levels. Some early tension in behavioral community approaches between community psychologists and behaviorists related to issues of power and control (Bogat & Jason, 2000; Fawcett, 1991). It may be difficult for behavior analysts to compromise some level of control of the intervention, which is often necessary in behavioral community research, particularly with groups who may be distrusting of researchers and those external to the community. (Consider aspects of your own privilege and opportunities you may have to engage in behaviors to increase social justice for those you may work with and/or serve.)

Behavioral Considerations in Public Health

Although public health traditionally focused on disease prevention from a biomedical perspective, public health research and practice integrates analyses of setting events and potential reinforcers of health behavior. Modern public health theories integrate the behavior-analytic paradigm to better understand the mechanisms of disease development and prevention in large populations. One theory is the

behavioral ecological model (Hovell, Wahlgren, & Adams, 2009), which integrates behavior-analytic principles with Bronfenbrenner's (1977, 1994) ecological systems theory. Epistemologically, the behavioral ecological model "is derived from philosophical tenets of functional contextualism [...] and radical behaviorism [...]" (Hovell et al., p. 417). Thus, population-level mechanisms of disease pathology are explained by the environment, not by hypothetical explanations.

Whereas, the field of public health does not explicitly mention behavior-analytic principles, the tenets of the behavioral ecological model, and ABA more broadly, are evident throughout the research. The HIV/AIDS epidemic has been a particularly important area of behavior-analytic integration within public health, and such interventions often present discriminative stimuli in naturalistic environments to occasion behavioral processes. Such experimental operations may include introducing free condoms in venues frequented by individuals at elevated risk of HIV acquisition (Bom et al., 2019) and increasing the presence or salience of mobile HIV testing sites to improve linkage to care (Bassett et al., 2014).

To be sure, public health does not focus solely on discriminative stimuli and proximal consequences of behavior. Rather, it fully integrates setting events into its understanding of complex public health behavior across individuals and settings. Many of these setting events are encompassed in the term *social determinants of health*, defined as the environmental and social conditions in which people are born, live, work, grow, and age (Centers for Disease Control and Prevention, 2018; World Health Organization (WHO), 2019). In public health, social determinants may include housing instability, income inequality, employment and working conditions, education, food insecurity, and social inclusion/exclusion. Additionally, social determinants include the structural and institutional systems that shape the conditions in which individuals live. The social determinants often serve as environmental and structural stimuli acting as setting events for behavioral contingencies.

The public health literature clearly demonstrates that social determinants impact health outcomes across populations and settings. For instance, housing instability, low social support, and lower education have been shown to be risk factors for incarceration among sexual and gender minorities (Anderson-Carpenter, Fletcher, & Reback, 2017), and a recent systematic review found that housing instability was a major barrier for engagement across the HIV continuum (Aidala et al., 2016). Within many populations, structural violence (e.g., stigma, discrimination, xenophobia) is associated with a number of health outcomes such as lower rates of health care utilization (Philbin et al., 2018), substance use (Abdallah-Hijazi, Anderson-Carpenter, Gruber, Chiaramonte, & Haight, 2019), and decrements in mental health (Blosnich et al., 2016).

Like ABA, public health addresses the co-occurring nature of disease and maladaptive behavior. Comorbidity is best understood as a *syndemic*—that is, multiple interacting health conditions that increase adverse population-level disease outcomes beyond the effects of each individual health condition (Singer & Hispanic Youth Council, 1996; Wilson et al., 2014). Similarly, at the individual level, intersectionality refers to the multiple, intersecting identities by which human organisms interact with environmental stimuli. For example, the value of a discriminative

stimulus (e.g., reading an individual's chosen name) may be different for a transgender African American woman compared to a cisgender Caucasian/White man. In this regard, the intersection of multiple identities (i.e., gender identity and race/ethnicity) acts as a motivating operation for an individual's verbal behavior. Taken together, social determinants of health, intersectionality, and syndemics provide a public health context for understanding the role of setting events and motivating operations in multiple contingencies across the behavioral ecology.

Prevention Science Understanding of Risk and Protective Factors

Prevention science is a relatively newer field that was influenced by public health and human development. The focus of prevention science is to decrease the risk (i.e., risk factor) and increase protection (i.e., protective factor) to reduce the likelihood of an individual or group engaging in a problem behavior. Risk factors address personal factors that may be biological and developmental (e.g., skills), as well as environmental factors such as economics, services, and broader policies (Center for Community Health and Development, 2018). Prevention science integrates an ecological perspective for classifying risk and protective factors across levels including the individual, family, peer, school, and community domains. For each ecological level, risk and protective factors are identified. Hawkins, Catalano, and Arthur (2002) developed a matrix of risk factors associated with adolescent substance abuse that shows the relationship across often co-occurring problem behaviors including violence, delinquency, risky sexual behaviors, and dropping out of school. The risk for engaging in a problem behavior or poor health outcomes increases with the more risk factors associated with an individual or group. Comprehensive or multicomponent interventions that address multiple risk factors are strategic (Hawkins et al., 2002).

The three primary types of prevention are primary, secondary, and tertiary prevention. For each type of prevention there are corresponding intervention strategies (i.e., universal, selective, indicated). Primary prevention is focused on addressing antecedents that may serve as risk or protective factors for a problem behavior. With primary prevention all individuals in the population are considered to have the same likelihood of risk to engage in the problem behavior. Therefore, the level of intervention is universal and is provided or is available to all individuals in a population or group. For instance, in substance abuse prevention, providing peer refusal skills training to all students to resist drugs or alcohol use in a school-based curriculum is primary prevention. Secondary prevention is focused on individuals and groups who have not exhibited the problem but have elevated or increased risk for engaging in the problem behavior. Selective prevention strategies are used to support secondary prevention. For example, a substance abuse program at a treatment facility for the children of parents who have abused drugs and are seeking treatment would be

an example of a selective strategy. Lastly, tertiary prevention may be considered early treatment or intervention as the focus is on treating the problem to reduce the risk or likelihood of the problem continuing or reoccurring. With tertiary prevention, indicated strategies focus on individuals who have already engaged in the problem behavior. An example of an indicated strategy is required participation in a diversion program after being cited for driving under the influence. Often, community-level interventions support comprehensive or combined multicomponent interventions supporting multiple levels of prevention interventions (Greenwood et al., 2017).

Strategic Prevention Framework as a Comprehensive Intervention In the early 2000s, the Substance Abuse and Mental Health Services Administration (SAMHSA) developed the Strategic Prevention Framework (SPF) as a systematic and comprehensive approach to support community-based efforts in reducing problem behaviors such as underage drinking and substance use. The SPF provides a five-phase iterative process (i.e., assessment, capacity, planning, implementation, and evaluation) to promote culturally responsive adaptations and sustainability of evidence-based strategies. In September 2005, the Kansas Department of Social and Rehabilitation Services (currently, the Kansas Department for Aging and Disability Services) was awarded a 5-year, \$ten million, Kansas SPF-State Incentive Grant from the Center for Substance Abuse Prevention (CSAP). There were 14 Kansas community coalitions funded to implement a combination of evidence-based strategies to reduce underage drinking (Anderson-Carpenter, Watson-Thompson, Chaney, & Jones, 2016).

As part of the SPF process, each coalition conducted comprehensive community assessments with support from the state prevention system partners to identify the behavioral outcome to be prioritized and related risk or contributing factors (i.e., antecedents). An identified risk factor could be accessibility of alcohol in the community by retailers, peers, or parents, which would employ different interventions. Local stakeholders were engaged with the coalition to develop logic models grounded in the assessments to inform the planning and capacity-building phases. As part of the planning phase, coalitions developed comprehensive strategic and action plans; these plans included behavioral objectives, evidence-based prevention strategies related to each objective, and detailed action steps.

From January 2009 through June 2012, the coalitions implemented approved evidence-based prevention strategies (e.g., programs and environmental strategies) using the action plans as a guide. Each coalition actively engaged multiple community sectors as agents of change. For example, some coalitions worked closely with policy makers and judicial systems to increase the penalty for providing alcohol to youth, and others partnered with school districts to implement school-based programs aimed at teaching peer refusal skills. The community coalitions implemented 30 evidence-based strategies, with an average of four strategies per community. During the implementation phase, the community coalitions participated in ongoing evaluation activities with their state evaluation partners, which included the Center for Community Health and Development at the University of Kansas. Together, the

communities facilitated 802 documented community-level changes, with an average of 57 community changes facilitated within each community. Approximately, 36% of all community changes were new programs, 6% were policy changes, and the remaining 58% were new practices within the communities. Moreover, the funded coalitions' combined efforts contributed to a decrease in self-reported 30-day alcohol use between 2007 and 2012. From a behavior-analytic perspective, the use of indirect measurement through self-reported data is a limitation of this effort; however, from a multidisciplinary approach the use of data valued by the community and funder through mixed methods when working as interdisciplinary teams is important.

Community Health and Development Models Supporting the Work

In supporting community health and development efforts, collaboration with local people and groups is critical to foster change and sustain improvements. Improvements in community health and development goals require a long-term investment, including a commitment to the people and the place. In the remainder of this chapter, key concepts and additional frameworks are provided to demonstrate the use of behavioral community approaches that support improved community health and development.

Based on influences from ABA, community psychology, and public health, there are several underlying values to the behavioral community approach supported by the Center for Community Health and Development (CCHD) at the University of Kansas. According to Fawcett, Schultz, Collie-Akers, Holt, and Watson-Thompson (2017), “community development is both process (engagement of people and groups in collaborative action) and product (changed conditions and improved outcomes related to locally determined goals)” (p. 444). In this chapter, community is defined as people who share a common place, interest, and/or experience (Community Tool Box, 2019). For the work of community health and development, we are generally referring to people who share a common geographical place.

Frameworks Guiding Collaborative Action for Community Health and Development

There are a variety of frameworks and models in community psychology, prevention science, and public health used to guide the work of community health and development. Two of these frameworks adopted by the CCHD to support community-based efforts have been integrated as shown in Fig. 14.3, which provides an integrated framework for collaborative action with communities and incorporates both models to provide a process for supporting change and improvement. There is

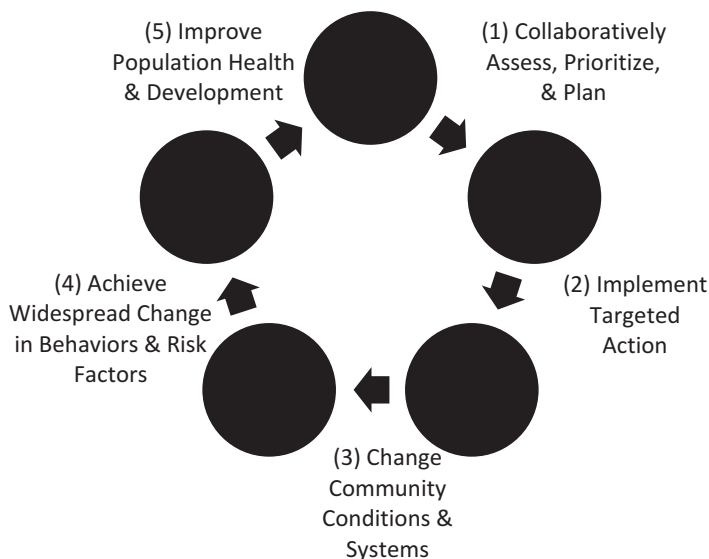


Fig. 14.3 Integrated Framework for Collaborative Action for Community Health & Development. (Adapted from the Framework for Collaborative Public Health Action in Communities. Institute of Medicine. (2003). *The community*. In Institute of Medicine (Ed.), *The future of the public's health in the 21st century* (pp. 178–211). Washington, DC: National Academies Press. Adapted from Community Tool Box. (2019). *A model for getting started*. Lawrence: University of Kansas. Retrieved from: <https://ctb.ku.edu/en/get-started>)

evidence of associated improvements in population-level health and development outcomes using the frameworks (Collie-Akers, Fawcett, & Schultz, 2013; Watson-Thompson, Fawcett, & Schultz, 2008).

Community Tool Box (CTB) Model for Collaborative Action The Community Tool Box (CTB) Model is a five-step process (CTB, 2019) that guides community health and development efforts. Based on the CTB model, communities or individuals and groups natural to the environment, come together to collaboratively address community health and development. The phases of the model include: (1) Assess and prioritize the issue at the community level through a problem analysis to better understand the issue, including the related risk and protective factors that maintains the behavior(s); (2) Plan with other collaborative partners for how to address the issue across sectors or settings of the environment in which the behavior of interest occurs; (3) Act with other individuals and groups (i.e., targets and agents of change) to implement the plan to bring about change; (4) Evaluate the effectiveness of the intervention efforts and examine if there are any corresponding changes in behaviors of groups of people in the community; and (5) Sustain the intervention and improvements in population-level behavior changes over time and in a place. The phases of the models are iterative and interactive and contribute to a continuous cycle of change and improvement.

Since 1994, the CTB has been supported by a collaborative team of behavioral community psychologists at the University of Kansas Center for Community Health

and Development (KU CCHD), the University of Massachusetts Medical School, and the University of Massachusetts Lowell. Through the KU CCHD, the CTB supports knowledge, translation, and dissemination for how to support the work of community health and development. The mission of the CTB (2019) is “to promote community health and development by connecting people, ideas, and resources” (Fawcett et al., 2004, p. 230). The CTB (<http://ctb.ku.edu>) is an online technology aimed at enhancing individual competency and group-based capacity to come together to support improvements in health and development outcomes.

Using a behavior-analytic approach, the CTB identifies competencies, skills, and processes at the community level. Through the CTB, each core competency skill and process (i.e., community-level target behavior) is broken down into components and elements, or a series of smaller actions and steps. The CTB provides access to resources including checklists, training materials, and supports to enhance the knowledge, skills, and application of individuals and groups to contribute to improvement. The CTB content is available in multiple languages including Arabic, English, Farsi, French, and Spanish. The CTB content and the related curriculum modules are used by multiple disciplines, including public health, applied behavioral science, community development, and community psychology, to train students, workforce professionals, and community members. KU also offers a Graduate Certificate in Community Health and Development using the CTB Curriculum. Figure 14.4 provides a summary of 16-core competency or skill areas based on the CTB Model for Collaborative Action.

Assess: Community Assessment and Problem Analysis

1. **Create & maintain coalitions & partnerships:** Develop or identify a partnership that can come together to address a common goal.
2. **Assess community needs and resources:** Identify assets, resources, and needs related to the effort/practices.
3. **Analyze information about the problem or goal at the population or community-level.**
 - Examine the setting and contextual factors (i.e., setting events, motivating operations).
 - Take the perspective of the people who would be completing the practice to understand the environment that will support or hinder - what are the antecedents and consequences for the practice?
 - Gather & analyze information about the goals and factors affecting practice.
 - Find references and conduct literature reviews to identify best practices.

Plan—Develop and Implement Plan of Action with Partners

4. **Develop or adopt a framework or model for change and improvement in communities:** Identify the framework or visual pathway to guide the work.
5. **Develop strategic and action plans:** Identify the vision, mission, objectives, strategies/interventions, and action steps to guide the collaborative effort.
 - Identify and prioritize the multiple sectors to engage as targets and agents of change.
 - Identify the most feasible goal area and arrange the antecedents and consequences to make that practice more likely – remember, the aim is not to make people engage in the practices, but to rather arrange the environment to make the practices more likely.
 - For each strategy selected, develop an action plan to support implementation.
6. **Build leadership:** Identify leadership to support implementation of prioritized strategies and in/across sectors.
7. **Improve organizational management:** Determine structure & human resources to support the effort. Develop a structure and way of operating together.

Act: Implement Collaborative Action with Partners

8. **Develop and implement intervention(s):** Implement community and systems changes (i.e., programs, policy, and practice changes).
 - Implement effective and feasible strategies selected by the group. Ensure technical assistance and support to build the capacity of the community.
9. **Increase participation and membership:** Increase participation & engagement of stakeholders to support the effort.
10. **Enhance cultural competence & humility:** Assess and enhance cultural competence and appropriateness of the effort with partners and the community.
11. **Advocate for change:** Support advocacy efforts and understand how to respond to opposition, if/when appropriate.
12. **Influence policy development:** Support & influence policy change in organizations and community, as appropriate for the sector & strategy.

Evaluate: Examine Intervention Effectiveness

13. **Evaluate the initiative:** Evaluate the program and related intervention efforts, as well as examine corresponding changes in the prioritized behavioral outcome(s) of interest.
 - Document progress and use feedback to support implementation.
 - Make outcomes of the effort matter and ensure its importance to key stakeholders & audiences.
 - Identify the reinforcers and social supports to enable continuing the work; Ensure there is a community that will ensure that the work continues.

Sustain: Maintain and Adapt Effective Interventions

14. **Implement a social marketing effort:** Market the behaviors to be maintained and disseminate adoption of the innovations.
15. **Apply for grants and other funding:** Leverage funding and resources with the community to maintain the work and its effects.
16. **Sustain the work:** Consider other tactics and develop a sustainability plan for the effort with stakeholders.
 - Adapt: Be prepared for a constantly evolving process – the environment and contingencies will continue to change, sometimes quickly, so adapt.

Fig. 14.4 Community Tool Box process to support 16 core competencies in community health and development (<https://ctb.ku.edu/>)

The Center for Community Health and Development also developed the Community Check Box (CCB) Evaluation System. The CCB is a related, but different suite of tools developed based on a behavioral community approach. The CCB provides an internet-based system to document community and systems changes and other important events facilitated to support efforts in community settings (e.g., services provided). The CCB was also developed in the early 1990s as an online documentation and support system. The evaluation system is used with a variety of initiatives supporting community health and development efforts locally, statewide, nationally, and globally. The CCB and the related community change methodology have been used with grassroots organization (e.g., Watson-Thompson et al., 2008) and multisite national initiatives. Through participatory evaluation, the CCB records the occurrence of events that are described and then coded and characterized using operational definitions to understand how the environment is changing related to a targeted community health and development outcome. The information recorded in the CCB can be examined using automated graphs and reports, including cumulative time series graphs to examine trends and discontinuities in efforts addressing community-level behavioral outcomes. The CCB has been used across multiple community health and development initiatives to support the process of understanding and improvement through the CTB and the Institute of Medicine's (IOM) Frameworks.

IOM Framework for Collaborative Public Health Action The IOM's Framework for Collaborative Public Health Action (Institute of Medicine (IOM), 2003) further distills a similar process of collaboration to support community health and development. The IOM Framework, adapted from the early work of Fawcett et al. (2000), provides an understanding of behavior and environment interactions. In Fig. 14.3, the IOM five-phase framework is presented within the CTB process. Based on the IOM Framework, collaborative assessment and planning (Phase 1) supports the identification of community actions (Phase 2). The plan guides the implementation of community change strategies (i.e., programs, policies, and practices) to support community change interventions (Phase 3) related to identified personal and environmental factors. The implementation of community and systems changes through comprehensive or multicomponent intervention leads to widespread changes in the behaviors of multiple individuals and groups (Phase 4), and corresponding improvements in more distal population-level outcomes (Phase 5). If improvements in prioritized behavioral outcomes are achieved, then the effects of the intervention (i.e., community and systems changes) on behavior are maintained across time, people, and place. Based on the IOM framework, the focus of community and systems change interventions is not total attribution, as it is impossible in community settings for no other interventions to occur, but rather to understand the contribution of the effort to changes in prioritized goals and behavioral outcomes.

As part of implementing the IOM framework, antecedent and consequent conditions that contribute to the problem behavior or goal are addressed. The CCHD promotes the use of six behavior change strategies to address personal, environmental, or a combination of factors contributing to the behavior of interest. As shown in Fig. 14.5, behavior change strategies, which include both antecedent and consequent conditions, can be categorized as instructional (e.g., provide information),

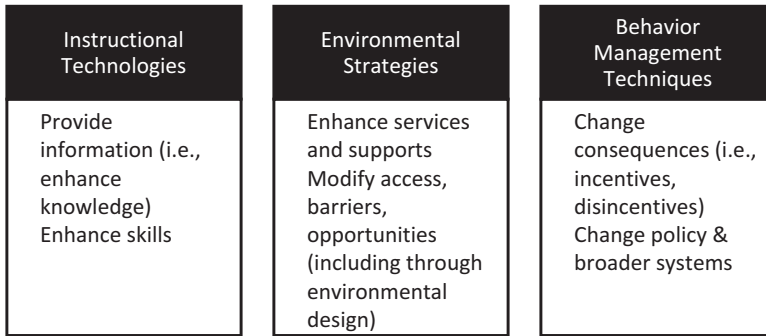


Fig. 14.5 Behavior change strategies for addressing personal and environmental factors

environmental (e.g., modify barriers), or behavior management (e.g., change policy). Because the work of community health and development is influenced by multiply determined and interrelated factors, it is necessary to simultaneously address factors through comprehensive or multicomponent interventions. Based on the desired behavioral outcome, it is important to ensure that the dosage of the community-level intervention is of sufficient intensity (i.e., target behavioral goals using an appropriate mix of strategies for varying durations) and penetration (i.e., reach the identified targets of change across sectors in places). Often, observed changes in related factors are more immediate and serve as antecedents for longer-term improvements in population or community-level outcomes (e.g., reducing community violence, improving graduation rates), which may take years to decades to achieve.

The framework has demonstrated improvements in prioritized behavioral outcomes related to teen pregnancy (Paine-Andrews et al., 2002), adolescent substance use (Fawcett et al., 1997), and neighborhood development (Watson-Thompson et al., 2008, 2018). The framework supports the implementation of multicomponent combined interventions (i.e., community and system change) within and across the settings (Fawcett, Schultz, Watson-Thompson, Fox, & Bremby, 2010). For instance, the IOM framework has been adapted to guide the development of a multicomponent combined (i.e., comprehensive) intervention to address the Word Gap and related disparities in vocabulary learning, which is predictive of later educational outcomes (Greenwood et al., 2017). The comprehensive initiative is focused on promoting language-rich learning environments for children by increasing the number of words children hear across actors in different sectors and settings of the environment (e.g., home, preschool, church, doctor's office).

Illustrative Application of the IOM Model to Prevent Community Violence In 2005, the Commission on Violent Crime was instituted by the City Council of Kansas City, MO (KCMO) to examine increases in homicides. The Commission on Violent Crime, which represented a multisector group of stakeholders from the community, identified that the antecedent or primary cause of local homicides was arguments and unresolved conflicts. Based on the community assessment and problem analysis, it was determined that “too many residents in the community were not

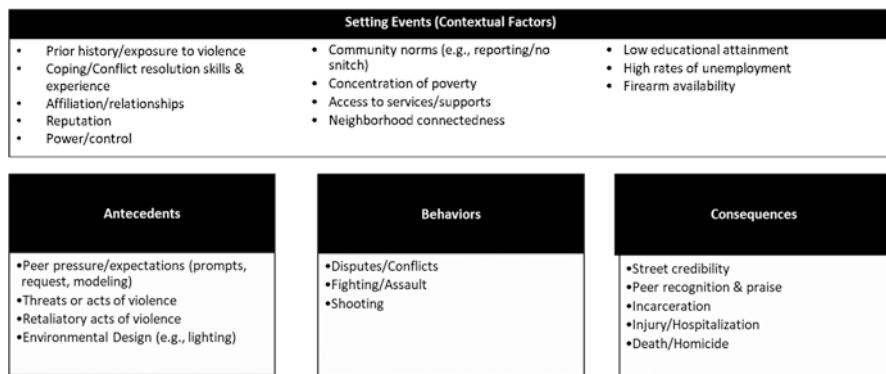


Fig. 14.6 Examining the ABCs of community violence for the Aim4Peace Initiative

peacefully resolving their arguments and conflicts” (Watson-Thompson et al., 2013, p. 157). Figure 14.6 displays a summary of the context or setting events, antecedents, behaviors, and consequences associated with community violence. CeaseFire Chicago (renamed Cure Violence) and Caught in the Crossfire were identified as appropriate evidence-based programs to adapt for implementation in KCMO.

Aim4Peace, a program of the KCMO Health Department, was developed to address shootings and killings. In 2008, the East Patrol, one of six patrols in KCMO was identified as the intervention area as disproportionately high homicide and aggravated assault rate were experienced. Interrupted time series with nonequivalent comparison group designs across smaller units of East Patrol (i.e., police sectors and beats) were identified over time as appropriate units of analyses by the Aim4Peace program and the evaluator. The program did not think a quasi-experimental interrupted time series design with switching replication (i.e., multiple baseline design) was politically appropriate, and so there was an agreed compromise for a design that worked for both the program and evaluation partners.

The IOM Framework was selected as the model of change to support the multi-component comprehensive intervention. The core components of the program include: (a) targeted outreach, education, and support for individuals with high risk for violence perpetration or victimization, and (b) community mobilization to modify community norms and reduce tolerance toward violence. The Aim4Peace program is a multicomponent intervention and supports primary, secondary, and tertiary prevention efforts across multiple socioecological levels by addressing identified risk factors (i.e., personal and environmental factors) contributing to firearm-related homicides (i.e., killings) and aggravated assaults (i.e., shootings). The intervention strategies or community changes implemented encompass a combination of universal, selective, and indicated levels based on the risk factor addressed.

Figure 14.7 provides illustrative examples of documented community and systems changes that Aim4Peace strategically implemented using an array of prevention and behavior change strategies that were supported across different socioecological levels.

| Illustrative Example of Community Changes Facilitated by Aim4Peace | Ecological Level and Type of Prevention Strategy | Behavior Change Strategy |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Conflict mediation classes are facilitated by Aim4Peace staff in the local schools to train youth in conflict resolution skills. | Targeted <ul style="list-style-type: none"> • Community level • Universal strategy | Providing information and enhancing skills |
| The Love Yo Hood Concern and Peace Talk Event was held that featured local rapper and artist to unify the community and reduce tolerance toward violence. | <ul style="list-style-type: none"> • Community level • Universal strategy | Enhancing services and supports |
| Job readiness class with 19 participants in the Aim4Peace program, with risk for violence. Trained on job etiquette, dress code, resume writing, and had mock interviews. | <ul style="list-style-type: none"> • Individual level • Selective strategy | Barrier removal, enhancing access & opportunities |
| Received call from hospital chaplain of shooting related admission. Met with recent shooting victim and family. Family agreed to not retaliate. Victim enrolled in A4P program. | <ul style="list-style-type: none"> • Interpersonal level • Indicated strategy | Changing consequences |
| Street intervention workers met with leaders of two rival street organizations in the target area to collaborate and set a new agenda. For the first time, there was a new agreement between the organizations to support a ceasefire. | <ul style="list-style-type: none"> • Interpersonal level • Indicated strategy | Changing consequences |
| A romantically involved couple was in a dispute. When a male bystander and friend intervened during the dispute, the two men engaged in an altercation and guns were drawn. An A4P worker received a call from the female partner requesting mediation and went to the scene. The conflict was peacefully resolved. | <ul style="list-style-type: none"> • Interpersonal level • Indicated strategy | Changing consequences |
| A man shot at another person and missed. Now, the person who was shot at was riding around in a bulletproof vest seeking revenge. A4P workers met with the young man, who indicated he was seeking retaliation out of fear for his life. A4P workers spoke with both individuals who agreed to a ceasefire, which resolved the problem. | <ul style="list-style-type: none"> • Interpersonal level • Indicated strategy | Changing consequences |
| A local funder expanded the portfolio of public health to include violence prevention in the types of projects that could be funded due to advocacy from Aim4Peace leadership. | <ul style="list-style-type: none"> • Societal level • Universal strategy | Changing consequences, systems, & broader policies |

Fig. 14.7 Examples of community changes facilitated by Aim4Peace by ecological level and strategy

Conclusion

It is important to understand the history and promotion of behavior-analytic approaches in addressing broader societal issues not only in ABA, but also in other disciplines to better understand the reach of our science. There was intentionality by behavioral community scientists in both ABA and community psychology to support bidirectionality through the integration of behavioral community research across disciplines. Since the 1990s, a generation of behavioral community researchers was seemingly less visible in ABA, but the concentration of behavioral community research and expansions in other fields should be further examined. Through a

behavioral community approach, it is important to continue to consider the range of problems, including in community health and development, which may be further advanced with the pairing of a behavior-analytic approach. Additionally, fields supporting the behavioral community psychology subspecialty area should consider collectively advancing key mechanisms to aid in understanding the broad multidisciplinary influence of the behavioral community approach. For instance, the use of common key terms in publications, such as “behavioral community,” would help to support identification of the use of the approach across fields of study. Special sections in journals or invited presentations at conferences of the other related disciplines on behavior community approaches would support cross-fertilization, as well as intradisciplinary recognition of breadth with a new generation of behavioral community scientists. There is promise of the resurgence of behavioral community approaches to address community health and development outcomes using coordinated tools, resources, and interventions that integrate and advance our behavioral technologies and collaborative opportunities for impact.

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Chapter 15

Evolution of the Mexican Muralist Movement: A Culturo-Behavior Science Account



Maria E. Malott

Evolution of the Mexican Muralist Movement: A Culturo-Behavior Science Account

Between 1921 and 1955, groups of artists worked together in the generation of a great number of figurative (as opposed to abstract) frescoes that expressed their sociopolitical views of peoples' struggles in an unjust society (Anreus, 2012; Anreus, Barnet-Sanchez, & Campbell, 2012; Helm, 1989; Lee, 1999; Myers, 1956; Tibol, 1975). The movement that produced these murals is sometimes referred to as the "Mexican Mural Renaissance" (Capek, 1996; Koffey, 2012). Helm (1989) pointed out, "It is one of many ironies in the history of modern Mexican painting that the political education of the painters evolved more rapidly than their aesthetics" (pp. 35–36). This is why the movement cannot be understood without an appreciation of the contextual circumstances in which it developed as well as their influence in the creation and evolution of organizations.

Malott (2019) detailed how a three-year program from the Mexican government's Secretariat of Public Education (Secretaría de Educación Pública [SEP]), called the SEP mural program, constituted a cultural cusp that gave rise to the Mexican muralist movement (see Glenn et al., 2016, p. 11 for a definition of "cultural cusp"¹). She detailed how five individuals helped to start the movement: a teacher and mentor, Gerardo Murillo Cornado, known as Dr. Atl (1875–1964; Espejo, 1994; Myers, 1956); a politician and writer José Vasconcelos Calderón (1882–1959; Stavans, 2011; Vasconcelos, 1963; Young, 1959); and the "great three"—the utmost renowned Mexican muralists (Aguilar-Moreno & Cabrera,

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2011; George, 2005; Hill, 2005; Moyséén, 1970; Rivera & March, 1960; Rochfort, 1993; Wolfe, 1972): Diego Rivera (1886–1957), the most prolific of the three (Coronel Rivera, Pliego, & Zavala, 2007; Downs, 1999; Serrano, 2006; Souter, 2014); David Alfaro Siqueiros (1896–1974; Stein, 1994); and José Clemente Orozco (1883–1949; Manrique, 1989). The SEP program gave rise to mural-making lineages of three generations of artists that enabled the movement’s expansion in Mexico and elsewhere. To complement that analysis, this chapter focuses on the roles of the (a) context, (b) individuals, and (c) organizations in the evolution of the movement. These components are detailed as an illustration of how they might be studied in other social movements.

Context

Context consists of “the interrelated conditions in which something exists or occurs” (Context, n.d.). It includes political, economic, and social events, as well as the “cultural milieu,” which, according to Houmanfar, Rodrigues, and Ward (2010), entails the “prevailing beliefs within a culture” (p. 87) that set “the occasion for ... various aggregate products” (p. 88).

The political and social circumstances that occasioned the muralist movement were everchanging and interconnected. This chapter recaps several influential events that took place in Mexico, Russia (later the Union of Soviet Socialist Republics [USSR]), the United States (US), and Spain—four nations with very different histories, cultures, and realities. Evolving contextual circumstances in these nations coalesced in the evolution of the movement. These circumstances functioned as analogs of either establishing operations (EOs) or abolishing operations (AOs) that altered values regarding communism and the use of murals to express socio-historical realities. As well, contextual circumstances set the occasion for the establishment of organizations that facilitated actions consistent with those values.

Individuals

Goldman (1982) reported that from 1905 to 1969, 289 artists took part in the creation of 1,286 murals in Mexico (Deffebach, 2015). In addition, intellectuals and politicians engaged in the movement in different ways. The five individuals mentioned above who were critical in the emergence of the movement (Malott, 2019) are emphasized as an illustration of how their actions and histories became entangled in organizations in response to contextual circumstances. They acted sometimes in concert and other times in disparity, sometimes in unity and other times in

estrangement. They influenced each other and others by engaging in activities and generating products consistent with their values.

Organizations

Organizations are analyzed in the framework of metacontingencies—that is, “a contingent relation between (1) recurring interlocking behavioral contingencies [IBCs] having an aggregate product [AP] and (2) selecting environmental events or conditions” (Glenn et al., 2016, p. 3²). A “culturant” consists of the IBCs of groups of people working together and the AP they produce (Hunter, 2012).

Twelve organizations exerted relevant and different functions in the evolution of the Mexican muralist movement. They varied in complexity, ranging from an institution to a small group of individuals united by a cause. Each organization is analyzed in terms of duration, function in the movement, its culturants (IBCs plus their APs), the selectors that established selection contingencies, factors that contributed to its establishment (EO analogs), and factors that contributed to its collapse or eventual irrelevance to the movement (AO analogs). Table 15.1 provides a synopsis of this chapter. It summarizes contextual circumstances, individuals’ historical events, and organizations relevant in four phases of the movement’s evolution: (a) antecedents (before 1920), (b) emergence (1920–1924), (c) development (1925–1955), and (d) decline (after 1955). Although some organizations overlapped during different phases, they are described in the phase where they exerted the most impact.

Antecedents (Before 1920)

A fertile ground for the movement developed before the 1920s in Mexico during the chaotic transition from a longstanding dictatorship to a democratic government. The success of the Bolshevik Revolution inspired influential politicians, intellectuals, and artists in Mexico to seek opportunities for change in society and in art—a number of whom would later become major players in the Mexican muralist movement. In the US, many subscribed to communism as well, but the government perceived it as a threat to its democracy (Krauze, 2017). Three organizations helped to set the stage for the start of the movement: (a) the Academy of San Carlos; (b) the Artistic Center (“Centro Artístico”); and (c) the Union of Painters and Sculptors, referred as the “Students’ Union.”

²This reference is also republished as Chap. 2 of this volume.

Table 15.1 Context, individuals, and organizations in the evolution of the Mexican muralist movement

| Context | Individuals | Organizations |
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| <p><i>Antecedents</i></p> <p>World War I (1914–1918) Mexico: Porfirio Diaz ruled (1876–1880; 1884–1911); Mexican Revolution and nine interrupted presidencies (1910–1920); Emiliano Zapata assassinated (1919); 1917 Mexican Constitution created Russia: Imperial Russia (1721–1917); Nicholas II, tsar (1894–1917); Nicholas II abdicated; Bolshevik Revolution (1917); Russian Civil War (1917–1921); Russian Communist Party established (1918); Lenin, head of Russia (1917–1924) US: William McKinley assassinated (1901); had three presidents (1901–1920); 10,000 American troops entered Mexico (1916); joined World War I; “First Red Scare”; Espionage and Seditious Acts (1917) Spain: First Republic (1873–1875); monarchy restored (1875); Spanish-American War (1898)</p> | <p>Vasconcelos graduated from law school (1905); joined anti-Diaz movement (1909); was minister of public education (1914); abandoned public life (1915–1919) Dr. Alt studied (1896) and taught at the Academy of San Carlos (1904–1911); lived in Europe (1897–1903; 2011–2013); painted the first modern mural in Mexico and created the Artistic Center, where Orozco and others joined him (1910); was involved in the Artistic Center with Siqueiros, Orozco, and others (1911); joined Carranza’s army and was imprisoned (1916); went into exile in Los Angeles (1917) Rivera studied at the Academy of San Carlos (1898–1905); lived in Europe (1906–1920); went back to Mexico and exhibited work at the Academy of San Carlos (1910–1911) Siqueiros studied at the Academy of San Carlos (1911–1913); joined anti-Huerta movement (1913); joined Carranza’s army (1914–1918); became a military attaché in Europe (1919–1921) Orozco had his arm amputated (1904); joined the Academy of San Carlos strikes (1911); lived in the US (1917–1919) Other artists studied at the Academy of San Carlos, participated in political activities, and trained abroad</p> | <p>Academy of San Carlos (1781–present). Provided trained artists who would later become muralists <i>Culturam:</i> Trained artists who rebelled against European standards and promoted original Mexican art <i>Selectors:</i> Spanish monarchy; UNAM <i>EO:</i> Monarchy decree <i>AO:</i> New structure and priorities irrelevant to the movement</p> <p>Artistic Center (1910). Strengthened the value of murals original to Mexico <i>Culturam:</i> Secured government walls to paint murals <i>Selector:</i> Academy of San Carlos <i>EO:</i> Celebration of 100 years of independence from Spain <i>AO:</i> Members dispersed due to the Mexican Civil War</p> <p>Union of Painters and Sculptors (Students’ Union; 1911). Rebelled against the Academy of San Carlos’s teaching methods <i>Culturam:</i> Organized protests and strikes against methods of teaching <i>Selectors:</i> Ministries; media <i>EO:</i> Resentment of request to follow instructors’ requests <i>AO:</i> Members dispersed due to the Mexican Civil War</p> |

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| <p><i>Emergence</i></p> <p>Mexico: Álvaro Obregón, president (1920–1924); Villa temporarily retired (1920); “Bucareli Treaty” signed and Villa assassinated (1923)</p> <p>USSR: Formed (1922); Lenin, head of the USSR (1922–1924); Mexico established relations with the USSR and Lenin died (1924); Joseph Stalin, leader of the USSR (1924–1953)</p> <p>US: Economic depression (1920–1921); provided support to Mexico to contain uprising</p> <p>Spain: Continued with monarchy</p> | <p>Vasconcelos become rector of the UNAM (1920) and secretary of public education (1921–1924); resigned (1924)</p> <p>Dr. Atl became director of the SEP Department of Fine Arts (1920)</p> <p>Rivera returned to Mexico to the mural program (1920); worked on the first mural (1922); cofounded SOTPE</p> <p>Siqueiros and Orozco and others joined the PCM and SOTPE</p> | <p>Secretariat of Public Education (SEP), Mural Program (1921–1924). Established selection contingencies for artists painting murals</p> <p><i>Culturam:</i> Recruited and supported artists to produce murals original to Mexico as a means of cultural public education</p> <p><i>Selector:</i> Secretariat of Public Education</p> <p><i>EOs:</i> Leader’s vision and financial support</p> <p><i>AOs:</i> Leader’s resignation and lack of funding</p> <p>Mexican Communist Party (PCM; 1917–1924; 1935–1951; 1978–1981). Provided opportunities for artists to engage in political activities and strengthen their communist values</p> <p><i>Culturam:</i> Defended workers’ rights and embraced the Russian Communist Party’s principles through publications (<i>El Socialista, El Machete</i>), congresses, and public protests</p> <p><i>Selector:</i> Russian Communist Party; the III International</p> <p><i>EOs:</i> Workers organized, inspired by the Bolshevik Revolution</p> <p><i>AOs:</i> Government repression; communist ideals lost relevance with improved socioeconomic situation in Mexico</p> <p>Union of Workers, Technicians, Painters, and Sculptors (SOTPE; 1922–1925). Provided a forum for artists working on the SEP mural program to pursue communist-oriented activities</p> <p><i>Culturam:</i> Engaged in communist-inclined activities that produced the movement’s mission, political protests, and the publication of <i>El Machete</i></p> <p><i>Selectors:</i> PCM; SEP mural program</p> <p><i>EO:</i> Social gatherings of communist artists working together for the same cause</p> <p><i>AO:</i> End of the SEP mural program</p> |
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(continued)

Table 15.1 (continued)

| Context | Individuals | Organizations |
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| <p><i>Development</i></p> <p>World: World War II (1939–1945); “Cold War” (1947–1991)</p> <p>Mexico: Maximato (1924–1934); Cristeros, civil war against anti-church laws (1926–1929); relations with USSR established (1924); Cárdenas, president (1934–1940); Trotsky arrived in Mexico (1937) and was killed (1940); Mexico entered World War II (1942)</p> <p>USSR: Great purge of opposition began; 20 million people were killed (1934); Trotsky was exiled (1929)</p> <p>US: “Great Depression” (1929–1939); WPA established (1939); Pearl Harbor (1940); US entered World War II (1941); “Second Red Scare” (late 1940s–late 1950s); HUAC established (1938–1975)</p> <p>Spain: Alfonso XIII, king, forced to abdicate (1931); Spanish Second Republic followed by power struggles (1931–1936); Spanish Civil War (1936–1939); Franco reigned</p> | <p>Vasconcelos lived outside Mexico (1924–1928; 1929–1939); ran for president and was defeated (1929)</p> <p>Dr. Atl dedicated himself to artistic and intellectual endeavors outside muralism</p> <p>Rivera resigned from the PCM (1925) and was readmitted (1926); traveled to the USSR (1927); became director of the Academy (1929–1930); was expelled from the PCM (1929); painted murals in the US (1930–1932; 1940–1941); requested asylum in Mexico for Trotsky (1936), who stayed at Frida Kahlo’s home (1937); ended alliance with Trotsky (1939); became a member of the Strident Society and LIP with Orozco</p> <p>Siqueiros abandoned art for union and political activity (1926); visited the USSR (1928); was expelled from the Communist Party (1930); was confined in the town of Taxco (1930–1932); traveled to Uruguay and was expelled for his political activities (1932); fought in the Spanish Civil War (1936–1939); led a failed assassination attempt of Trotsky (1940); fled to Chile (1941); was involved in ‘30–30’ and LEAR</p> <p>Orozco continued painting murals on and off in Mexico until his death (1949); lived and painted murals and easel paintings in the US (1927–1934; 1940; 1946–1947)</p> <p>Other artists who participated in the emergence of the movement continued producing socially inspired murals in Mexico and abroad</p> | <p>Strident Society (1921–1927). Set the occasion to strengthen the value of experimentation in the arts</p> <p><i>Culturam:</i> Encouraged art experimentation in all visual arts, literature, and music through exhibitions, books, and periodicals: <i>Actual, Ser, Irradiador, Horizontie</i></p> <p><i>Selectors:</i> Veracruz State government; artists and intellectuals</p> <p><i>EO:</i> Arce’s flyer calling artists and intellectuals to unite in creating radical change in the arts (<i>Actual</i> Number 1)</p> <p><i>AO:</i> Removal of government support</p> <p>‘30–30’ (1928–1930). Opposed traditional art education of the Academy of San Carlos</p> <p><i>Culturam:</i> Protested against art education standards and proposed new formats through the publication of <i>‘30–30’, Órgano de los Pintores de México</i>, and posters</p> <p><i>Selector:</i> Secretariat of Public Education</p> <p><i>EO:</i> Group of discontented artists with shared values</p> <p><i>AO:</i> Government censorship and suppression</p> <p>Intellectual Proletarian Struggle (LIP; 1933–1939). Strengthened the value of bringing socialism to the arts</p> <p><i>Culturam:</i> Encouraged simplification of art and literature so they would be understood by the masses through the publication <i>La Llamada</i> and exhibitions</p> <p><i>Selector:</i> General public</p> <p><i>EO:</i> Artists’ interests</p> <p><i>AO:</i> Not reaching a supportive audience</p> <p>League of Revolutionary Writers and Artists (LEAR; 1933–1936). Strengthened the value of socialism in the arts</p> <p><i>Culturam:</i> Defended workers’ causes and the USSR; promoted a social function of art; opposed government sponsorship through the publication of <i>Hoja Popular, Frente a Frente, Ruta</i>, flyers, brochures, and books; congresses; exhibitions; concerts; and conferences</p> <p><i>Selector:</i> International Union of Revolutionary Writers</p> <p><i>EO:</i> Artists with shared values</p> <p><i>AO:</i> Plastic art members left</p> |

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| <p><i>Decline</i></p> | <p>Mexico: Mexican Miracle (1954–1970) USSR: Stalin died (1953); Nikita Khrushchev, leader (1953–1964) US: End of Cold War (1990) Spain: “Spanish Miracle” (1959–1974)</p> | <p>Vasconcelos continued with intellectual activities until his death (1959) Dr. Atl joined the Mural Commission along with the “great three”; died (1964) Rivera continued painting murals until his death (1957) Siqueiros was active in the TGP; was jailed (1959–1964); continued painting murals until his death (1974) Other generations of muralists came about whose work influenced other artists abroad; the volume of murals produced decreased</p> | <p>People’s Graphic Workshop (TGP; 1937–2010). Promoted the production and sale of arts to support social causes <i>Culturamir:</i> Supported the use of visual arts in the service of social change in an art collective by generating artwork for sale in a variety of formats: Flyers, posters, prints, and others (e.g., portfolio editions, banners, and book illustrations) <i>Selector:</i> Mexican artist market <i>EOs:</i> Government support; PCM <i>AOs:</i> Leader died (Jesús Alvarez Amaya) and lack of income</p> <p>Commission for the Promotion and Regulation of Mural Painting (Mural Commission; 1947–1959). Approved of government-sponsored mural contracts and regulations for their protection <i>Culturamir:</i> Selected artists and themes for government-sponsored mural contracts <i>Selector:</i> National Institute of Fine Arts <i>EO:</i> Government solution to muralists’ protests <i>AOs:</i> Major players died and loss of relevance</p> |
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Context

At the start of the 1900s, Mexico was in political, social, and economic turmoil. Porfirio Díaz (1830–1915) ruled for over 30 years (1876–1880; 1884–1911). Under his rule, wealth accumulated in the hands of a few, while the majority lived in poverty (Bryan, 1976; Gonzalez, 2002; Reed, 1914). While exports increased by 300%, the country's debt rose sharply. Agricultural production dropped and basic goods had to be imported. The wealthy took possession of the land, leaving 90% of the rural population landless. The land-disowned peasants became indebted to their landowners, forcing them to pay their debt with labor.

During the Mexican Civil War, which lasted from 1910 to 1920, a tenth of Mexico's population died and more than 890,000 Mexicans immigrated to the US (U.S.-Mexico Relations: 1810–2010, n.d.). In this period, power passed through several hands. Díaz was removed in 1911; Emiliano Zapata (1879–1919), commander of the Liberation Army of the South, was assassinated; and a series of nine interrupted presidencies took place in 10 years: two presidents were killed, six resigned, and two completed the term of someone who resigned or was killed.

Venustiano Carranza (1859–1920) was president of Mexico from 1917 until his assassination in 1920. He led the development of the 1917 Mexican Constitution, which restricted the Catholic Church's power and supported human rights, free and mandatory education for all, land reform, and labor force empowerment. Although it took decades to implement many aspects of the Constitution, its creation defined values for generations to come.

Russia also experienced dramatic change before 1920. The Russian Empire, declared in 1721 by Peter the Great (1672–1725), ended with the overthrowing of Tsar Nicholas II (1894–1917) in 1917. Then, during the devastation of Russia's participation in World War I, a provisional government took control for 8 months until the Great October Socialist Revolution of 1917, when the Bolsheviks (denoting the "majority"), led by Lenin (Vladimir Ilyich Ulyanov; 1870–1924), assumed power. Joseph Stalin (1878–1953) and Leon Trotsky (1879–1940) were Lenin's closest lieutenants. In 1918, the Bolsheviks assassinated Nicolas II and his entire family, forever ending the Romanov rule.

Also in 1918, the Bolsheviks established the Russian Communist Party, previously known as the Russian Social-Democratic Labour Party (1912–1918). The Party ruled Russia and later the USSR until 1991, though its name changed two more times (History of Russia, n.d.). Lenin became head of Russia (1917–1924). The Bolshevik Revolution inspired many social movements around the world. Communist parties emerged in several nations, led by Russia's organized efforts to expand its control internationally. Mexico was fertile ground for many politicians, intellectuals, and artists who saw Russia's achievements as examples to live up to.

In the US, after William McKinley (1843–1901) was assassinated in 1901, the country had only three presidents until 1920. The political relations between the US and Mexico were strained at times. One reason was Mexico's confiscation of Americans' privately owned property during the Mexican Civil War. The other

reason was that in 1916, despite it being an unsuccessful mission, 10,000 American troops went to apprehend Pancho Villa (1878–1923), commander of the Division of the North, in response to the killing of 17 Americans and the burning of the town center of Columbus, New Mexico (U.S.-Mexico Relations: 1810–2010, [n.d.](#)).

In 1917, the US entered World War I and the Espionage and Sedition Act was established in federal law. The Act aimed to “prohibit interference with military operations or recruitment, to prevent insubordination in the military, and to prevent the support of US enemies during wartime” (Espionage Act of 1917, [n.d.](#)). The success of the Bolshevik Revolution began to influence the US labor movement. Organized labor actions, regardless of their dissimilarity, were branded “communist.” This perceived threat of communism lasted until the mid-1920s—a period known as the “First Red Scare” (“Red” refers to the red Soviet flag), characterized by censorship of radical groups, illegal searches, and deportation of many foreigners.

Finally, Spain was governed by a monarchy, challenged during the First Republic (1873–1875). The Spanish-American War (1895–1898) ended with Spain’s giving Cuba, the Philippines, Puerto Rico, and Guam to the US. Spain remained neutral in World War I.

Individuals

During this phase, many artists who would become muralists trained at the Academy of San Carlos, including Dr. Atl, who studied and later taught there (1904–1911). He mentored the “great three” (Rivera, Siqueiros, and Orozco) and others in art and instilled in them a rebellious attitude against traditional standards of art and government. He painted the first modern mural in Mexico (1910), and in the same year, he created the Artistic Center at the Academy, where Orozco and others joined him. Also in the Academy, Siqueiros and Orozco participated in the Students’ Union in 1911.

Some of the key players lived and worked abroad as well. Dr. Atl lived in Europe for 8 years, Rivera for 14, and Siqueiros for three. Dr. Atl lived in the US for about 1 year and Orozco for two. Other future muralists followed similar paths. Many individuals opposed a climate of oppression and economic disparity. Except for Orozco, whose arm was amputated in 1904, three other pioneers, joined by other artists, participated in political activities: Vasconcelos, who had become a lawyer in 1905, joined an anti-Díaz Movement in 1909, became Minister of Public Education in 1914, and then abandoned public life from 1915 until 1919. Dr. Atl and Siqueiros joined Carranza’s army against Huerta; Dr. Atl was jailed in 1916, and Siqueiros remained in combat for 4 years (1914–1918) before becoming a military attaché in Europe (1919–1921). Rivera left Mexico in 1906 and returned to live there in 1920. In conclusion, major players got trained, gained a worldly education, and took a political stand against dictatorship and social oppression and disparity.

Organizations

Academy of San Carlos (1781–Present) This organization was essential to the movement because it provided trained artists who rebelled against European standards and promoted the creation of original Mexican art. It was established by royal decree in 1781 in honor of King Carlos III of Spain as the “School of Engraving” (though it changed its name multiple times). In 1913, it was integrated into the “Universidad Nacional Autónoma de México” (UNAM; National Autonomous University of Mexico) but originally kept its independence. Today the Academy’s old building houses postgraduate studies of the National Academy of Fine Arts (Academy of San Carlos Explained, [n.d.](#)). Therefore, contingencies of selection were first established by the Spanish monarchy and then by UNAM.

Several directors influenced the Academy’s course in different ways. For example, Román de Lascuráin, director for 25 years during the Díaz regime (1878–1903), inculcated the Spanish tradition in art; Dr. Atl (1914) promoted departure from replication of European art; Rivera (1929–1930) imposed a communist structure in the curriculum, ending with his firing after just over a year in the role (Founders Society Detroit Institute of Arts, [1986](#); Hernandez-Duran, [2016](#)). Although the Academy still exists today, its structure and priorities lost relevance to the movement.

Artistic Center (1910) The Artistic Center set the occasion for individuals to engage in activities that strengthened the value of mural making and the creation of original Mexican art. It was created at the Academy of San Carlos during the celebration of 100 years of independence from Spain, in the hopes of also promoting independence in the arts. The festivities included a vast display of contemporary Spanish art; however, an exhibit of Mexican art organized by Dr. Atl and his students overshadowed the Spanish display (Luna Arroyo, [1992](#); Orozco, [1945](#)). Subsequently, Dr. Atl created the Artistic Center (Sampaio Amaro, [2004](#)) with the help of Orozco and other students. Its purpose was to secure walls of government buildings on which to paint murals (Espejo, [1994](#)) and create original Mexican art. The Center existed for only a short time, ending when the Mexican Civil War caused its members, including Dr. Atl, to disperse (Pérez Rosales, [2001](#)).

Union of Painters and Sculptures (“Students’ Union”; 1911) This organization rebelled against the teaching methods of the Academy of San Carlos. It was formed by students who resisted the request to buy mimeographed sheets from the anatomy class instructor. The students lobbied various ministries and protested outside the Academy’s building; this attracted the media, which sided with them (Charlot, [1962](#)). Both the ministries and the media functioned as selectors of their activities. Partly instigated by Dr. Atl, strikes went on for months; in one, the Academy’s director was stoned by a mob of students. Siqueiros, only 13, was one of the students sent to jail, along with Ignacio Asúnsolo (1890–1965), who later became a muralist. Like the Artistic Center, the Students’ Union ended due to the dispersion of its members during the Mexican Civil War.

Emergence (1920–1924)

During Lenin’s control in Russia, the Bolshevik Revolution continued to be an example for many groups around the world who hoped to form communist societies. However, the US government grew wary of communist activism. Many Mexican intellectuals, influenced by communist ideology, perceived the US as a capitalist country that favored the rich over the proletariat. In Mexico, the first stable government after the Mexican Civil War was that of Álvaro Obregón (1880–1928). His government, inclined to the left, embarked on a massive educational reform, including support for Mexican muralism as a vehicle for public awareness. Artists who had communist inclinations were contracted to paint murals autochthonous of Mexico in government buildings. Three organizations were essential for the movement’s emergence: (a) the SEP mural program; (b) the Mexican Communist Party (“Partido Comunista Mexicano”; PCM); and (c) the Union of Workers, Technicians, Painters, and Sculptors (“Sindicato de Obreros, Técnicos, Pintores y Escultores”; SOTPE).

Context

Obregón was the first Mexican president who completed a full term (1920–1924) since Díaz’s removal in 1911. He contained uprisings, convinced Villa to retire peacefully at the beginning of his term, and improved relations with the US. He implemented many aspects of the 1917 Constitution, including land reform, development of labor laws, and massive transformation of education.

The US underwent an economic depression (1920–1921) and tried to recover the losses it incurred during the Mexican Civil War. In 1923, Obregón finally signed the highly controversial “Bucareli Treaty” (signed on Bucareli Avenue in Mexico City) with the US to obtain diplomatic support of his presidency. In recognition of the financial losses to US citizens and companies during the Civil War, the accord stipulated, among other remedies, a prohibition against Mexico’s developing technology and science for 100 years, which would allow the US to continue controlling the oil industry (Bucareli Treaty, *n.d.*). Disagreement over the treaty led Obregón’s government to the battlefield. Villa, who began uprising again, was assassinated, and with the help of the US, all rebellions were suppressed.

The USSR formed when the Bolsheviks took control over neighboring countries. In 1924, Mexico became the first country in the Americas to establish relations with the USSR. Lenin died in 1924, and tensions for control between Joseph Stalin (1878–1953) and Leon Trotsky (1879–1940) heightened, though Stalin assumed power until his death in 1953. Spain, on the other hand, continued under monarchy rule during this period.

Individuals

After being rector of the UNAM in 1920, Vasconcelos became the first secretary of the newly established SEP in 1921, where he housed the mural program and appointed Dr. Alt as its director. The program's goal was to create cultural awareness through public murals. Vasconcelos brought Rivera from Europe and recruited other top artists living abroad and in Mexico, among them Siqueiros and Orozco. The five main players in the movement participated in the SEP mural program, and the "great three" became leaders and members of PCM and SOTPE.

Rivera joined the PCM in 1922 and soon became a leader along with Siqueiros. Rivera resigned in 1925, was reinstated in 1926, was expelled in 1929, was denied entry three times, and finally was reinstated in 1954. Siqueiros was expelled and readmitted as well. The "great three" were involved in SOTPE along with other muralists and traveled to the USSR at different times affirming their communist beliefs.

Organizations

Secretariat of Public Education, Mural Program (1921–1924) The SEP mural program was essential for the movement as it established selection contingencies for artists painting socially inclined murals on government walls. Obregón created the SEP and appointed Vasconcelos—a firm proponent of raising the educational level of Mexico—as its first secretary. Vasconcelos developed the structure of the SEP and conceived the program in the Department of Fine Arts (Stavans, 2011). He envisioned murals as conduits to educate the public about the Mexican culture, national history, diverse ethnicity of its people, and resistance to oppression and fascism.

The government allocated substantial funding to education, which, by 1923, constituted 15% of the nation's budget. With financial support, Vasconcelos hired established Mexican artists to participate in the program; some he brought from abroad, like Rivera and Roberto Montenegro Nervo (1885–1968; Quirarte, 1989). He gave them nominal administrative appointments, for instance appointing Jean Charlot (1898–1979) the "inspector of drawing" (Charlot, 1967; Marnham, 2000).

Artists were free to develop their own styles, resulting in a variety of mural-making techniques. However, Vasconcelos demanded results, announcing, "I wish the painting to be done as quickly as possible, over the widest possible area. Let it be monumental and didactic art, at the opposite extreme of Studio painting" (Bethell, 1998, p. 208). The murals took on monumental status because of their themes, styles, and locations in colonial government buildings. The "great three" alone covered 10,696 ft of mural walls (Hooze, 1993). The program ended with Vasconcelos's resignation in 1924 and reduction of funding for the program.

Mexican Communist Party (1917–1924; 1935–1951; 1978–1981) In 1917 the Mexican Socialist Party (“Partido Obrero Socialista”) was formed, and in 1921 it changed its name to PCM. The Party was originally established by organized workers to protect their rights. PCM adopted the principles of the Russian Communist Party (established in 1917) and joined a group of communist parties from several countries in the III International (“Tercera Internacional”) in 1919. Although the PCM’s roots preceded the inception of the movement and continued an interrupted existence after its decline, the Party was most relevant in its emergence. PCM provided muralists opportunities to engage in political activities and strengthen their communist values. The Party “evolved into a party of radical painters with only a few dozen members” (Patenaude, 2009, p. 81).

PCM members engaged in political endeavors that promoted workers’ rights and communist principles through publications, congresses, and public protests. PCM published *El Socialista* (The Socialist) starting in 1917, though due to financial difficulties, it was discontinued until its reinstatement in 1919 (Carr, 1983). Later PCM continued the publication of *El Machete* (The Sledgehammer; Patenaude, 2009), originally created in SOTPE.

PCM was officially registered from 1922 to 1929; however, it was in complete disarray by 1924 (Carr, 1983), was outlawed from 1925 to 1935, and was officially registered again from 1935 to 1951. Its relevance to the movement decreased due to government repression and lack of attraction when the socioeconomic situation improved in Mexico. Nevertheless, it was registered again from 1978 to 1981 when it merged with other organizations.

Union of Workers, Technicians, Painters, and Sculptors (1922–1925) SOTPE provided a forum for artists to pursue communist-oriented activities. It was founded in 1922 by artists working in the SEP mural program who were also members of the PCM, some of whom had participated in the Students’ Union at the Academy of San Carlos.

SOTPE members engaged in political protests against the Mexican government for its failure to fulfill promised reforms. They expressed their discontent in SOTPE’s publication, *El Machete*, coedited by Rivera, Siqueiros, and Xavier Guerrero (1896–1974), who also formed SOTPE’s executive committee. Through SOTPE, the muralists also articulated the movement’s mission, published in *El Machete*: “We repudiate the so-called easel art and all such art which springs from ultra-intellectual circles, for it is essentially aristocratic. We hail the monumental expression of art because such art is public property” (Siqueiros et al., 1924, p. 4).

The government threatened to cut funding for SOTPE members’ mural work if they continued publishing *El Machete* (Azuela, 1993). So, after five or six issues, *El Machete* was transferred to PCM (Orozco, 1945), where it continued to be published from 1924 to 1929. The end of SOTPE followed the end of the SEP mural program.

Development (1925–1955)

The Mexican muralist movement developed during a period of repression, followed by political stability and economic recovery. It brought opportunities for Mexican muralists in the US during the Great Depression; however, they were also censored for their communist inclinations. The USSR sought to spread communism in Spain. Well-known artists and intellectuals in Mexico, the US, and countries around the world sided with the Republicans in their fight against General Francisco Franco (1892–1975) in Spain. The asylum and assassination of Trotsky in Mexico stimulated tensions among the US, the USSR, and the Mexican governments as well as among the muralists.

Between 1925 and 1955, organizations and private sponsors established a market for mural making. For instance, the Mexican government continued giving Rivera mural commissions. And in the US during the Great Depression, murals were viewed as one way to stimulate the arts and the economy. Murals were also created by well-known artists in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, and Peru.

In Mexico, the movement continued through the influence of several organizations that kept art innovation, social causes, and communist values connected: (1) the Strident society (“Sociedad de Estridentistas”), (2) ¡30–30! (“Treinta-Treinta”), (3) the Intellectual Proletarian Struggle (“Lucha Intelectual Proletaria”; LIP), and (4) the League of Revolutionary Writers and Artists (“Liga de Escritores y Artistas Revolucionarios”; LEAR).

Context

In Mexico, the period from 1924 to 1934 was known as the “Maximato,” in reference to president [Plutarco Elías Calles](#) (1877–1945), who was called “el Jefe Máximo” (“Maximum Leader”). Although Calles was president from 1924 to 1928, he ruled for an additional 6 years behind weak presidents. Obregón had circumvented repression of the Catholic Church, which had been enacted in the 1917 Constitution. But Calles strongly opposed the Catholic Church and initiated a confrontation, resulting in the loss of about 90,000 lives in the Cristero War (1926–1929). (“Cristeros” fought for Jesus Christ; Maximato, [n.d.](#)).

The US had opposed Mexico’s decision to establish diplomatic relations with the USSR in 1924. According to [Krauze \(2017\)](#), the U.S. government “confused Mexican nationalism with communism,” and “President Calvin Coolidge [1872–1933] seriously considered military action against ‘Soviet Mexico’” (para. 3). Nevertheless, during the Maximato, dissenting groups, including those with communist ideologies, were repressed in Mexico.

In the US, the Great Depression (1929–1939) was at its lowest point between 1929 and 1933. Franklin D. Roosevelt (1882–1945) won the presidential election in

1933 with the promise of the economic recovery plan, known as “the New Deal.” Through the Works Progress Administration (WPA; renamed Work Projects Administration in 1939), millions of people were hired to work in public projects. (Works Progress Administration, [n.d.](#)). As part of these efforts, the Public Works of Art Project (PWAP) operated from 1933 to 1934, followed by the Federal Art Project (FAP) from 1935 to 1943. The FAP created over 5000 jobs for artists (Works Progress Administration (WPA), [n.d.](#)), and among many other developments in the arts, it commissioned 2500 murals (Anreus et al., [2012](#)). The US mural program was inspired by the Mexican muralist movement. Mexican muralists were admired and hired in the US by well-known patrons, increasing their recognition internationally, which in turn, enhanced their popularity in Mexico.

In Spain, power struggles and wars continued until 1931, when King Alfonso XIII was forced to abdicate and the Second Republic was established (1931–1936). The central issue was the role of the Catholic Church, which the Republicans saw as the major enemy of modernity and the military saw as the protector of Spanish values. Power oscillated back and forth from 1931 until 1936, followed by the Spanish Civil War (1936–1939).

The support for the Republicans inspired an extraordinary number of exceptional artists and writers who attracted volunteers to join Spain and offer military and monetary aid. About 40,000 foreigners from about 53 nations joined the International Brigades in support of the Spanish Republic. Mexican muralists were also in support. In the end, over half a million people died and Franco won the fight against the Republicans.

In the meantime, in Mexico, Lázaro Cárdenas (1895–1970), who was president from 1934 to 1940, condemned the persecution of the Catholic Church and put an end to Calles’s influence, forcing him into exile in 1936. Cárdenas’ regime, at the displeasure of the US, nationalized the oil and electric industries, offered asylum to Trotsky in 1937, and supported the Republicans in the Spanish Civil War. Mexico sold them arms and welcomed about 50,000 Spanish refugees. The USSR became the main provider of military aid to the Spanish Republicans and supported the Spanish Communist Party (Sibley, [2016](#); Simkin, [2012](#)).

Following the attack on Pearl Harbor in 1940, the US entered World War II in 1941 and partnered with the USSR and its allies against Hitler. Mexico entered the war in 1942 and supplied oil and labor to the US (Koffey, [2012](#)). This alliance continued during the presidency of Manuel Ávila Camacho (1897–1955) in Mexico from 1940 to 1946. As a result, Mexico experienced positive economic development, known as the “Mexican Miracle,” and organized communist efforts eased.

After the end of World War II in 1945, the Cold War with the USSR intensified the perceived threat of communism in the US, which led to the “Second Red Scare.” The House Un-American Activities Committee (HUAC), which started in 1938, engaged in an anti-communist campaign. Joseph R. McCarthy (1908–1957), aided by FBI director J. Edgar Hoover (1895–1972), led intimidations, investigations, and charges of disloyalty against Americans due to communist ties and activities. The HUAC questioned celebrities, intellectuals, and politicians. Although the HUAC

existed until 1975, the public communist persecution eased by 1954. Mexican muralists in the US were also perceived as communists and were chastised for it.

Individuals

Vasconcelos left Mexico after his resignation from the SEP and lived abroad for several years (1924–1928; 1929–1939). He was no longer involved in the Mexican muralist movement, and instead dedicated the rest of his life to politics and writing. He ran for president in 1929 but was defeated. Dr. Atl continued with art, intellectual, and writing activities outside of the movement during this phase. Artists who participated in the emergence of the muralist movement continued producing socially inspired murals. Some of them, like the “great three,” painted murals the rest of their lives and became well known in the US and abroad. Siqueiros, though, interrupted his mural work for several years and dedicated himself to political and military activity, including fighting for 2 years in the Spanish Civil War. Rivera and Orozco became members of the Strident Society and LIP, and Siqueiros was involved in !30–30! and LEAR.

In 1937, President Cárdenas supported Rivera’s request to give Trotsky asylum in Mexico. Trotsky moved into the house of Rivera’s wife, the famous Frida Kahlo (1907–1954), in Mexico City (Carpenter, 2007; de Cortanze, 2015; Grimberg, 1997; Herrera, 1983, 1991; Hooks, 2002; Lowe, 1995; Michel, 2013; Mujica, 2002; Wolf, 2010; Zamora, 1987) but later moved out to a nearby home. Welcoming Trotsky in Mexico created conflicts inside the PCM (Patenaude, 2009) and between muralists. Some, led by Siqueiros, supported Stalin; others, led by Rivera, supported Trotsky (Ojeda-Revah, 2002). Trotsky and André Breton (1896–1966; who was also welcomed by Rivera in Mexico) denounced Stalin’s role in the Spanish Civil War in the manifesto *Towards a Free Revolutionary Art* (Breton & Trotsky, 1938), increasing tensions between the two groups. Siqueiros, profoundly influenced by the Spanish communists, conspired with other artists in planning the purging of Trotsky supporters from the PCM as well as his failed assassination attempt in Mexico. “Mexican public opinion was shocked to learn that one of its greatest artists with world renown, locally held in high esteem, had been a GPU [Russian ‘State Political Directorate’] agent since 1928” (Ojeda-Revah, 2002, p. 276). Siqueiros fled to Chile with the help of Pablo Neruda (1904–1973). Finally, in 1940, Trotsky was killed in his Mexican home by the Spanish communist Ramon Mercader (1913–1978).

Organizations

Strident Society (1921–1927) The Society set the occasion to strengthen the value of experimentation in the arts. It was established in 1921 by the poet Manuel Maples Arce (1900–1981) with the release of a flyer called *Actual* Number 1 “strident”

(“estridente”), characterizing a loud and sharp voice. In it, he called on artists and intellectuals to unite by engaging in radical change in all visual arts, literature, and music through experimentation (Deffebach, 2015). The call fit like hand in glove to the Mexican muralists, some of whom joined the movement (Stridentismo, n.d.).

The society generated flyers, magazines, books, and exhibitions. It produced two other manifestos in *Actual* (1923) and a final one elsewhere (1924); three magazines: *Ser* (“Being”; 1922), *Irradiador* (“Radiator”; 1923), and *Horizonte* (“Horizon”; 1926–1927), with editorial designs of muralists from the SEP mural program. The Society also published several books, including two of poetry, one of which was translated into English and published in New York (1929). The first Strident exhibition took place in the *El Café de Nadie* (“Nobody’s Coffee”) in 1924 in Mexico City.

In 1925, the Strident Society was formally established in Xalapa, the capital of the state of Veracruz, which became known as “Estridentópolis” (“city of Stridentism”). It was housed in the state’s government from 1924 to 1927, under the auspices and support of its governor, Heriberto Jara Corona (1879–1968), whose secretary was Arce. In 1927, Jara Corona was removed from his governor post, after which the society dissolved because it no longer had government and financial support (Estridentismo, n.d.).

¡30–30! (1928–1930) This organization, named after a machine gun used in the Mexican Revolution (the “.30-30 Winchester/.30 Winchester Center Fire”), opposed the traditional art education of the Academy of San Carlos and proposed new methods aligned with the muralists’ values. It was constituted by 30 discontent artists, who were called “treintatrentistas” (a play on words, meaning 30 members of an organization called thirty). Some members were pioneers of the muralist movement, and some had also been members of the Strident Society.

Members of ¡30–30! satirically ridiculed and discredited everything that the Academy stood for: its administration, staff, methods of teaching, and the plastic works it produced. For instance, they argued that Indians and poor people were painted superficially, replacing aristocrats as subject matter, and they claimed that the revolutionary spirit that characterized the muralist movement was lost. They proposed ending the academia, establishing outdoor painting schools, creating a Mexican museum of modern art, and changing the teaching methods and staff of the Academy of San Carlos.

The group published three issues of its magazine, *¡30–30!, Órgano de los Pintores de México* (Deffebach, 2015; El Grupo de Pintores ¡30–30!, 1928), and five posters that were placed on the doors of the Academy of San Carlos and walls of some buildings. Their actions caused the SEP to censor the members’ activities, requiring approval of the content of their publications. Furthermore, during the interim presidency of Emilio Portes Gil (1890–1978) from 1928 to 1930, radical outbreaks were suppressed in Mexico. With government censorship and suppression, the group lasted only 2 years.

Intellectual Proletarian Struggle (1931) LIP set the occasion for strengthening the value of bringing socialism to the arts. A group of artists and muralists founded LIP. Their goal was to “simplify their artistic expression so it would be understood by the masses” (Fuentes Rojas, 1995, p. 18), hoping to engage workers by relating to their everyday experiences. LIP produced a periodical, *La Llamada* (“The Call”), and exhibitions. The organization lasted only 1 year as their activities and products did not attract a supportive audience.

League of Revolutionary Writers and Artists (1933–1939) Like LIP, LEAR strengthened the value of bringing socialism to the arts, hoping to bring literary and artistic creations to the masses. It was formed by a group of heterogeneous plastic artists, writers, and musicians who defended workers’ causes (Fuentes Rojas, 1995), supported the USSR, believed that art had a social function, and opposed government censorship. The group published the periodical *Hoja Popular* (“Popular Leaf”) and the magazine *Frente a Frente* (“Front to Front”), both of which were discontinued in 1938 when LEAR began publishing the magazine *Ruta* (“Route”). LEAR also produced flyers, brochures, and books and organized congresses, exhibitions, concerts, and conferences.

The formation of LEAR originally came about in a gathering of an antifascist group in the John Reed Club in 1929 in the US (Fuentes Rojas, 1995). But it was established 4 years later in 1933 by one of LIP’s ex-members, Leopoldo Méndez (1902–1969; Caplow, 2007), along with other muralists who had participated in the SOTPE and in the SEP mural program. LEAR was the Mexican division of the International Union of Revolutionary Writers, founded in the USSR, which lasted from 1925 until 1935 (International Union of Revolutionary Writers, n.d.; Anreus et al., 2012). LEAR weakened by 1937, when some members of the plastic arts section left, and collapsed by 1939 (Pereira, Albarrán, Rosado, & Tornero, 2004).

Decline (After 1955)

When contextual circumstances no longer supported the generation of revolutionary murals and consistent political accomplishments (cultural products), the organizations that produced them changed to meet new demands or ceased to exist. Subsequently, their members either adjusted to evolving vicissitudes, abandoned their causes, got involved in other organizations, or died. Two organizations were relevant in the decline of the movement: (1) People’s Graphic Workshop (“Taller de Gráfica Popular”; TGP); and (2) the Commission for the Promotion and Regulation of Mural Painting, referred to as the “Mural Commission.”

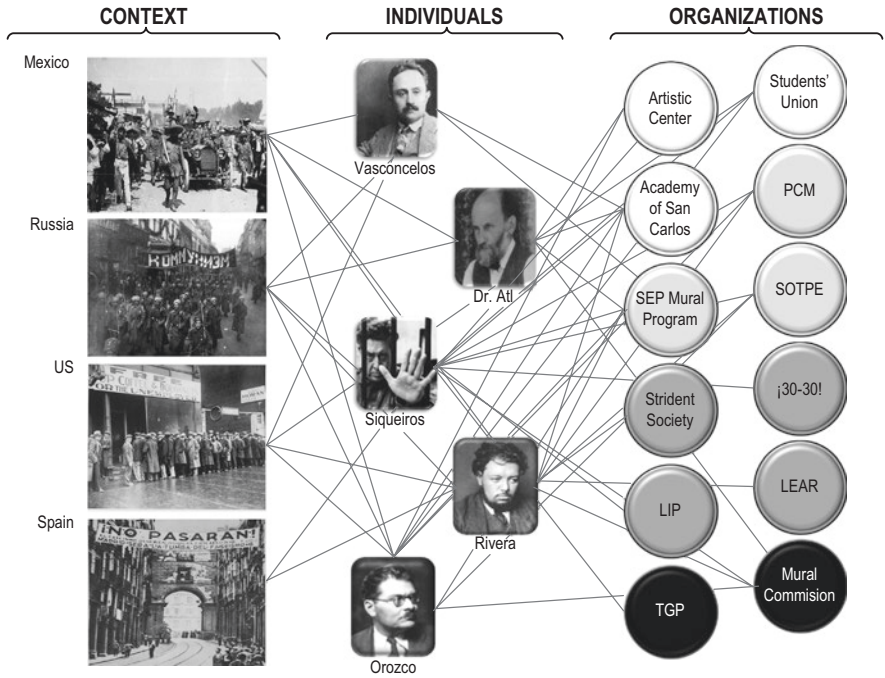


Fig. 15.1 Interactions between contexts, individuals, and organizations in the evolution of the Mexican muralist movement. (Sources of the photographs are as follows: *Mexico*: Francisco I. Madero entering the city of Cuernavaca on June 12, 1911. Emiliano Zapata is on the far right, with a tricolor band across his chest. Retrieved from https://commons.wikimedia.org/wiki/File:Madero_en_Cuernavaca.jpg; *Russia*: Armed soldiers carry a banner reading “Communism,” Nikolskaya Street, Moscow, October 1917. Retrieved from https://upload.wikimedia.org/wikipedia/commons/7/79/Armed_soldiers_carry_a_banner_reading_%27Communism%27%2C_Nikolskaya_street%2C_Moscow%2C_October_1917.jpg; *US*: Unemployed men lined up during the Depression outside a soup kitchen in Chicago by Al Capone, February 1931. Retrieved from https://en.wikipedia.org/wiki/Great_Depression#/media/File:Unemployed_men_queued_outside_a_depression_soup_kitchen_opened_in_Chicago_by_Al_Capone,_02-1931_-_NARA_-_541927.jpg; *Spain*: They shall not pass! Republican banner in Madrid reading “Fascism wants to conquer Madrid. Madrid shall be fascism’s grave.” 31 December, 1935. Retrieved from https://commons.wikimedia.org/wiki/File:%C2%A1No_pasar%C3%A1n!_Madrid.jpg#/media/File:%C2%A1No_pasar%C3%A1n!_Madrid.jpg; *Vasconcelos*: José Vasconcelos Calderón (1913). Harris & Ewing Collection, Library of Congress. Retrieved from https://upload.wikimedia.org/wikipedia/commons/f/fb/Jose_vasconcelos.jpg; *Dr. Atl*: Dr. Atl, aka Gerardo Murillo (1926). Photograph by Edward Weston, Art Institute of Chicago. Retrieved from <http://www.artic.edu/aic/collections/artwork/75435>; *Rivera*: Diego Rivera (1910) retrieved from https://commons.wikimedia.org/wiki/File:Diego_Rivera,_1910.jpg; *Siqueiros*: David Alfaro Siqueiros (1960). Retrieved from [https://en.wikipedia.org/wiki/David_Alfaro_Siqueiros#/media/File:David_Alfaro_Siqueiros_\(El_Coronelazo\).jpg](https://en.wikipedia.org/wiki/David_Alfaro_Siqueiros#/media/File:David_Alfaro_Siqueiros_(El_Coronelazo).jpg); *Orozco*: José Clemente Orozco (1932). Photograph by Arnold Genthe. © Library of Congress, Washington, DC (neg. n o. LC-G412-T-6066 -004). Retrieved from <https://www.loc.gov/item/aggc1996013201/PP/>.)

Context

The contextual circumstances that set the occasion for the movement changed dramatically in Mexico and elsewhere during this phase. Mexico, the US, the USSR, and Spain stabilized politically. Mexico continued with a democratic system, strengthened economically in drastic contrast to the years of its Civil War, and maintained relations with the US, despite taking dissenting views. In Spain, the period from 1954 to 1970 was known as the Spanish Miracle, due to its economic recovery. Franco ruled Spain until his death in 1975. Stalin ruled the USSR until his death in 1953, and his successors maintained the Cold War until 1990, when Mikhail Gorbachev (1931–present) put an end to it. Although there were socially charged murals painted in Mexico after 1956, the strength of mural production and the message they communicated weakened.

Individuals

Rivera died in 1957, Vasconcelos in 1959, and Dr. Atl in 1964. Siqueiros, who was jailed from 1959 to 1964, continued painting murals after his release and died in 1974. Other generations of muralists came about. The work of the muralists influenced artists in several Latin American countries as well as in the US.

Organizations

People’s Graphic Workshop (1937–2010) TGP promoted the value of using visual arts in the service of social change and sold art in a collective of incoming and established artists. It was formed by dissidents who separated from LEAR in 1937 (Deffebach, 2015), including Leopoldo Méndez and other muralists who had participated in the SEP mural program. They collaborated with some artists of the US PWAP (for images of selected prints, see “Taller de Gráfica Popular,” n.d.).

TGP supported the progressive policies of president Cárdenas, such as land reform, labor unions, and the nationalization of the Mexican oil industry. However, it became unpopular in 1940 after one of its workshops was used by Siqueiros and other artists to plan the failed assassination attempt of Trotsky. Due to financial difficulties, TGP had to be moved several times. Jesús Álvarez Amaya (1925–2010) kept the organization alive from 1967 until his death in 2010 (Ricker, n.d.).

Commission for the Promotion and Regulation of Mural Painting (1947–1959) The Mural Commission oversaw the approval of government-sponsored mural contracts and regulations for their protection. The idea of the Commission came about when the city canceled Maria Izquierdo’s (1902–1955) mural contract

in a prominent building in Mexico City's center ("Zócalo") in 1945. Siqueiros and Rivera opposed the contract, arguing against her style and her inexperience at mural making. They suggested that she work under the supervision of an established muralist. The rejection caused much controversy among muralists. So, in 1947, the Director of the National Institute of Fine Arts convened 16 muralists to exchange ideas about mural creation. (Izquierdo did not attend.) The group passed a resolution with several provisions, one of which was the establishment of the Mural Commission. The Commission faced much resistance; muralists argued that censorship opposed the spirit of Vasconcelos's original mural program.

The Commission was composed of the "great three"—Rivera, Siqueiros, and Orozco—who at their discretion could invite two additional painters. Dr. Atl joined them the first year. When Orozco died, Jorge González Camarena (1908–1980) replaced him; and when Rivera died, Federico Cantú (1907–1989) took his place. In 1959, Juan O'Gorman (1905–1982) became part of the Commission. He attended only two meetings and indicated that they were not of much significance, suggesting that the Mural Commission was no longer relevant. As for Izquierdo, she remained resentful the rest of her life for having lost that commission. "In 1953 she told a newspaper reporter that Siqueiros should give up being 'the boss of the mural painting monopoly' and go back to painting 'portraits, which is what he does best'" (Deffebach, 2015, ch. 6, para. 60).

Conclusions

As a complex, adaptative system, the Mexican muralist movement evolved from many moving parts dynamically interrelating and coevolving. It involved a web of metacontingencies continuously entangling culturants, selectors, and contingencies—all affected by the context in which they evolved and the value-driven actions of individuals. Figure 15.1 illustrates this web of interconnections.

Context

The photographs on the left of Fig. 15.1 identify critical events that affected the movement: the Mexican Civil War, the Russian Bolshevik Revolution, the US Great Depression, and the Spanish Civil War. Some contextual variables functioned like establishing operations (EOs)—"events, conditions, circumstances that momentarily alter the effectiveness of other events as reinforcement (and punishment), and simultaneously alter the frequency of those types of behavior that have been followed by that reinforcement (or punishment)" (Michael, 1993, p. 154). Other contextual circumstances functioned like abolishing operations (AOs) by decreasing the value of events as reinforcers or punishers and abating response frequency

(McGinnis, Houchins-Juárez, McDaniel, & Kennedy, 2010). Both EOs and AOs are referred to as analogs because the original definitions have been used to describe properties of events within a linear, operant framework. In a laboratory environment, for instance, deprivation could be an EO and satiation an AO. Although the functions of EOs look similar in the laboratory and in a social event, the underlying units of selection are different, operant vs. IBCs. Both type of units involve environmental selection, but the selection processes are different.

To explain how the circumstances “alter the effectiveness of other events as reinforcement (and punishment)” (Michael, 1993, p. 154), there is still much to be understood. Even within a behavior analysis perspective, missing are considerations for the role of the organism in motivating conditions (Killeen, 2019; Killeen & Jacobs, 2017) and of private events, such as those involved in rule-governed behavior (Malott, 1993; Malott, Malott, & Trojan, 1999). A broader discussion still needs to take place. As Killeen (2019) said, “Google Scholar returns four million links to articles with the term *motivation* in their title or abstract; perhaps there is useful information in some; perhaps, as responsible scientists we should know and cite some of those most relevant to our undertaking” (p. 18). I concur. Although the contributions from behavior analysts have been of great value, our field will benefit from expanding the scope of understanding motivating conditions within the framework of complex adaptative systems.

Individuals

At the center of the movement were individual’s actions in IBCs. They interconnected with contextual events and organizations. As a matter of illustration, Fig. 15.1 shows the five most influential individuals in the emergence of the movement. Dr. Atl was more relevant in the antecedent phase and Vasconcelos in the emergence. The “great three,” along with other muralists, played a role in most of the movement’s evolution. Their involvement in organizations facilitated the transmission of repertoires across individuals. Of the “great three,” Siqueiros, participated in 10 organizations; Rivera and Orozco participated in seven. They painted murals all their lives, consistent with the original vision of the movement, and achieved international recognition. Other recognized artists, such as Dr. Atl, Ramón Alva de la Canal (1892–1985), Fernando Leal (1896–1964), and Xavier Guerrero (1896–1974), were involved in five organizations (or perhaps more). Some became founders or leaders of several organizations.

Organizations

The Cambridge dictionary defines “organization” as “a **group** whose **members work** together for a **shared purpose** in a **continuing way**” (Organization, n.d.). What is missing from the popular understanding of “organization” is that selection contingencies affect its evolution—the part of the definition that facilitates development in a “continuing way.” “Selection” is a critical element, embedded in the concept of “metacontingency” (Glenn, 1988, 1991, 2004; Glenn & Malott, 2004; Houmanfar et al., 2010; Houmanfar & Rodrigues, 2006; Malott, 2003, 2016a, 2016b, 2018, 2019; Malott & Glenn, 2006; Sandaker, 2009, 2010; Todorov, 2004, 2006, 2013). That is why organizations were analyzed in the framework of metacontingencies.

External entities—“selectors”—affected future repetitions of culturants over time. Like in a behavioral contingency, where the reinforcer affects the future occurrence of the behavior, in a metacontingency, the selection of culturants also affects their next iteration, which occurs with variation. Some aspects of the murals changed due to the feedback from the selector; as a result, some elements of the future repetitions of IBCs might have changed, such as using different compositions, techniques, or materials. Variation of IBCs resulted in variation of the murals produced. Selectors (e.g., the patron or organization) also changed over time. In Fig. 15.1, organizations are represented with circles, symbolizing lineages of culturants over time, which helped participants strengthen their values, develop mural-making skills, and engage in political causes (Espinoza, 1992). The variation of shading in the circles represents the different phases of the movement.

Organizations are often composed of internal smaller components, which could also be analyzed in the framework of metacontingencies. For instance, the SEP mural program was part of Mexico’s Secretariat of Public Education, and, given that it was central to the muralist movement, the program is analyzed here as an organization. The body of murals produced during the evolution of the movement can also be considered the AP of the movement.

Different organizations exerted different functions with respect to the muralist movement. They established lineages of IBCs that helped individuals acquire and/or strengthen relevant repertoires, established selection contingencies, provided resources, or supported internal components. Because of this complex adaptative system’s nature, the movement per se could not be replicated. For example, it is interesting that even though the Bolshevik Revolution inspired the muralist movement in Mexico, it was not conducive to a similar movement in the USSR because the Bolsheviks exerted control over the arts, inhibiting free expression. As well, the mural creation in the US under the PWAP took on a different overtone from that of Mexico.

Based on the analysis of the 12 organizations presented in this chapter, a list of factors that contributed to their existence and relevance can be inferred. Several factors contributed to the establishment or strengthening of organizations in the movement: (a) shared values of participants clearly articulated through a mission; (b) support from other organizations, some as selectors, others as resource providers;

(c) increased market demand by involving well-known artists in the creation of the murals; and (d) adaptation to new contextual circumstances. Other factors contributed to the abolition or relevance of organizations to the movement, such as (a) weakening or disappearance of organizations that functioned as selectors; (b) repression and censorship of APs; (c) decline of market demand when socially charged murals lost attraction as the world around them dramatically changed; and (4) discontinuation of IBCs due to leaders' leaving without having established continuity with new members, internal fraction caused by discrepancies in values and priorities, or lack of incentives to keep individuals involved.

This chapter illustrated how the Mexican muralist movement evolved based on a culturo-behavior science perspective. Factors identified and described here as part of the complex culturo-behavior system might help researchers to identify areas of intervention at a cultural level (Mattaini, 2016). For instance, new organizations or movements could be evaluated in terms of these factors to determine whether they do in fact contribute to their survival or decline.

In the end, organizations that survived the movement changed dramatically to adjust to new contexts, like the Academy of San Carlos; lost strength in Mexico, like PCM; became irrelevant to the causes that ignited them in the past, like TGP; or stopped exerting a function altogether, like ;30–30! and all others that vanished. The “great three” died, along with other important players in the movement. New generations of muralists came about in Mexico, but they never reached the force, the focus, and the spirit that once propelled muralists' work.

Although the Mexican muralist movement declined, it left a tremendous legacy of murals as a historical and cultural heritage. It also provided inspiration for other muralist movements elsewhere. As well, the movement constituted an example of how complex adaptative social systems evolve. It is my hope that this analysis serves as a model for investigators attempting to study other cultural movements.

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Chapter 16

Public Policy Advocacy in Culturo-Behavior Science



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The Alliance for Justice (2005) defines *advocacy* as “efforts to influence public policy” (p. 4). Many more detailed and varied definitions have been used in the literature but few include the inequities experienced by marginalized groups. For example, and perhaps surprisingly, in reviewing the literature on advocacy in public health, Cohen and Marshall (2017) report that, “significantly, there were relatively few examples of definitions that specifically identified equity and/or social justice for disadvantaged populations as a primary goal” (p. 311). In some of B. F. Skinner’s earliest work (1948, 1953), he suggested (and later strongly emphasized; 1987) that behavior science had the potential to reshape societies for the better, in ways we often now discuss using terms like social and environmental justice. The post-World War II era, when Skinner wrote his earliest applied behavior science-oriented books, overlapped with the period when the newly organized United Nations developed and globally ratified the 1948 Universal Declaration of Human Rights (<https://www.un.org/en/universal-declaration-human-rights/>). The Declaration affirmed universal political, economic, social, and cultural rights, including among others access to adequate food, housing, medical care, and education; participation in governance; and freedom from oppression (although the rights elaborated have not yet been fully realized anywhere on earth).

Most behavior science and practice at the time, probably necessarily, focused on basic research and small-scale intervention, laying the groundwork for subsequent advances. Regardless of the limited available knowledge base however, many

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behaviorally oriented researchers and practitioners subsequently became deeply involved in the social movements of the 1960s and 1970s, including the civil rights, antiwar, ecological, and women's movements (and a few in the LGBTQ+ movement). Those efforts have not yet been extensively documented, given that most participation was in and through non-behavioral organizations and collectives. For further information on the early history of social and environmental justice efforts within behavior science, see Chap. 17, "Advocacy, Accompaniment, and Activism."

By the late 1980s, the Association for Behavior Analysis¹ (ABA) was encouraged by members, particularly those working in community settings, to examine how behavior analysts and the organization itself could "contribute to policymaking relevant to the public interest" in a more systematic way (Fawcett et al., 1988a, p. 27). Therefore, in 1987, ABA assembled a Task Force on Public Policy "to examine ways to encourage members to contribute to policymaking relevant to the public interest" (Fawcett et al., 1988a, p. 27). The goal of the Task Force was to outline "ways for behavior analysts to be more functional citizen scientists in the policymaking arena" (Fawcett et al., 1988b, p. 11), to become "scientist-advocates" (Fawcett et al., 1988a, p. 27). The Task Force published an annotated set of recommendations (Fawcett et al., 1988a) and a more extended article summarizing "the contexts and processes of policymaking; and ... [outlining] issues regarding the roles of behavior analysts in creating policy-relevant conceptual analyses, generating research data, and communicating policy-relevant information" (Fawcett et al., 1988b, p. 11).

Foundational Considerations: Values and Ethics

It is essential that those engaging in public policy advocacy supporting social and environmental justice, especially as scientist-advocates, ground their practice in foundational values and ethics. Many policy issues involve complex issues in that they can have profound impacts, often especially for vulnerable persons and marginalized groups.

Values Guiding Cultural and Community Advocacy

Values and ethics, both of which have important implications for culturo-behavior science research and intervention, have been contested constructs in behavior science at least since Skinner's (1953) *Science and Human Behavior*. Skinner (1987) indicated that, "What is good for a culture is whatever promotes its ultimate survival, such as holding a group together or transmitting its practices" (p. 58)—which although helpful, provides only limited guidance for cultural and community

¹Renamed the Association for Behavior Analysis: International (ABAI) in 2008.

research and intervention within the behavior analytic community. Hayes, Barnes-Holmes, and Roche (2002) defined values as “verbally-constructed, globally-desired life directions ... [that] manifest themselves over time and unfold as an ongoing process” (p. 235). Statements of cultural values can be viewed as relational networks established within a collective that, in Hayes et al.’s terms, “over time ... become ‘frozen metaphors.’” Some professional groups, for example the National Association of Social Workers (2017), begin their ethical code with a list and explication of collective core values, potentially producing a shared relational network, believed to be consistent with Skinner’s (1987) “what is good for a culture.” Scholarly and professional behavior is expected to be consistent with those values, including behavior expected or proscribed in the more specific ethical code that follows. The six identified core values in the NASW Code are (a) service, (b) social justice, (c) dignity and worth of person, (d) importance of human relationships, (e) integrity, and (f) competence. It is relatively easy to make an argument that each of these, and the aggregate, are “good for a culture.”

Social and environmental justice are essential values in such work, and underlie ethical practice (see Chap. 9 in this volume for related ethical content). Inevitably, more detailed relational networks related specifically to the work of culturo-behavior science and practice in these areas will be shaped as the field matures. Other disciplines have focused on justice-related work guided by similar values for many years, and it can be valuable for behavior scientists to expose themselves to existing perspectives and their applications as we develop those networks. There is an enormous existing literature related to social and environmental justice across multiple disciplines (e.g., Alejandro, 1998; Erickson, 2018; Holifield, Chakraborty, & Walker, 2017; Jost & Kay, 2010; Rawls, 2001) that has considerable potential to provide guidance.

Jost and Kay (2010) offer a preliminary definition of social justice that begins to capture much of the related literature:

[I]t is possible to offer a general definition of social justice as a state of affairs (either actual or ideal) in which (a) benefits and burdens in society are dispersed in accordance with some allocation principle (or set of principles); (b) procedures, norms, and rules that govern political and other forms of decision making preserve the basic rights, liberties, and entitlements of individuals and groups; and (c) human beings (and perhaps other species) are treated with dignity and respect not only by authorities but also by other relevant social actors, including fellow citizens. (p. 1122)

They add, “A just social system is to be contrasted with those systems that foster arbitrary or unnecessary suffering, exploitation, abuse, tyranny, oppression, prejudice, and discrimination” (p. 1122)—patterns that also have been studied intensively (e.g., Brady & Burton, 2016; Young, 1990). These descriptions can be relatively easily translated in terms of the analysis of cultural systems that determine relative access to reinforcers, established schedules of reinforcement and exposure to aversives, as well as motivative operations and stimulus relations that shape and contribute to supporting networks of cultural practices.

Erickson (2018), describes environment justice and its links to social justice as follows (again easy to reframe in behavioral terms):

Environmental justice occurs when all people equally experience high levels of environmental protection and no group is excluded from environmental decision-making or affected disproportionately by environmental hazards (Forbes, Nesmith, Powers, & Schmitz, 2016). Environmental justice also affirms ecological unity and the interdependence of all species—and the right to be free from ecological destruction. (p. 10).

There are many areas of public policy in which advocacy is valuable; issues of social and environmental justice however are central to healthy cultures, and therefore receive particular attention in the material that follows.

Ethical Considerations in Advocacy Research and Practice

Most of the disciplines involved in culturo-behavior science and practice (for example, psychologists, social workers, licensed or certified behavior analysts, medical professionals, and educators) have established codes of ethics. There are, however, some specialized considerations related to (a) ethical integrity and (b) the obligation to act that are particularly salient in policy advocacy.

Integrity in Advocacy

It may seem obvious that justice-oriented advocacy activities should be handled with integrity; the professional disciplines involved in this work generally include a requirement for integrity in their codes. Most effective advocacy is directed toward achieving specific changes in individual or collective behavior. In many cases, however, the best policy directions to take are not yet well established by data. Furthermore, some advocacy is intentionally focused on choices that are optimal for some, and potentially dangerous for others. Advocacy or lobbying focused on commercial or disciplinary advantage or funding are common, and require particular caution. In addition, advocates and lobbyists in some cases are not familiar with existing data (although they have an obligation to be so informed).

There is a clear ethical obligation in science to advocate with integrity based on the best available information. As indicated by the ABA Task Force, “When testing one or more controversial alternatives in a study, behavior analysts should pay particular attention to the authenticity and ecological validity of interventions” (Fawcett et al., 1988a, p. 28). Full disclosure is ethically essential, as well as crucial for maintaining the advocate’s reputation with policy makers and citizens who may be pivotal in the future. There are several approaches that can be consistent with the requirement for integrity. For example, the Research to Policy Collaboration (RPC, <https://www.research2policy.org/>), which grew out of the work of the National [United States] Prevention Science Coalition (<https://www.npscoalition.org/>), recommends collaboratively sharing the full range of established research around an issue within ongoing partnerships between research experts and legislative staff. In cases in which participants are open to databased decision-making consistent with

both science and social and environmental justice, this may be a useful approach. As is the case across most of the advocacy literature, however, evidence that the use of this approach produces actual policy change has yet to be demonstrated.

In many critical areas of public policy, policy-makers may be unwilling to act based on well-established data for political reasons, or because of established, contradictory relational networks. (Resistance to effective action addressing climate change is a powerful example, as discussed extensively in Chaps. 10, 11, and 12 in this volume.) In such cases, there remains a clear ethical obligation to advocate for justice, even where less collaborative approaches may be required. In such cases, advocacy necessarily and appropriately involves persuasion—convincing decision-makers (and as discussed later, often the public) to consider a desired action. Current data indicate that persuasion often relies on shifting or expanding relational networks. In their work on persuasion and rhetoric, Hayes et al. (2002), outline ways that stimulus relations can be affected to support necessary social change.

At the same time, it is clear that such approaches can be used in manipulative ways, a potentially serious threat. Recent political movements across many nations have demonstrated that damaging and dangerous relational networks can be constructed to include links like {immigrants \approx criminals}, {climate change \approx political fiction}, or {strongman governance \approx citizen safety}. Intentional efforts to shift relational networks are clearly central to advertising, lobbying, and many types of advocacy, and demonstrate the power to profoundly strengthen or damage societies. As an example, the growth of “fake news” risks establishing and supporting false equivalence relations and relational networks that can produce poor policy decisions (Mattaini, 2013; Tsipurski, Votta, & Roose, 1918). Decisions to intentionally attempt to shift relational responding toward more prosocial patterns (see, for example, Dixon, Belisle, Rehfeldt, & Root, 2018) therefore require careful weighing to avoid deceptive and manipulative actions inconsistent with sustainable cultures of justice. One approach that can reduce such risks is to commit to operating transparently from participatory community bases in research, analysis, and advocacy (Biglan, 1995; Fawcett et al., 2003; Israel et al., 2010, see also Chaps. 9 and 14 in this volume).

The Obligation to Act

In 1971, B. F. Skinner made the widely quoted statement that “if your culture has not convinced you that there is [a good reason why you should be concerned about the survival of a particular kind of economic system], so much the worse for your culture” (p. 137). He goes on to suggest there are “many reasons why people should now be concerned for the good of all mankind,” including environmental, population, and nuclear threats, and describes in broad strokes how to arrange contingencies to evoke responsible behavior. Most professions structure education and practice around collective responsibilities, including obligations to provide professional service to those in need, with preferential attention to marginalized populations in the greatest need (Farmer, 2013; National Association of Social Workers,

2017). Scientists also commonly recognize that they have responsibilities, not only to do responsible science and advocate for that science when it addresses significant issues like addictions and climate change (Pollard, 2012), but also in some cases to decide on their areas of scientific activity based on social need.

For example, New York Times journalists Kristof and WuDunn (2020) describe the damage that economic despair leading to increasing prevalence of suicide, drug and alcohol abuse, and resulting family breakdowns has created among working class rural populations in the US over the past two decades. One important theme highlighted in this work is that these challenges are typically framed as individual problems (that can only be resolved through increases in personal responsibility), when broader systemic analysis indicates that the core issues are economic and cultural—calling for much more attention to social responsibility. Much the same is the case for a number of other cultural-level issues. Given the seriousness and breadth of social and environmental issues, and consistent with Skinner's (1971) warning, a case can be made that those behaviorists who have the socially supported education, capacity, and scientific resources to contribute to the good of the larger culture carry a particular ethical responsibility to do so. (Members of the Behaviorists for Social Responsibility Special Interest Group within ABA/ABAI have worked for decades to explore and commit to our individual and collective responsibilities, and approaches for exercising them.)

The community of culturo-behavior science researchers, educators, and practitioners includes members from multiple professional groups, some of which are more explicit than others about attention to social responsibility beyond work with individuals. Both public health (Cohen & Marshall, 2017; Weed & Mckeown, 2003) and social work place heavy emphasis on this commitment as a central element in education and field training. For example, one of the six major sections in the social work code of ethics is entitled “‘Social Workers’ Ethical Responsibility to the Broader Society,” indicating that social workers have obligations to (a) promote social welfare, (b) facilitate public participation in shaping social policies and institutions, (c) provide services in public emergencies, and (d) engage in social and political action, with specific guidelines for each.

The situation for licensed psychologists has been viewed as more complex. Nadal (2017), in an article in the *American Psychologist*, reviews “major controversies or dilemmas regarding psychology, social justice, and political participation” (p. 935). He traces psychologists’ history of activism in major social issues including civil rights, women’s rights, marriage equality, and rights to health and mental health care, as well as significant barriers, including, among others, a lack of advocacy training, ethical concerns around boundary issues, and the utility of political neutrality in practice. Nadal outlines the possibilities of framing oneself as a “psychologist-activist,” prepared to challenge oppression on individual, interpersonal, group, and institutional levels. The responsibility to participate in such work at the organizational and institutional levels is a final emphasis in his analysis. (Professional practice as a psychologist-activist as framed by Nadal has strong similarities to what is labeled “structural social work” in that field [e.g., Mullaly &

Dupre, 2018], recognizing that cultural institutions and practices structure advantages, possibilities, and limits for diverse groups.

The Policy Process

Near the beginning of this chapter, we noted the 1988 article prepared by the ABA Task Force on Public Policy (Fawcett et al., 1988b), and the accompanying set of recommendations (Fawcett et al., 1988a). Notable in these publications is a strong rationale for the importance of the scientist-advocate, with specific recommendations for engaging in policy advocacy, an area that had seldom been discussed in a scientific way in behavior science or most other disciplines.

Early Behavioral Perspectives on the Policy Process

Fawcett et al. (1988b) describe the typical policy process as including four stages: (a) agenda formation, (b) policy adoption, (c) policy implementation, and (d) policy review. They further explain that while these stages generally are common across issues and context, the content, sequencing, and actors in each stage varies in part based on the roles of key decision-makers, which may be in legislative, executive, judicial, bureaucratic, or regulatory positions or institutions, or among the general population in the case for example of public referendums. Seekins, Maynard-Moody, and Fawcett (1987), in an article with crossover authors with the two Fawcett et al. papers cited (1988a, 1988b), emphasize that political or administrative decisions are significantly influenced by context, including the realities of institutions, individual actors, and contingencies affecting those actors. They note that:

A decision that produces a policy or non-policy response rarely occurs between all policy actors on an issue instantaneously. Rather, each actor makes many decisions over time. The consequences of these individual decisions influence the future decisions of other actors and those of the individual actor. Thus, policymaking may be described as involving a series of events taking place over time that set the occasion for other events by other individuals. (p. 68)

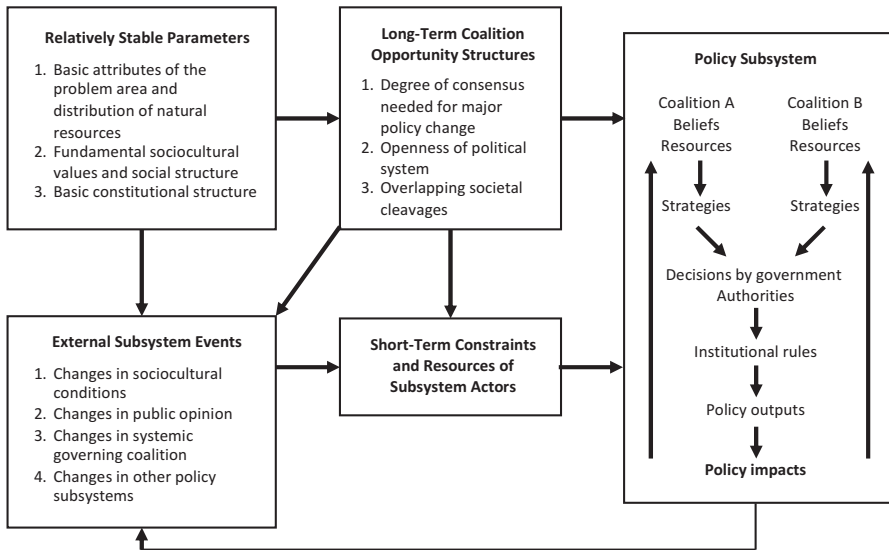
Seekins et al. (1987) describe two frameworks for examining analyses of policy decisions, the Rational Model, and the Dynamic Interest Group Model. In the first, the policy process is viewed as linear, with each of the previously listed stages proceeding neatly into the next. While such a framework can be useful for taking a beginning look, in public arenas, realities generally are more complex, characterized by multiple concurrent streams of activity. The Dynamic Interest Group Model emphasizes that the four stages listed at the beginning of the last paragraph may overlap, and indeed may occur in any order—and that the crucial role of interest group actions that shift contexts must be included in most adequate analyses.

Other Systemic Policy Perspectives

There are a large number of public policy decision-making models; some give much more attention and interest to group dynamics than others. One widely used model is the Advocacy Coalition Framework (ACF), “a loosely systemic framework in which “coalitions compete within a policy subsystem to translate their beliefs into policies” (Pierce, Peterson, Jones, Garrard, & Vu, 2017, p. S15; Weible, Sabatier, & McQueen, 2009). The ACF has been widely implemented; unfortunately, nearly all of the data collected have been qualitative, limiting the extent of validation considerably. One useful contribution this framework offers however, is a graphic depiction of the model, as displayed in Fig. 16.1, which reminds us of the frequent and often unpredictable competition among interest groups, as well as that considerable effort over an extended period is typically required for large-scale policy change.

More complex models from other disciplines also offer lessons to culture-behavior science, pertaining particularly to ecological systems analysis.² Orach and Schlüter (2016) indicate that:

“Social-ecological systems (SES) research emphasizes the interdependencies between human and natural systems (Berkes et al., 2000; Liu et al., 2007) and their importance for governance of SES. It moves forward from studying society and the natural environment



Source: Jenkins-Smith et al. (2014)

Fig. 16.1 Flow diagram of the Advocacy Coalition Framework. (Source: Jenkins-Smith et al., 2014)

²See Chap. 3 in this volume for more information on cultural systems analysis.

within their own disciplinary domains towards focusing on the relationships between components of the two systems” (p. 13).

They recommend as examples “five established theoretical frameworks of the policy process originating in political science and public policy research with respect to their potential to enhance understanding of governance and complex policy dynamics in social-ecological systems” (p. 13), including the previously discussed ACF as well as:

- Punctuated Equilibrium theory (Baumgartner & Jones, 1993) which draws on evolutionary biology;
- the Institutional Analysis and Development Framework (Kiser & Ostrom, 1982), a largely rational choice approach;
- the Multiple Streams Framework (Kingdon, 1984), an approach for analysis under conditions of ambiguity; and,
- the Policy Networks Approach (Atkinson & Coleman, 1989; Kenis & Schneider, 1991; Rhodes, 1997).

Each of these, and other available frameworks, are worth exploring, and sometimes can be consistent with work in our own field, for example related to recent evolutionary analyses within behavior science (e.g., Wilson, Hayes, Biglan, & Embry, 2014). Some of this work can be of real assistance as culturo-behavior science strives to develop meaningful and effective approaches for advocating with integrity for critical policy change.

The State of Advocacy Research

Recall that the overall policy process can be conceptualized as consisting of four phases (a) agenda formation, (b) policy adoption, (c) policy implementation, and (d) policy review (Fawcett et al., 1988a), and that the process is often not linear, with phases intermixing, overlapping, and repeating, often with many decisions being made by multiple actors throughout (Seekins et al., 1987). Even though there is considerable literature available on three of the four phases (agenda formation, policy implementation, and policy review/evaluation), the process of policy adoption—the actual decision-making—is considerably less developed. Recall that we initially defined advocacy as “efforts to influence public policy.” The question we need to answer here is what actions result in actual policy decisions—specifically what data support the effectiveness of particular advocacy behaviors, and what advocacy behaviors actually result in decisions producing desired policy changes?

As Devlin-Foltz, Fagen, Reed, Medina, and Neiger (2012) state “it is one thing to catalog meetings held, position papers drafted, and pamphlets distributed, it is quite another to demonstrate that these outputs resulted in useful policy change outcomes” (p. 581). Unfortunately, the literature on policy advocacy focuses primarily on single examples, without rigorously demonstrating that, for instance,

developing and sharing a policy brief, participating in a collaborative meeting with legislative staff, or organizing a protest are key factors leading to policy change even in a single case, much less across cases. The level of generalizable knowledge present in the literature around such questions is therefore quite limited. Addressing a related challenge, Pawson, Wong, and Owen (2011) argue that the standard predicament of evidence-based policy is that such “[e]vidence does not come in finite chunks offering certainty and security to policy decisions. Rather, evidence-based policy is an accumulative process in which the data pursue but never quite capture unfolding policy problems.” (p. 518).

Perhaps the most significant, and terribly important, challenge is that effective cultural and community work generally must be done in partnership with community members, in ways that align with community values, shared stimulus relations, and traditional repertoires, reflecting the central importance of social validity—an ethical requirement (Adkins, 1997; Goldiamond, 1976, 1984, 2002; Wolf, 1978; see also Chapters 9 and 14, this volume). The scientist-advocate must therefore be prepared to adjust their work to fit within cultural and community dynamics, with considerable self-awareness, even when their own values may be quite different.

The impact of larger political factors can also not be ignored. There have recently been some movements in Europe, the US, and elsewhere toward federal governments developing national behavior science teams, generally focused on achieving “small wins,” often using language like “behavioral insights” (Sousa Lourenço, Ciriolo, Rafael Rodrigues Vieira de Almeida, & Troussard, 2016). A similar process was initiated in 2014 in the US during the Obama presidency (Congdon & Shankar, 2015). A web search completed on January 25, 2020, however, opened a page with the following message at the top: “This is historical material frozen in time on January 20, 2017” (sbst.gov). Which is to say, political interest in this work was no longer of interest under the Trump administration.

Given such collective realities, it should not be surprising that there are no well-controlled experiments persuasively demonstrating that the application of one advocacy repertoire produces a specific policy change (outcome) more effectively than any other, much less rigorously demonstrating specific changes on the level of the relevant social issue (impact). The uniqueness of conditions, structures, and personnel from setting to setting further complicate the discovery of generalizable findings. Treatments in medicine can often be almost entirely standardized, for example, by offering standard medication regimens. Such standardization is more challenging in evaluating individual behavioral treatments, given differences in histories of clients and professionals and contextual factors, limiting the utility of reviews and meta-analytic studies (Mattaini, 2012). Standardization at cultural levels, within highly-varied systemic contexts, is at least an additional order of magnitude more complex.

Nonetheless, there are many available reports offering potentially useful examples of advocacy, some with considerable social validity, as well as conceptual models grounded in well-developed behavior science (e.g., Hovell, Wahlgren, & Adams, 2009 [an important behavioral public health model]; Mattaini, 2013). A classic

model developed and implemented by Fawcett and colleagues (Fawcett et al., 1988b; Fawcett, Seekins, & Jason, 1987; Seekins & Fawcett, 1986), advocated successfully for state laws to encourage child safety seat use in vehicles throughout the state of Kansas. The investigators began by identifying interested parties, including medical and highway safety advocacy groups as well as a legislative sponsor. They then spent time interviewing those parties, determining what information would be helpful to them in deciding how to proceed (e.g., current public sentiments, related prevalence data), and ensuring that the information requested was provided in a timely manner. Recognizing that there would be opposition, as is true in many advocacy processes, media and more personal strategies were developed from the beginning and throughout the process as needed to address concerns. Two factors that the researchers indicated were most important are (a) very active, timely, and wide engagement required from the first discussion with a potential sponsor through the final outcome, and (b) use of behavioral research methods, including direct observations to determine prevalence, review of literature on child passenger safety, and survey methods to explore social validity.

An example of somewhat similar work currently under development is the RPC, a nonprofit coalition mentioned earlier. The RPC takes the position that “it is more fruitful to work within the context of existing policy priorities because our primary objective is to facilitate trusting partnerships between research and policy communities” (RPC, *Our Approach*) through ongoing non-partisan relationships with policy-makers (e.g., Congressional staff). This approach avoids taking particular policy stances and instead focuses on bringing the best range of evidence to the table. It also clearly has limitations when strong opposing positions are present (e.g., seriously engaging climate change denying members of Congress in this way would likely fail under current conditions). However, in cases when the issue is primarily lack of knowledge rather than rigid political stances, the approach seems to be of value.

RPC work by D. Max Crowley and colleagues particularly appears to have potential for successfully engaging policy-makers, at least those who demonstrate interest (Crowley et al., 2018; Crowley, Scott, & Fishbein, 2018; Scott, Larson, Buckingham, Maton, & Crowley, 2019). In their report, Crowley, Scott, and Fishbein (2018) discuss the development of “strategic legislative needs assessments and a rapid response researcher network to accelerate the translation of research findings into usable knowledge for policymakers” (p. 260) in a pilot program of legislative engagement. This report provides considerable detail about how the pilot translational program was planned and implemented, and elaborates the financial and time costs for all participants. Although the article uses the language of “impact analysis,” what is measured are primarily the number of participating scientists, number of participating legislative offices, and number of legislative requests for evidence relevant to policy-making. However data on associated policy changes are not presented.

Both the Kansas example and the RPC examples are based on an expectation that providing research information to inform policy will have a meaningful influence, a

position that is not without challenges. The question as to whether policy-makers actually use research has been studied extensively. Newman, Cherney, and Head (2016) summarize:

Over many decades, the study of how policy decisions can be based on—or impervious to—the outputs of academic research has grown, inspiring subgenres with names such as “research utilization,” “knowledge transfer,” “knowledge brokering,” and “evidence-based policy.” (p. 24) ... A substantial number of survey respondents indicated that they do not value academic research very highly and do not often use the findings of academic research when constructing advice for making policy (p. 25).

Many policy decisions depend in part on forecasts (estimates, predictions) of what will happen in the future, but forecasts are commonly shaped by political positions; decision-makers often solicit forecasts using questions and selecting sources based on those political positions. Cost and utilization estimates often vary dramatically by political position, and the estimates often prove inaccurate. Forecasting relies on technical information and analysis, but in fact also involves ethical questions as “In the end, forecasts are often expected to be advocacy which at the same time can be presented to the public for political reasons as the results of unbiased analysis” (Wachs, 1990, p. 141). Wachs (1990), a senior specialist in the area, indicates that he has come to be doubtful of “virtually all forecasts introduced into political debates by government agencies, consultants, or supposed technical experts” (p. 146). As one response, Tetlock, Mellers, and Scoblic (2017) report on a process called “forecasting tournaments” (originally developed within the US intelligence community) which involves particular ways of integrating multiple forecasts that may have potential for “depolarizing political debates and resolving policy disputes” (p. 481). Some behavior science lab procedures and artificial intelligence research may be well positioned to participate in this work.

Advocating for Specific Decisions and their Implementation

Advocacy as it is being discussed in this chapter is in all cases directed toward decision-makers (individually or collectively), and those with influence on decision-makers related to a specific area of concern. The more specific the action on which advocates focus, the easier planning and execution will be. Advocacy for “peace,” for example, generally reflects good will, but is not specific enough to bring about meaningful change. Gandhi (1945) noted that “Civil Disobedience [an important form of advocacy in extreme circumstances] can never be directed for a general cause such as Independence. The issue must be definite and capable of being clearly understood and within the power of the opponent to yield” (p. 28). The same is generally true for other forms of advocacy. An advocacy campaign can be organized around a general value or principle (like increasing diversity, or support for science), but specific advocacy acts, including ultimately “making the ask,” directed

toward specific actors or classes of actors are required to advance toward the general goal (Lee, 2016; Seekins & Fawcett, 1986).³

Depending on the case, key decision-makers may be legislators, executives (e.g., state governors, corporate CEOs), administrators of many kinds (e.g., state agency directors), practitioners, or others depending on organizational structures (public or private). Broader advocacy around a specific issue or campaign is often directed toward specific actions of multiple key persons, including the persons who make and implement decisions themselves, but also in many cases toward “influencers” whose actions and advice shape and sustain the behavior of the decision-makers; this is often the most realistic option (Mattaini, 2013; Paul & Motskin, 2016). Influencers may be financial contributors, media figures, or others with more direct contact with decision-makers than is true for the general public, and often than many behavior analysts.

Research on each group indicates that economic elites, organized business interests, other organized interest groups, and ordinary citizens have influence across a large range of US government policy issues (Gilens & Page, 2014). Large-scale multivariate analysis by Gilens and Page, however, proves less encouraging, indicating that most influence lies with economic elites and organized business interest groups, while private citizens and organized citizen groups demonstrate little independent influence. (Similar factors are likely to be relevant to state and local decisions; the situation may be different in other nations, a question worth exploring if comparable data are available.) This analysis should not be interpreted as hopeless, but rather as an incentive to expand the influence of citizens by increasing their engagement, as discussed below, with the networks of influence currently operative (Coffman & Beer, 2015; Mattaini, 2013).

Advocacy Repertoires

The literature suggests a number of modest but potentially valuable repertoires for engaging in advocacy. The pioneer behavior analyst Richard Malott has for many years recommended the classic *How to Win Friends and Influence People* (Carnegie, 1936) as highly consistent with behavior science principles, including arousing “an eager want” in the person you are trying to persuade. The 2-Minute (or Elevator) pitch (Lee, 2016)—making your key points with your reasons very quickly and interestingly—clearly can facilitate further discussion in many cases. Preparation of policy briefs (Demarco & Tufts, 2014; Wong, Green, Bazemore, & Miller, 2017), is not only important, it is an expected skill. The power of narrative is well established. The first author of this chapter has been heavily involved in two major legislative

³The material in Chap. 17 in this volume provides additional helpful material on integrating advocacy work into a broader activism framework.

advocacy efforts (among others), one directed toward funding for services for children and adolescents on the autism spectrum (in Utah), and another for funding for youth mental health services (in Alaska). Stories of the struggles faced by particular young people (and in some cases their voluntary attendance at legislative hearings), combined with accessible data presentations and handouts, were among the factors that were associated with funding successes in both cases. These efforts emerged from ongoing collective efforts by parents, youth, and professionals. While not minimizing the experience of such standard approaches, current challenges often can benefit from more rigorously developed strategic approaches to incentivizing action by those in a position to make decisions regarding important social and environmental issues.

Some basic requirements of this work are known; for example Oliver, Innvar, Lorenc, Woodman, and Thomas (2014) found in two extensive surveys that, “Timely access to good quality and relevant research evidence, collaborations with policy-makers and relationship- and skills-building with policymakers are reported to be the most important factors in influencing the use of evidence” for policy change (p. 2). Findings from marketing studies (much of advocacy is a form of marketing) suggest that conscientiousness, extraversion, and active listening skills can be particularly valuable repertoires, and a good deal of specificity about the relevant behaviors is available (Drollinger, Comer, & Warrington, 2006; Helfert & Vith, 1999). These widely acknowledged recommendations, and analytic tools to explore the contextual dynamics of influence in particular cases, can be effectively combined. Dolan et al. (2012) noted that:

The usual route to behaviour change in economics and psychology has been to attempt to “change minds” by influencing the way people think through information and incentives. There is, however, increasing evidence to suggest that “changing contexts” by influencing the environments within which people act (in largely automatic ways) can have important effects on behavior (p. 264).

Dolan et al.’s statement is clearly congruent with our cultural systems perspective (See Chap. 3), in that in most cases effective advocacy requires not only specifying the primary objective (a decision by the key actor[s]), but also analyzing the often-multiple factors that are most likely to support and sustain that action.

*Strategic Influence*⁴

Advocacy is at base a behavior change strategy that in many cases relies primarily on persuasion and protest. Although persuasion may appear to be the preference much of the time, there is also commonly an element of protest, acknowledged or

⁴The material in this section is drawn largely from Mattaini (2013), and Mattaini et al. (2016). These will not be additionally cited in this section. Mattaini (2013) is available in open access at: <http://www.aupress.ca/index.php/books/120224>

not. Persuasion is based primarily on two processes: changes in contingencies of reinforcement, and changes in relational responding. In the simplest (and very common) cases, subtly or directly offering incentives to a decision-maker in financial, voter, or even personal support terms can have powerful influence. Shifts in relational networks, alone or in conjunction with enriched reinforcement, are also often important; for example, constructing or altering the interlocking verbal relations among climate change, current resulting deaths in marginalized parts of the world, and personal responsibility, under the right conditions, may lead to behavior change without other incentives (Dixon et al., 2018; Hayes et al., 2002). A smaller example: the first author's US Congressional Representative called to request a significant campaign contribution; in a very friendly and complimentary conversation, I agreed, and asked her not to forget the importance of protecting public lands, one of many issues in which she is immersed. The next day I arranged a gift membership in an outdoor advocacy and social community that distributes continuous, very engaging, and consistently high quality materials and activities for my representative (a gift that fell within the legal limits). My hope is that this combination (financial contribution, recognition, and continuing access to related advocacy materials) strengthened and/or altered the functions of established verbal relations related to my advocacy intentions.

There is also typically an element of protest (based in negative reinforcement) involved in advocacy, even when persuasive processes are primary. When important influencers come to a state senator with disturbing stories of child abuse, for example, and express concern that the state is not doing more, there are at least two potential aversives established—one the painful stories (which if well-presented are often very powerful, particularly at local and state levels), and the dissatisfaction of the influencer that not enough action has been taken by the senate that includes the senator. Specific narratives about such serious problems can be very powerful, particularly at local and state levels, with the potential to present sensory or perceptual functions, bringing them into psychological proximity (motivative augmenting; Hayes et al., 2002; Valdivia, Luciano, & Molina, 2006). There is recently a growing and important literature in behavior science on the value and processes of narrative—a rich and ancient cultural practice—as a technology to shift relational responding and thereby to influence public policy (Critchfield, 2018; Grant, 2007; Himeline, 2018). Chapter 13 explores this valuable persuasive option in detail.

Successful advocacy often requires strategic application of persuasive action (and protest where appropriate) directed toward multiple actors. Advocacy for legislative change, for example, typically requires action directed to, and often individually tailored for, multiple members of the legislative body. Action directed toward influencers valued by the decision-makers (funders, advocacy group members, disgruntled citizens) may be even more important. Such efforts are discussed in the next section on Strategic Systemic Advocacy. First, however, for completeness, we mention four strategic options other than persuasion and protest, each of which generally requires greater resources, sometimes can be controversial, and for which ethical dimensions require attention. Even so, serious social or environmental

injustices are often deeply structured into networks of cultural practices, and may require more powerful strategic actions. These additional options include:

- Constructive noncooperation: refusal to participate in unjust systems by constructing alternate, competing arrangements (extinction and constructive resistance to unjust systems, e.g., alternative support networks for homeless young people) (Holtschneider, 2016).
- Disruptive noncooperation: refusal to participate in unjust systems by withdrawing from them (extinction), often accompanied by protest (negative reinforcement).
- Resource disruption: actively disrupting unjust systems (e.g., shutting down roads or electricity)—generally only a temporary tactic.
- Retaliation: application of aversives (punishment); generally carrying all of the disadvantages of punitive processes.

In-depth exploration and extensive examples of these four options are provided in Mattaini (2013) and Mattaini, Holtschneider, and Williams (2016).

Strategic Advocacy: Cultural Systems Technologies

Beginning with detailed cultural systems analysis and the existing knowledge base (limited as it is), there are several ways that science may contribute to advocacy efforts, and much that our science can learn from existing work in other disciplines. Three such possibilities will be summarized here, supplemented by a list of possible cultural strategies for advocacy directed toward the general population within communities. Readers are encouraged to develop further examples using these tools that can contribute to their own areas of social and environmental concern.

Nested Contingency/Cultural Practice Mapping

Contingency diagrams are common tools used in behavior science research and practice (Malott & Shane, 2019; Mattaini, 1996). Figure 16.2 is a simplified example, depicting a case in which advocacy focuses on asking an urban mayor to initiate and sustain a review of the use of force by the local police, especially with young men of color.

Sample (a) antecedents (motivative operations and discriminative stimuli), (b) essential and facilitating resources and conditions, and (c) consequences that may support or limit their response are included in the diagram. Unless actual data are available—and sometimes they are with this kind of issue, such elements can often be estimated from observation, history, and conceptual models; additional variables would typically be included in an actual case. For example, strong citizen demands and possible outside funding, if those were available, might facilitate successful advocacy; threatened protests from within the police department may serve as

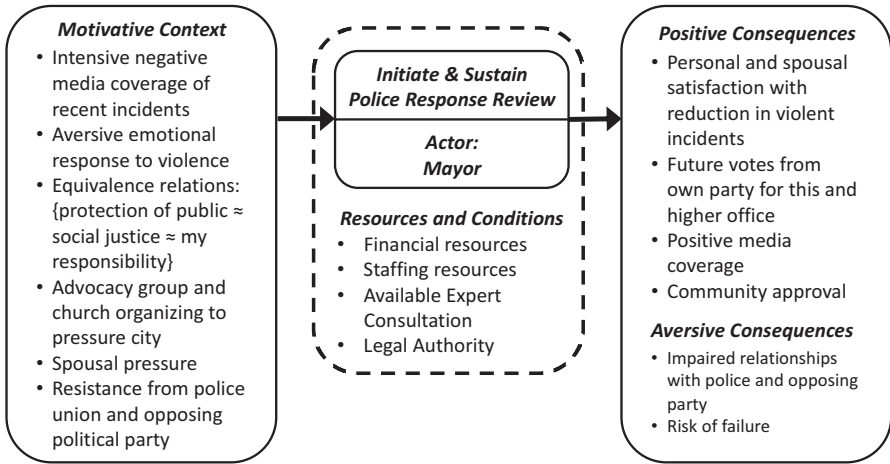


Fig. 16.2 Contingency diagram of contextual factors relevant to action by the mayor

abolishing operations. Potential reinforcers might include increased campaign contributions for the next election; assignment of potential public blame for unfavorable statistics could be a punishing outcome.

An effective advocacy plan, however, could be more systemic, nesting the diagram in Fig. 16.2 into an overall graphic (Fig. 16.3) exploring potential antecedents and consequences for classes of actors/influencers whose actions contribute to the pattern depicted in Fig. 16.2.

While Fig. 16.2 attempts to capture contingencies related to the behavior of an individual, Fig. 16.3 is largely tracing hypothesized or known patterns of contingencies (in some cases metacontingencies) that shape and sustain the cultural practices present in the community situation. The analysis could be carried on to additional levels, diagramming potential contingencies for other individuals and collectives who participate in contingencies for the central players. See Mattaini (1996, 2013) for further examples and details for using the nested contingencies tool.

Force Field Analysis

Staying with the same community example, a tool originally developed by Kurt Lewin called *force field analysis* (FFA; see Fig. 16.4) is widely used in social science, community planning, and business (Kruglanski et al., 2012; Spier, 1973).

The goal in FFA is to identify “drivers” and “inhibitors” that encourage or discourage a decision by a key actor or group, for example the mayor above, or the city council. The items included are actions (certain or likely) from other sets of actors—actions that may constitute important contingencies. Although FFA diagrams like Fig. 16.4 are not as detailed as contingency mapping, they can be a useful summary

Nested contingency diagram

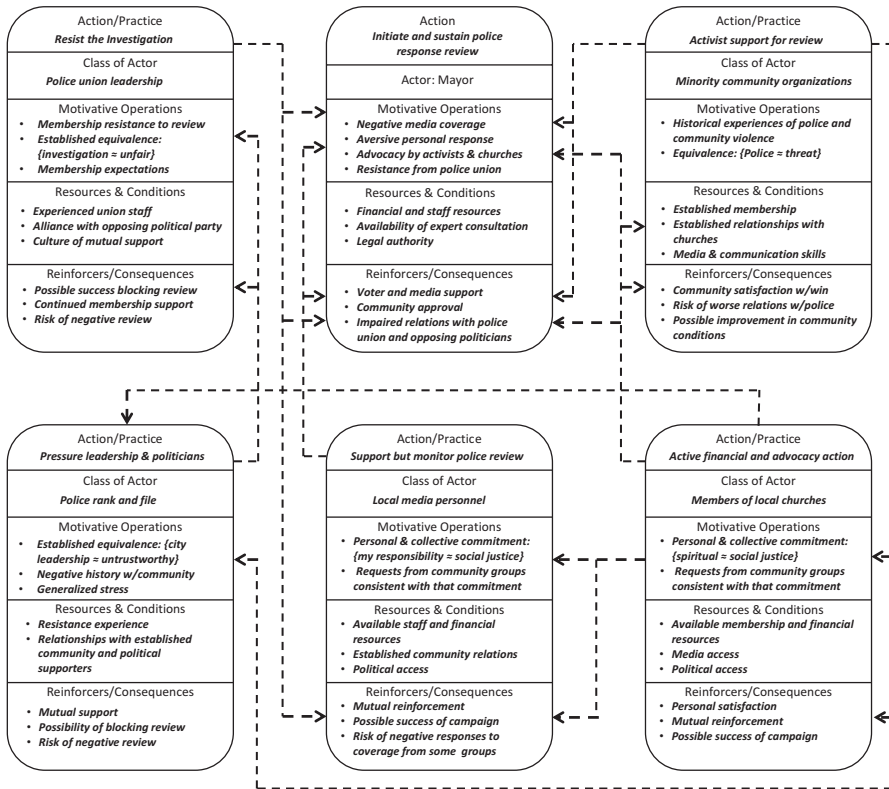


Fig. 16.3 Nested contingency diagram

Sample force field analysis

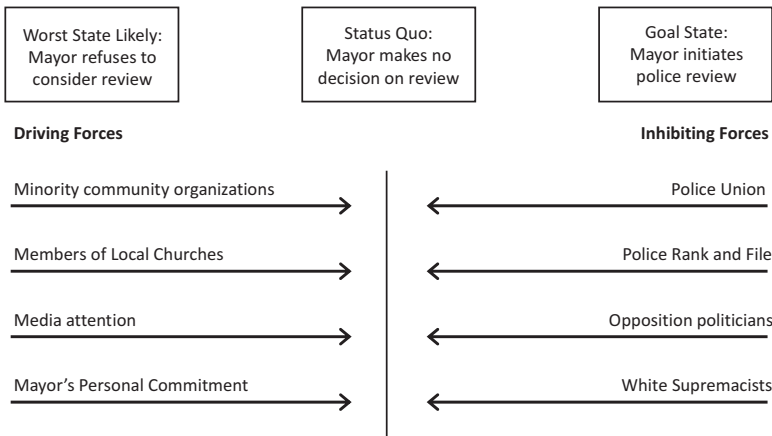


Fig. 16.4 Sample force field analysis

tool, especially when working with non-behavioral groups. An advantage of FFA in planning is that the tool is built around the expectation that to increase the probability of the desired decision, activists would construct a specific plan to essentially increase the level of drivers, and/or decrease the level of inhibitors. For additional examples, please see Mattaini (2013).

Community Matrices

Behaviorists for Social Responsibility (BFSR) has in recent years devoted considerable effort to the development of the Matrix Project (Mattaini & Luke, 2014; Seniuk, Cihon, Benson, & Luke, 2019), a means for applying culturo-behavioral systems analysis to issues of social importance, noting that, “By understanding the contingencies that hinder or promote working in a particular area we can begin to create the conditions that will facilitate such work” (p. 911). The Matrix tool was originally developed by Biglan (1995) and later expanded in Mattaini (2013). As is clear throughout this chapter, while problems of social importance are often viewed narrowly as emerging from individual behavior—and therefore requiring individual behavior change to ameliorate, in nearly all cases the practices of many community systems contribute to initiating and sustaining problems, *and can contribute to reducing them* (Holtzschneider, 2016). As an example, Table 16.1 provides a subset of possible entries in a matrix examining the potential for constructive community responses to the risks facing women living and working on the streets of major cities. Footnote: The analysis of approaches for reducing community violence in Chap. 13 provides a detailed example.

Most members of this population experience violence and health issues, many are victims of trafficking, many must support themselves through sex work, and sadly many disappear. Rigorous research on risks faced living under these conditions (with the exception of HIV) is surprisingly thin, although there is occasional media coverage in major cities (e.g., Chandler, 2018; Deering et al., 2014; see also streetsafenewmexico.org). The Matrix tool can be used to analyze current and potential dynamics related to a broad range of issues; both contingency mapping and FFA can be integrated into policy work as outlined by Matrices.

Advocacy Approaches Focused on the General Public

The primary focus of this chapter is on advocacy directed toward persons in positions of some authority who hold responsibility for community or organizational processes. There are however some important forms of advocacy directed toward members of the general public (who may then engage in collective advocacy directed toward community leaders). Space allows only a brief listing with published resources for three approaches of this kind; each has at least some empirical support. There are many possible extensions to each, once the underlying

Table 16.1 Sample entries in matrix of practices supporting or reducing street safety by community sector

| Sector | Practices supporting street safety | Practices reducing street safety | Possible incentives and facilitating conditions ^a |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| News media | Publish stories identifying structural factors contributing to issues, examples of resilience, and supportive service needs | Prioritize stories emphasizing community costs, criminal behavior | Community response to stories published; advertising dollars; sources for types of stories listed |
| Police | Connect women to available resources; participate in street safety trainings; participate in circles of understanding | Emphasize surveillance and enforcement; participate in dehumanization | Training resources; availability of models of respect; person-to-person contacts in joint projects and circles of understanding, positive media attention |
| Local businesses | Contribute to outreach efforts providing services; encourage innovative governmental responses; participate in circles of understanding | Treat struggling women as neighborhood threat to be managed primarily through exclusion and law enforcement | Positive media attention, actions of respected models within business community |
| Arts community (including students) | Active outreach to engage women as peers in collaborative street-level and community arts projects related to social justice and human rights | Maintain distance from women; regard those living or working on the street primarily as threats to rather than members of the community | (As an exercise, the reader is asked to develop motivative options here) |

^aTo increase supporting and decrease reducing practices

conceptual underpinnings are understood. It is important to emphasize that each of these social technologies can best be constructed within a community-based participatory research framework, as discussed in the conclusion of this chapter.

Public Health Media Campaigns

Public health research has demonstrated the power of mass media campaigns, the challenges faced in a crowded media world (Randolph & Viswanath, 2004), as well as some of the parameters that lead to effectiveness (Davis & Duke, 2018). Social media also are proving powerful (Gough et al., 2017); many behavior analysts are active in that explosively expanding world. Behavior scientists have not rigorously studied the extent to which such media could be used as a tool for constructing socially important, or challenging socially toxic relational networks, but this seems like a promising direction for further exploration.

Consequence Analysis

Sanford and Fawcett (1980) tested a consequence analysis procedure over 40 years ago that demonstrated that giving community members opportunities to think in detail about the possible social and community results of a policy change (in this case a proposed roadway project) led to more environmentally sensitive opinions. To the best of our knowledge, only two partial replications have been reported (Moore & Mattaini, 2001, 2014). In both cases, the procedure (basically collecting opinions before and after a questionnaire exploring multiple consequences of a decision) led to more socially and clinically responsible opinions. This procedure appears to be potentially powerful in terms of sensitivity to both delayed consequences and social responsibility; further replications should not be neglected.

Collective Leadership and Circle Processes

Initial work has been done to create and test novel procedures that solicit and organize input on community and organizational concerns and plans from community members. The outcomes of such sessions can in many cases assist in developing consensus decisions, which can then structure advocacy efforts with other decision-makers. Fawcett, Seekins, Whang, Muiu, and de Balcazar (2008) developed a systematic databased process to organize member-led concerns reports from consumers of public institutions and clients of human service systems, in which clients themselves gathered to construct and conduct surveys of peers, resulting in demonstrable improvements in services. Ball, Caldwell, and Pranis (2010) report on both successful and less successful applications of circle processes (now a well-developed social technology) for public planning in a range of settings, and Mattaini and Holtschneider (2017) developed an integrated model for structuring circle processes within a culturo-behavioral framework.

Conclusion: A Research and Evaluation Agenda

There is clearly much more research required to provide rigorous guidance for advocacy, particularly of four types, each of which will prove challenging. Because we are only beginning to identify what variables under what conditions should receive priority for experimental research, much more data collection from observational and retrospective studies is needed. For example, one of the authors is tracking the approaches being taken by a nonprofit advocacy group focused on preserving public lands, wilderness, and opportunities for outdoor recreation with over 40,000 members (growth rate, over 50% annually), that has had remarkable success advocating with state and provincial governments. Specific relational and contingency

oriented approaches have been used consistently both to grow and sustain membership, and in legislative and administrative advocacy (technical analysis pending). There is much to learn from success, and from direct observation, in order to identify what data are the most important to track (a question that also concerned Willems, 1974).

Secondly, it is likely that the richest guidance for future advocacy will come from experimental studies, challenging as they may be. Initially the most workable focus is likely to be on single-system (Mattaini, 2016), and community-level time series designs (Biglan, Ary, & Wagenaar, 2000). There are also multiple quantitative approaches for extracting knowledge from existing or newly connected data that can be helpful, including for example data-mining, multilevel structural equation modeling, and deep neural networks (Jason & Glenwick, 2016; Ninness, Ninness, Rumph, & Lawson, 2018). Data visualization (Cardazone & Tolman, 2016; Tufte, 2006) can be particularly effective in advocacy work with community members and decision-makers.

A critical third recommendation is to seriously engage in community-based participatory research, as Fawcett recommended in Fawcett, 1991 and elsewhere. A particularly valuable resource for research guidance and technology is the Center for Community Health and Development at the University of Kansas, described in detail in Chap. 14 of this volume. Such community research is challenging work, especially for scientists who are accustomed to controlling as many variables and procedures as possible, but community members typically are much better informed about variables, values, and options, and thus have much to contribute. Particularly important for our purpose here, Israel et al. (2010) argue that such research can function as “a capacity-building approach for policy advocacy” (p. 2094). Many community psychologists and social workers (e.g., Swenson, Henggeler, Taylor, & Addison, 2009) note both the ethical and practical advantages of such community partnerships for research and effective advocacy for social and environmental justice—the central goals of this chapter.

Finally, there is much to learn from existing advocacy groups, and there are many opportunities to join and support such collectives. As a member/participant, opportunities will present themselves to contribute from your knowledge of behavior science, including many chapters in this volume. Chap. 17 of this volume on advocacy, accompaniment, and activism may be of particular value “on the street.” There are also opportunities to engage in this work through participation in BFSR, including in the Matrix Project.

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Chapter 17

Activism, Advocacy, and Accompaniment



José G. Ardila Sánchez, Sarah M. Richling, Molly L. Benson,
and Richard F. Rakos

Introduction

A wide array of populations and communities are trapped in complex, multilevel systems of interlocked behaviors that offer no clear path toward dignity and social justice. Even though thorny social and cultural problems resist simple answers, the obvious contribution of the environment to systemic dysfunctions has not escaped the notice of behavior analysts. In fact, the discipline has a heritage of extending its analytic efforts to the social and cultural levels—from its inception with Watson’s “behaviorist manifesto” in 1913 (Rakos, 2013) through its philosophical growth with Skinner’s cultural design writings (Rakos, 1992). In fact, Skinner (1971) aptly argued “if your culture has not convinced you [to work on its behalf], so much the worse for that culture” (p. 137), implying that an ethical behavior science of culture requires attention to the most pressing social problems by working with disadvantaged communities and persons. Individuals face disadvantage when their circumstances restrain access to all sorts of resources, such as medical, economic, educational, and institutional. One example in which behavior analysts (among others, perhaps most notably the parents of individuals with autism spectrum disorders [ASDs]) have been instrumental in achieving significant social change is in the

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advocacy efforts in the United States that have resulted in inclusive education programs and insurance coverage for treatment for individuals with ASDs. These efforts required the allocation of significant resources toward cultural research and the expansion of our science to social and systems-level intervention; for example, autism insurance legislation was passed partly because the values of an organization of behavior analysts included allocating resources to improving the human condition through behavior change (BACB®, n.d.).

The impact behavior analysts can have with progressive social change also can be enhanced through the acquisition of three key repertoires: activism, advocacy, and accompaniment (AAA, see Mattaini, Holtschneider, & Williams, 2016). Mattaini et al. (2016) discuss these concepts as horizontally aligned roles that sometimes overlap; however, a hierarchical relationship with activism as the superordinate concept that encompasses advocacy, accompaniment, and a third peaceful option, nonviolent resistance, may better reflect the interdependence of these repertoires (see Fig. 17.1).

From this vertical perspective, activist actions are typically directed at broad, ongoing change rather than concrete behavioral goals, and are therefore maintained primarily by values, or verbally constructed consequences. Advocacy and accompaniment actions, however, are functionally related to goals, which are specific, operationalized outcomes. An *activist action* would be to join a “sustainability movement” that targets a range of desirable outcomes, including decreased use of fossil fuels. An *advocacy action* would be to work on the movement’s specific task force that is promoting a state legislative initiative to fund an incentive-based program designed to decrease home use of fossil fuel.¹ An *accompaniment action* would be to join the Board of Advisors of a local organization in the movement in the hopes of using behavior analytic expertise to improve the efficacy of the organization. Activist actions that are expressed as advocacy and accompaniment efforts are maintained by both values and goal attainment because the goals embody and exemplify the underlying values. These three AAA concepts will be examined in detail shortly.²

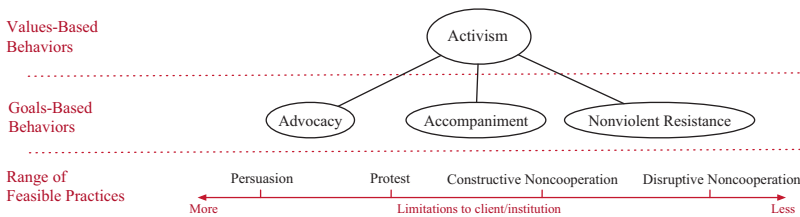


Fig. 17.1 Hierarchical structure of activism with its subcategories and range of feasible practices

¹See Chap. 16 in this volume for additional specific information on public policy advocacy.

²A detailed examination of nonviolent resistance, the third goal-directed activism option, is beyond the scope of this chapter. Nonviolent resistance involves activist practices that target immediate oppressive circumstances impacting a community or individual. For example, a *nonviolent resistance* would be participation in a protest that opposes fracking of fossil fuels in sacred indigenous land (see Mattaini, 2013, for extensive discussion).

In each category of activism, four distinct activist practices will be more or less feasible depending on the degree of organizational constraints such as the available resources upon which the individual may draw (Fig. 17.1, lower level). In general, work with institutions and clients limits activist actions to advocacy and accompaniment; in these contexts, behavior is a function of competing contingencies and the most feasible activist practices likely will be persuasion and protest. For instance, working for a governmental institution may limit advocacy actions to persuasion strategies, while nongovernmental institutions may permit protest as a strategy. Persuasion and protest manipulate setting factors to obtain compliance, such as using incentives when persuading or aversive stimuli when protesting (Mattaini, 2013). The effectiveness of these two strategies relies on identifying strong contingent consequences to use as leverage to obtain the desired results.

Skinner (1987) argued that those individuals uncommitted to governments, religion, and capital would be integral to solving a host of serious issues facing humanity. In fact however, individuals who have been or who potentially could be activists—scientists, teachers, writers, artists, therapists, social workers—may also be committed (belong to) to one or more of these institutions. Successful AAA efforts have been carried out by collectives of individuals with work constraints who share a myriad of personal values and cultural backgrounds. A key to such activism is to recognize institutional constraints and, to the greatest extent possible, overcome or circumvent them in the search for feasible practices to achieve social change. Behavior analysts, for example, can pursue meaningful societal change by recognizing institutional constraints and through the achievement of scientific goals (Mattaini & Aspholm, 2015).

But promoting cultural change is difficult, even on a relatively simple level such as with one institution, as it involves multiple factors and varying levels of analyses. Reppucci (2018), a pioneer in the behavioral community psychology movement that began in the 1960s, noted that the growing use of then-new behavior modification techniques was embedded in empirical data and in “the predominant societal events of the 1960s and 1970s (which) were the Civil Rights Movement and the ever-expanding involvement in the Vietnam War...these events provided the societal backdrop for changes in public policy, especially related to social justice” (p. 1224–1225).³ His implementation of behavior modification (e.g., token economies) in a residential boys’ school had the goal to not only change the boys’ behavior but “unlike other projects at the time (and) more importantly, to change the institutional culture...from punishment to rehabilitation while simultaneously reducing the number of boys incarcerated” (Reppucci, 2018, p. 1226). The outcome data were impressively strong in terms of desired individual and institutional changes, but implementation was impacted by external conditions and resource issues “that would always be present in some form, but which neither we, nor any other interventionists, could control with the specificity that Skinner’s operant

³Please see Chap. 14 in this volume for further information on the connections between behavior science and community psychology.

conditioning formulations implied” (Reppucci, 2018, p. 1227). This was a stark lesson learned early through his institutional-change experiences:

We are nowhere near a technological capacity or sophistication for Skinner’s utopian notions, and Skinner’s theory, as currently elaborated, is of demonstrated insufficiency to provide for that technology. This is simply recognizing that behavior modification was never intended to be the basis for describing, understanding, or changing natural settings. (Reppucci & Saunders, 1974, p. 660)

Reppucci’s (2018) experiences suggest that behavior analysts need significant knowledge and skills beyond technical expertise if they are to address cultural problems effectively. Fortunately, the field has made tremendous progress in the last 45 years in addressing some of the structural constraints on implementation, including incorporating theoretical advances such as the metacontingency, developing relevant interdisciplinary competencies and relationships, and utilizing new and emerging technologies. In other words, behavior analysts who desire to effect change on a systems-level will have to develop a professional and interpersonal behavioral repertoire that is much more extensive than expertise in the discipline. In this chapter, we address some of these competencies. First, we review the formative process of our discipline in dealing with social issues and how these efforts guide current developments in systems-level work from a behavior analytic perspective. Then we discuss AAA at both the individual and systems-levels of analysis.

Behaviorists for Social Responsibility

The evolution of behavior analysis to encompass systems-level conceptualizations, research, and practice did not occur in a vacuum. Organization of behavior analysts sharing an interest in addressing social issues dates back to the first Midwestern Association of Behavior Analysis (MABA) conference in 1974, where a discussion of how behavior analysis could help identify the antecedent stimuli, the positive and negative reinforcers, and the controlling economic and political systems that perpetuate societal injustices occurred during a symposium called “Radical Political Behaviorism” (Behaviorists for Social Action [BFSA], 1978). It ignited the interest of behavior analysts around the United States, resulting in the organization of more symposia, meetings, and in 1978, the creation of BFSA, the first Special Interest Group (SIG) of the Association for Behavior Analysis,⁴ the successor organization to MABA (BFSA, 1978). BFSA offered behavior analysts a community with whom to examine the causes of and potential solutions to the most pressing issues facing humanity.⁵

⁴The Midwestern Association of Behavior Analysis changed its name to the Association for Behavior Analysis with a subtitle with the word “International” in 1978 (Peterson, 1978).

⁵B. F. Skinner was among those signing the original BFSA “manifesto” (BFSA, 1978).

BFSA was created because of the perceived need among its members to encourage active political participation by behavior analysts in the struggle against injustice and to promote the science of behavior as a social change partner to other disciplines. Since its inception, BFSA, which changed its name to Behaviorists for Social Responsibility (BFSR) in 1996, has published the academic journal *Behavior and Social Issues* (Luke, Roose, Rakos, & Mattaini, 2017), which has become a leading platform disseminating knowledge about the analysis of and intervention in pressing social problems.⁶ Dissemination convinced many behavior analysts to expand their horizons to address social issues, but aligning the goals of science and the goals of social action is not necessarily straightforward. Behavior analysts initially studied animal behavior, mainly in experimental settings emphasizing prediction and control (Skinner, 1953). Social and empirical goals can be complementary—for example, Skinner’s (1971) notion that cultural survival is the ultimate value for decision-making benefits from adopting a pragmatist feminist perspective that emphasizes pluralism and inclusive communities for building consensus (Ruiz, 2013). Others have proposed multidisciplinary approaches to social intervention (Mattaini, 2013; Rakos, 1983), suggesting social action can be guided by scientific knowledge when the latter is intended to advance our understanding of social issues and not just to pursue experimental control.

Thus, a comprehensive behavior analysis of social issues needs to consider variables outside the three-term contingency, such as insights from all those who participate in the problem situations (Ruiz, 2013), an analysis of the interrelationship of various institutions, and limitations inherent in the current sociocultural environment (Rakos, 1983). Building from the experiences compiled over the course of 45 years of research and application, behavior analytic approaches to cultural analysis attempt an integration of science and systems-level work. The options include ecobehavioral science (Lutzker, Bigelow, Doctor, Gershater, & Greene, 1998; Mattaini, 2013), a constructional approach (Goldiamond, 1974/2002), interbehavioral psychology (Hayes & Fryling, 2009; Kantor, 1982), and the metacontingency (Glenn & Malott, 2004; Housmanfar, Rodrigues, & Ward, 2010). The latter concept integrates complementary sources of knowledge to study cultural processes from a behavior analytic perspective, such as cultural materialism (e.g., Glenn, 1988), organizational behavior management (e.g., Housmanfar, Alavosius, Morford, Herbest, & Reimer, 2015), and behavioral systems analysis (Housmanfar, Rodrigues, & Smith, 2009). Seen as a systems-level unit of analysis, the metacontingency offers one resource for tackling the complexity of social issues.

⁶In addition to BFSA, behavior analytic efforts to address social problems were reported on occasion in other behavioral outlets (e.g., see the *Journal of Applied Behavior Analysis*, 1968–1988; Thyer, Himle, & Santa, 1986).

The Metacontingency

The metacontingency, introduced by Glenn (1986), has emerged as the leading behavior analytic mechanism to address the interacting elements inherent in cultural systems. Over the years, the metacontingency has been theoretically refined (Glenn, 2004; Glenn & Malott, 2004; Houmanfar et al., 2010) including a recent effort to develop a consensus on the varying terminology employed in different models (Glenn et al., 2016, reprinted in Chap. 2 in this volume). These latter authors suggest that the metacontingency be defined as: (a) interlocking-behavioral contingencies producing an aggregate product and (b) the selecting environment. This 2-term metacontingency offers a conceptualization of the “third-level of selection” (i.e., cultural, see Skinner, 1981); it stands in contrast to the 5-term metacontingency proposed by Houmanfar et al. (2010) which provides an analysis of contextual and antecedent factors influencing the acquisition and maintenance of interlocking patterns of behaviors. Although several conceptual assumptions remain empirically unconfirmed in these two models (for a comprehensive review see Zilio, 2019), the scope and complexity of the 5-term metacontingency make it a useful analytic tool to study social issues and identify potential points of contact where specific environmental manipulations may occur to produce change within the given system. The elaborated 5-term account of the metacontingency captures cultural, sociological, and ecological factors influencing the interaction of multiple individuals’ behaviors in organized groups, and specific organizational roles and cultural milieu that participate in the production of system-level outcomes.⁷ Figure 17.2 illustrates the

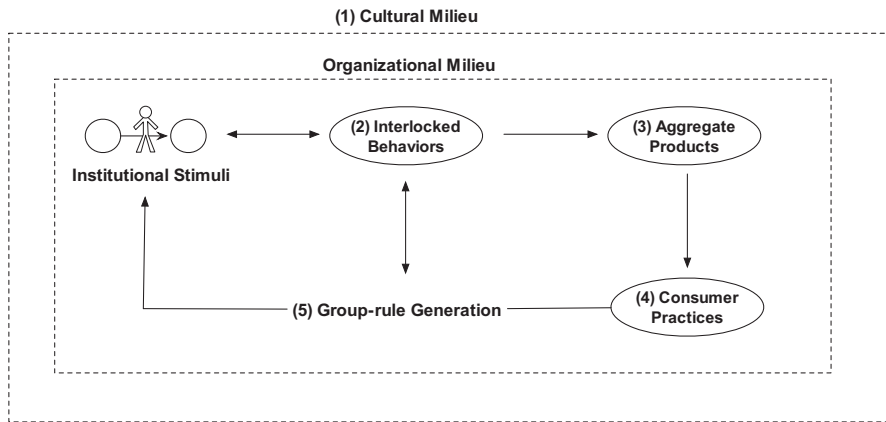


Fig. 17.2 Cultural milieu (1); IBs (2); APs (3); consumer practices (4); group-rule generation (5). (Adapted with permission from Houmanfar et al. (2010))

⁷The collection of functional properties of environmental stimulus objects influencing the behavior of the members of cultural groups. The elaborated account of the metacontingency is further discussed in Chap. 7 in this volume.

elaborated account of the metacontingency suggested by Houmanfar et al. (2010), describing a relation among five terms.

The first element is the cultural milieu, which may include historical, sociological, psychological, and geographical factors. When milieu factors function as institutional antecedent stimuli, they affect collective behavior and individual action. Institutionalized stimulus functions may inhere in any object, person, or event, and act with respect to the behavior of multiple individuals in a collectivity (Kantor, 1982). These stimuli act as antecedent events influencing the second factor—the interlocks among the behaviors of group members or socio-interlocked behaviors (socio-IBs), such as the interactions between individuals in an organization. Socio-IBs result in aggregate products (APs), the third factor, which are the products of the organization. APs may influence consumer practices, which is the fourth factor, and might be exemplified by the communities interacting with organizational products; it is consumer practices that determine the relevance and utility of APs. Finally, when there is feedback between consumer practices and socio-IBs, leaders may modify or formulate new rules, the fifth factor, that adapt and meet consumer practice demands and that are coherent with the overarching cultural milieu (Houmanfar et al., 2009). From this vantage point, interventions can target consumer practices as well as socio-IBs through the establishment of rules and manipulation of cultural milieu factors.

Thus, metacontingency analyses provide a lens through which activism can be examined, including its impact on multiple system-level factors, such as organizational practices (i.e., socio-IBs) or cultural practices (i.e., consumer practices). These elements as well as their interrelation with AAA behavior repertoires will be addressed after we consider the contexts and resources that facilitate AAA at the individual level of analysis.

Behaviorists in (Social) Action

The literature suggests that behavior analysts now have the conceptual tools to develop effective interventions at the systems-level—a link between empirical resources and social action that offers behavior analysts an important role as part of the “powerful collective action” through which social transformative changes are achieved (Mattaini et al., 2016, p. 269). To this end, AAA repertoires may lead the way in efforts to apply behavior science to find solutions for environmental and social issues.

Activism

The most general form of systems-level intervention, as noted earlier, is activism. Activists engage in a wide range of responses extending “over a long period and generally oriented toward broad goals affecting populations, communities, and

institutional systems” (Mattaini et al., 2016, p. 269). Defined functionally, activism consists of value-oriented social actions, or actions oriented toward “broad goals” *and* toward general shared values. This distinction is useful because goals and values are functionally different: goals are outcomes whereas values are verbally constructed consequences of patterns of activity for which the predominant reinforcer becomes intrinsic to the behavioral process (Wilson & DuFrene, 2009).

Activists achieve significant social change by promoting collective action (Mattaini et al., 2016), which requires strategic and planned efforts such as teaching nonviolent repertoires to collectives. Sharp (2010) identified “three types of knowledge” essential “for persons to develop a competent grand strategy to achieve a successful liberation struggle” through nonviolent means (p. 16): knowledge of the context (conflict situation; opponents; social values, needs, sources of power); knowledge of nonviolent action techniques; and knowledge and skills to think critically, analytically, and strategically.

At the individual level, a direct change in behavior can be designed by employing fundamental behavioral techniques. For example, Killeen (1988) suggested that peacemaker behaviors can be taught like any other behavior and prescribed six points for behavior change: (1) Identify the kind of consequences maintaining current behaviors; (2) Consider reducing the effort of teaching new responses by drawing upon the individual’s existing repertoire; (3) Design a plan of delivering consequences for successive approximations to target behavior; (4) Define multiple intermediate goals along the process; (5) Reinforce various forms of responses within the larger class of target behavior; and (6) Strategically use rate of reinforcement to keep the individual engaged. Killeen’s recommendations are complementary to Sharp’s (2010) strategies; both refer to behavioral process, though from the different vantage points of individual and system levels. Thus, Killeen’s six points are consistent with Sharp’s contention that goals be intermediate and achievable [points 3,4]; that the issues at stake be fully understood in terms of their importance, relationship to other factors, and sources of power [points 1,6]; and that nonviolent protest skills must be well learned through behavioral practice [points 2,5]. Killeen recognized the complex, interactive, and complementary nature of the two analytic levels when he noted that it is unclear whether “the selection of [peacemaker] responses in the individual [would] be good or bad for us at the other levels of selection” (p. 41). In short, activists promote collective action by incorporating both analytic levels in their work.

Behavior analytic graduate students, professors, researchers, private consultants, and other professionals, subject to institutional constraints, can engage in activism in several ways. The academic setting, for example, allows for the application and dissemination of knowledge, particularly through research that embraces community values which produces knowledge relevant to societal issues (see Fawcett, 1991). Relevant behavioral technologies identified through research can be communicated from academic institutions to communities. As non-behavior technicians (e.g., community members) need supervision and training (Couch, Miller, Johnson, & Welsh, 1986; Fawcett et al., 1984), students are an excellent resource to provide this training and supervision. Students might use their academic requirements to work as

activists, such as completing practicum responsibilities by working in partnership with public institutions (e.g., Brogan, Richling, Rapp, Thompson, & Burkhart, 2018) and doctoral dissertations that report community interventions (e.g., Aspholm, 2016) or metacontingency analyses of laws and decrees that contribute to the solution of social issues (e.g., Lemos, 2018, see also Chap. 8 in this volume). Researchers, too, can design interventions grounded in behavior science that promote collective prosocial behavior (e.g., Tsipursky, Votta, & Roose, 2018).

Outside academic settings, behavior analysts can perform activist actions in concert with a discipline, as psychologists and the American Psychological Association (APA) demonstrate (Nadal, 2017). APA has a long history of advocating on behalf of vulnerable and marginalized persons and communities as “‘psychologist–activists’ [who] partake in social justice activities through clinical practice, education, research, and training as well as in their personal lives...[to address] systemic barriers to social justice and human rights...[and] advocate for the good of humanity” (Nadal, 2017, p. 936). Nadal (2017) argues that the APA Ethics Code, despite its sole focus on “‘provid(ing) a common set of principles and standards upon which psychologists build their professional and scientific work” (American Psychological Association (APA), 2017), justifies and even mandates activism; as “‘neutrality can convey complicity to, and complacency with, injustices toward historically marginalized people...being apolitical or apathetic is detrimental to advancing human rights” (Nadal, 2017, p. 940).

Behavior analysts, similarly, may consider ABAI as their scientific community offering ways to engage in activist practices. ABAI is a nonprofit organization with no requirement to refrain from carrying on propaganda or influencing legislation and thus SIGs are permitted to promote collective action for social change. This kind of activism is represented by BFSR’s Matrix Project—“an evolving document consisting of sector-specific integrated sets of hypotheses, with the goal of identifying practices that support, oppose, motivate, and select the development and utilization of scientific behavioral systems to address social and global issues” (Behaviorists for Social Responsibility (BFSR), n.d.). The general goal of this project is increasing the number of behavior scientists working in areas of social relevance (Luke & Mattaini, 2014; Seniuk et al., 2019).

Initially, BFSR members identified 27 societal sectors to target for systems-level intervention. Next, they began to create resources to arrange the motivating operations for the actors in each sector (Seniuk et al., 2019). Currently, several of these sectors—most notably behavior analytic education and training in general (Ardila et al., 2019; Mattaini et al., 2018) and in environmental sustainability (Seniuk et al., 2019) have made significant progress—while others such as impacting state and federal government have made only beginning steps. Seniuk, Cihon, Benson, and Luke (2019) describe systems-level interventions to promote environmental sustainability in behavior analysts’ research, teaching, practice, and discipline-related professional activities. The education sector has developed several course units and bibliographies that introduce students to the principles of behavior through behavior analytic work in topics of social relevance (Ardila et al., 2019; Cihon, 2018). Thus, from a variety of professional settings and positions, behavior analysts may engage

in activism by focusing their studies or research agendas on social issues and/or volunteering their time to projects and organizations promoting progressive social change.

Advocacy

One major subset of activism is advocacy, which are goal-oriented, planned actions that target specific, valued changes for individuals (e.g., access to resources) or groups (e.g., policy change) (Mattaini et al., 2016). An example of the latter is the previously discussed advocacy efforts for the passage of autism insurance legislation as part of the larger BACB® (n.d.) activist initiative “to improve the human condition through behavior change.” That this instance appears to be a very rare and perhaps unique advocacy endeavor by behavior analysts serves to highlight the enormous potential for constructive change within the discipline.

The goals that guide advocacy actions are appropriate for all levels of complexity within organized cultural groups: behavior analysts can represent individual clients, but also persuade stakeholders who, in turn, can bring changes at the institutional level. However, behavior analysis is very much like psychology in that, as a discipline it has failed to develop “specific training focusing on public policy advocacy... resulting in a lack of familiarity with the types of political advocacy that psychologists can get involved in or the skills that are needed to advocate within particular working environments” (Nadal, 2017, p. 941).⁸ Besides lack of training, there are also antecedent and motivational factors that may constrain advocacy goals. For example, advocating for client-centered goals may align with clinical work demands, but public policy advocacy involves goals that may go well beyond and sometimes even compete with work-related goals, perhaps requiring time and effort that could otherwise be invested in other professional work (Eagleman, 2013).

Indeed, even if advocating for clients’ rights is a common practice for clinicians or applied behavior analysts, policy advocacy still needs further encouragement. Fawcett et al. (1988) suggested that developing information about roles that behavior analysts may take in the policymaking process is warranted, including examining how other sciences with similar advocacy goals promote advocacy actions among their members. For example, biologists in the United States have championed advocacy at many levels of their discipline. Science advocacy is one area in which biologists have become active in raising awareness of the importance of investing in science; for example, Jones-Jamtegaard and Lee (2017) suggest that political impact may be greater when advocacy groups encourage their members to call or write to legislators before an upcoming vote because their staff look for trends in social issues. Effectively communicating science to the public is another advocacy goal

⁸Chapter 16 in this volume offers further information on integrating public policy advocacy into behavior science research and intervention, and on the ethical considerations involved.

for biologists (Eagleman, 2013; Praveen & Motskin, 2016); the Pint of Science project is an example of an organized, long-lasting, and international event for scientific outreach in which citizens approach and learn from current discoveries and knowledge from various areas of scientific research. Advocating through groups and organizations for biomedical research funding also may be a goal (Pollard, 2012). Psychologists also achieved some success in overcoming their lack of training in public policy advocacy—APA and “psychologist-activists” today have taken formal progressive positions on, and a range of systemic interventions with, a myriad of social justice issues including civil rights, immigration, criminal justice, socioeconomic status, gun violence, interpersonal violence, education, health issues, and more. Further, APA promotes “advocacy tools” such as measurement instruments, legislators to contact, and highlighting of current “pressing federal issues” (see www.apa.org/advocacy/index.aspx). A current APA initiative recognized the first thirty “Citizen Psychologists” in an effort to motivate “psychologists to bring their knowledge of the field to improve people’s lives, whether through public service, volunteerism, board membership or other roles that are not directly associated with the psychologists’ day-to-day career” (DeAngelis, 2018, p. 52). These psychologists have engaged in actions, among others, that promoted racial equality in a Montessori school, aided asylum seekers through educating the public and professionals, developed a multiuse community center in an economically depressed area, ended noise pollution that suppressed classroom learning, supported undocumented immigrants and DREAMers, started a charter school in a high-poverty locale, fostered LGBTQ rights and health, promoted inclusion through grassroots groups to address the needs of marginalized youth, aided refugees, advocated for rural clients, empowered environmental action by older adults, promoted volunteerism, and more. An APA-sponsored Summit in December 2018 produced a training curriculum embodying “a detailed series of competencies, learning outcomes, and resources that can be used by educators to help prepare the next generation of psychologists to become Citizen Psychologists and by all psychologists interested in becoming Citizen Psychologist leaders through activities within their communities” (APA Citizen Psychologist, 2018, p. 4).

A general approach to developing a feasible plan of action for engaging in advocacy efforts as an individual behavior analyst can be derived, in part, from a comprehensive advocacy project conducted by Randall, Swenson, and Henggeler (1999) aimed at preventing neighborhood violence.⁹ Next, we identify several steps adapted from Randall et al., in addition to several novel steps that provide useful starting points for a specific advocacy plan that includes a thorough evaluation of the relevant contextual factors.

Identify Stakeholders and Leaders Within the Group Targeted for Advocacy The first step in developing an advocacy plan is to identify a group of individuals (a) whose goals align with the activist’s own values, (b) that demonstrate a need for advocacy efforts, (c) who would benefit from assistance with resources to

⁹See also Swenson, Henggeler, Taylor, and Addison (2009) for further detail.

better yield their collective power, and (d) for whom the advocate is in a feasible position of influence; the weight of each of these factors will determine where efforts may prove most beneficial. Because individuals are likely to advocate for groups whose values and goals are intimately aligned with their own, they must ensure they prioritize the group's goals rather than their individual goals. In this way, the behavior analyst engages in behaviors that align with his or her activist values and advocacy goals. It is also important for the behavior analyst to identify leaders or stakeholders within the group who have demonstrated value-based behavior that represent the collective interests of the group over their own goals.

Form a Partnership with Group Stakeholders and Leaders Once the prospective group and the corresponding stakeholders and leaders are identified, the behavior analyst can begin actively forming a partnership with those individuals. The behavior analyst may establish the initial contact through a variety of actions such as making "cold calls," establishing rapport through volunteer efforts, or building upon already established relationships. In any case, the behavior analyst can directly express an interest in forming a partnership with the group, demonstrate a willingness to learn more about the unique system and problems to be addressed, describe the position he or she is in to be of assistance, emphasize there are no intentions to exploit or coerce, and be transparent about any potential conflicts of interest. Ultimately, the mutual decision to establish a partnership involves communication between the behavior analyst and the identified leaders, pursued in partnership with the clients or communities involved. These collaborative efforts continue into the determination of the goals of the group.

Determine the Group Goals and Prioritize the Problems Affecting the Group Advocacy efforts are typically oriented toward a specific change (Mattaini et al., 2016). Several strategies can promote stakeholder involvement in identifying specific actionable concerns of the group (Randall et al., 1999). One approach is to obtain input from the group, as a whole, regarding issues the behavior analysts will address. A second strategy involves the behavior analyst communicating their intervention philosophy (e.g., the time-limited nature of the advocacy, the rules, the ultimate goal to transition change efforts to the group itself, and thus, the necessity for group members to collaborate and be actively involved). With all strategies, the behavior analyst identifies one or more specific, operationalized, feasible changes that can improve the situation of the group and its members (Mattaini et al., 2016), with priority given to change(s) most likely to produce the desired outcomes (see also Watson-Thompson et al., 2015).

Identify Community Stakeholders or Leaders Who Are in a Position to Make Significant Changes at a Social or Institutional Level In addition to forming a partnership with the group for whom the behavior analyst wishes to advocate, significant efforts must be made to establish and foster connections with individuals who are in a position to influence systemic change, which may include identifying and persuading those individuals who are in a position to persuade those who can make the actual relevant decisions and rules (Mattaini, 2013). Similarly, behavior

analysts can advocate at a broader level by first identifying a “chain of influence” within the system and then considering what strategies might be effective with those specific individuals. If the behavior analyst cannot find any significant points of entry into a chain of influence, then efforts should be made toward forming partnerships with relevant stakeholders within that system, such as lobbyists, politicians, professional organizations, and unions (Mattaini et al., 2016).

Select a Feasible Practice for Each Identified Goal and Each Identified Stakeholder or Leader The specific form of advocacy behavior selected ideally will be based on previous observations of the effectiveness of the feasible practice with each particular individual stakeholder or leader. If such information is not available, behavior analysts can look to empirical research with comparable individuals, populations, and communities or conduct an assessment of the relevant contingencies that (1) influence the identified stakeholder or leader within the specific institutional context and (2) how altering those contingencies and metacontingencies could impact the desired behavior and outcomes. From a systemic vantage point, the relevant establishing operations, abolishing operations, antecedents, and consequences are candidates for manipulation via specific advocacy efforts (see Biglan, 1995).

Types of Feasible Practices Although there are many specific forms of advocacy, ranging from opening access to resources for a client in need to lobbying for national or international policy change supporting human rights, the general feasible practices (see Fig. 17.1) used in advocacy tend to be limited to persuasion and mild protest (Mattaini et al., 2016). Persuasion is most effective when the values of the individual leader or stakeholder are in alignment with the values of the group, though, even then, external circumstances and contingencies may not support the desired changes. In such situations, protest is an alternative way to incentivize those with power to act under certain conditions (Mattaini et al., 2016).

Persuasion and protest leverage the power of positive and negative reinforcers by clarifying desired changes and the likely outcomes of making or not making the changes (Mattaini, 2013). While persuasion typically manipulates equivalence relations to promote change in decision-making on the part of stakeholders and promises the positive reinforcer of “an improved condition,” protest commonly relies on removing an aversive condition. Clearly, behavior analytic knowledge in goal setting, measurement, and contingency and metacontingency analysis provide important tools to strengthen advocacy efforts.

Accompaniment

One form of activism that only recently has been codified is accompaniment, derived from the Haitian *accompagnateur*, to describe the work Dr. Paul Farmer and his colleagues did in Haiti (Griffin & Weiss Block, 2013). Mattaini et al. (2016) suggest accompaniment behaviors, which can be applied to issues related to systemic

change, “walk with clients and communities through difficult journeys...from beginning to end...being present and staying there” (p. 268–269) through adverse and even violent times, ineffective solutions, and unstable situations. They stress that accompaniment differs markedly from case management and offer numerous examples of how social workers can incorporate accompaniment practice into their overall professional role. Indeed, accompaniment fits comfortably with social worker practice, given the discipline’s emphasis on service, including social action and change in ecologically unstable communities (see NASW Code of Ethics, 2017). However, behavior analysts, in general, do not accompany their clients on social change activities that could be dangerous; if they work in unstable environments, it is more likely to be as a consultant, which like the case manager, is an outsider who generally stays in the interchange for only a limited amount of time.

Accompaniment, however, can be compatible with behavior analytic practice if it is construed in a broader, more generalized manner; from such a perspective, Mattaini et al.’s (2016) discussion suggests that the core features of accompaniment practice are (a) using professional expertise informed by understanding and empathy (b) to help a community achieve specific goals as an ongoing member of that community (c) in an environment that challenges or even threatens the community’s rights (reinforcers) in some way, and (d) that increases the professional’s motivating operations (MOs) relating to nonmaterial reinforcers such as progressive social values and targeted systems change.

Values are likely to assume primary importance in maintaining accompaniment practice. Material reinforcement such as a salary will have lesser potency as accompaniment responses are often unpaid or the increasing response effort associated with sustained accompaniment practices thins the schedule of reinforcement. On the other hand, at least three value-related MOs seem likely to energize synergistic accompaniment practice: receiving social recognition for helping to change an unfair or inequitable situation; producing a progressive environmental change, including systems change, that results in an outcome closer to one’s values; and experiencing positive self-esteem by self-verbalizing the congruency between emission of the helping behaviors and one’s values.

The essential element in accompaniment is that the behavior analyst is “behaviorally with” the client or community in a struggle to effect progressive social change rather than functioning as an outside consultant or case manager. Research, particularly when it addresses cultural systems-level variables, may qualify as accompaniment; as Mattaini (2019) notes, this work can be challenging, as exemplified by Aspholm’s (2016) interview study of violent gang members active in his neighborhood. However, compared to social workers, the consequences identified as at stake for those being helped will be more diverse and thereby expand the definition of “a struggle” by looking beyond the importance of socioeconomic inequity by including attention to a wider range of social and cultural dysfunctions, and support progressive values, such as environmental sustainability. Thus, for example, a behavior analyst engages in value-driven accompaniment practices when joining, say, the Board of Advisors of a local social action non-profit and actively using his or her professional skills on an ongoing basis to enhance the group’s efficiency and

effectiveness. Accompaniment is demonstrated also by “large response effort-long duration” volunteering, as exemplified in the environmental sustainability work of one of the authors (MB); note the centrality of goals and values to the initiation and maintenance of the activist behavior:

Becoming employed in sustainability as a behavior analyst/special educator was beyond what I had come to expect, given my educational background. When I realized my sustainability-related goals were loftier than what I could accomplish on my own, I made the decision to team up with an organization whose values aligned with my mine. Maintaining a focus on individual behavior change to reduce our carbon footprint after all, didn't feel commensurate to the problem of climate change. I had become more interested in small changes to large systems that would result in aggregate change, and utilized a behavioral systems approach to determine where my efforts would be most impactful. Since I was located in NC, a clean tech hub, I sought volunteer work in clean energy. I marketed myself as a professional volunteer/behavior scientist, willing to help in whatever capacity was needed.

Through the interview process, I realized my background, time availability, and ability to leverage relationships, were of greatest value at a local governmental organization, whose funding had been dramatically cut. Their mission, to accelerate our transition to a clean energy economy, and collaborative approach through grant work, signaled to me an opportunity to become involved in large scale change, operating at a systems-level. I volunteered there for the next year, pairing myself with the availability of reinforcement, helping reduce the workload or increase our knowledge base through my assistance and research. This led to increased opportunities helping different groups within the organization. The work I conducted was goals-oriented, and although unpaid and mostly unrecognized, strengthened our interlocked behaviors, and aligned with my values more than any work to date.

To engage in accompaniment as a behavior analyst is to join and strengthen the efforts of a group or person whose mission aligns with progressive values by employing behavioral systems analysis and measurement to improve outcomes and goal attainment. The advent of routine electronic meeting options may permit accompaniment practice to expand even further, raising the question of how far an already broad definition of accompaniment can and should be stretched as technological advances expand behavioral capabilities: Can one be “behaviorally with” a community solely through electronic means—or does one have to have a physical presence in the relevant environment to engage in accompaniment practice? Finally, a behavioral interpretation of accompaniment practice emphasizes function rather than topography: “Struggle with” behaviors that change an oppressive or inadequately reinforcing environment are shaped by powerful nonmaterial reinforcers that derive their potency from progressive value-laden MOs. Nevertheless, while the actual “struggle with” behaviors that are shaped will vary depending on context and circumstance, the behavior analyst emitting accompaniment practice may be more likely than advocacy activists to consider constructive noncooperation and disruptive noncooperation as well as persuasion and protest to be “feasible” options. Furthermore, the behavior analytic impact probably relates to a behavior repertoire that includes three core non-disciplinary skill sets: self-management responses that delay reinforcement, interpersonal and communication behaviors that marshal resources, and problem-solving skills that overcome barriers. These are questions for future research to address.

Activists, Advocates, and Accompaniers in Systems of Interlocked Behaviors

AAA repertoires participate in contingency and metacontingency relations; that is, operate on both the psychological and sociological levels (Houmanfar et al., 2010). On the psychological level, activists interlock their behaviors with multiple members of the organizations to which they belong by participating in local contingencies, with the role of MOs particularly important. At the sociological level, IBs taken as a whole—that is, socio-IBs—result in the collective change of generating APs. When activists, advocates, and accompaniers participate in socio-IBs such as universities, schools, nonprofit and profit organizations the resulting APs are more likely to promote social change (Nadal, 2017).

Socio-IBs When activists align their values to those of the group in which they operate, they may effectively influence socio-IBs and the associated APs. Shared values can influence the recurrence of these actions over long periods of time; for example, a metacontingency analysis suggests that Sharp's (2010) three essential knowledges aim to teach a cultural movement how to encourage others to want to learn "liberation" responses, that is, to foster a change in attitude and motivation, rather than to encourage a direct change in behavior. This is because individual behavior must align with collective action for there to be an impact on consumer practices. Goal-oriented actions such as advocacy and accompaniment are directly concerned with consumer practices. For example, advocacy actions target institutional stimuli (e.g., leadership roles, organizational rules) at the socio-IB level in order to impact the generation of APs by fostering organizational change that meets consumer demands (e.g., access to resources, overcoming social constraints or injustice). On the other hand, accompaniment efforts focus mostly on actions within the consumer-end of the system—accompaniers help communities or clients achieve specific goals by being behaviorally with them. In this form of activism, it is essential to identify the best ways to obtain the APs that a community needs to achieve the defined goals. Thus, activism can be performed from multiple vantage points to impact the whole system.

Cultural Milieu Effective social action requires a range of behavioral competencies, including the ability to acquire knowledge in nonviolent change strategies, use interpretative tools such as the metacontingency that highlight additional areas for change, seek interdisciplinary collaborations and training, and identify individual and collective values. These skill factors are embedded in the cultural milieu influencing organized groups within which activists, advocates, and accompaniers operate. Stimuli in the milieu have shared functions with respect to multiple individuals' responses, and they can be used for cultural interventions to the extent that their manipulation results in changes to socio-IBs and not just to individual action. Because the cultural milieu is specific to the group, promoting social collective actions begins with identifying the contextual factors that help social activists achieve goals that are consistent with the overarching milieu. The feasibility of

AAA practices can be determined only when the milieu factors that promote collective action and social justice are accurately specified.

Future Directions

Activism, advocacy, and accompaniment are practices that behavior analysts can acquire and engage in, particularly if there is support from the behavior analytic community. The understanding of AAA as discrete repertoires suggests that more tailored and refined responses will increase the probability of successful systems-level outcomes. Scientific advances in cultural and behavioral systems analysis hold significant promise for this type of work, and lead to two recommendations for encouraging greater systems-level analysis and intervention by behavior analysts. In effect, both suggestions establish metacontingencies intended to influence the APs of the behavior analytic community.

Recommendation #1: Integrate Cultural Level Analysis and Intervention Training Within Behavior Analytic Education

The APA Citizen Psychologist (2018) project identified a range of competencies necessary for effective advocacy action and developed a curriculum to train them. The curriculum is tailored to educational level and teaching skills necessary for effective communication, addressing sociocultural diversity and inequities issues, public service engagement, community advocacy, community leadership, application of the ethics code, self-reflection, application of psychological science, community engagement, and self-care. As already mentioned, BFSR's Matrix Project (Ardila et al., 2019; Luke & Mattaini, 2014) has developed course materials to support social action. Additionally, interdisciplinary acquaintance is critical, as behavior analysis provides a powerful theoretical and methodological approach to remediating social problems—but because it is a purely functional approach, the content of what specifically is to be changed is located in other disciplines (cf., Rakos, 1983).¹⁰

A comprehensive integration of cultural level knowledge and analyses into undergraduate and graduate behavior analytic education can establish a metacontingency with at least two likely APs: (a) increased demand for, and placement in, social action internships and field placements and (2) growing research output as theses, dissertations, and senior exit projects tackle systemic dysfunctions. Both of these outcomes are likely to have additional positive consequences. The addition of

¹⁰Behavior analytic education in some of these competencies is addressed in the new ABAI approved course sequence in culturo-behavioral science.

a social action component to behavior analytic training programs may partially address an increasingly prevalent undercurrent among masters-level practitioners that the reinforcers available to them from a “technological education” are prone to satiation; the inclusion of systems analysis and intervention in behavior analytic education would expand these practitioners’ skills, options, and range of reinforcers. It also will likely increase the scientific data addressing vexing social problems as it simultaneously expands the scope, ideas, and growth of the discipline. Finally, behavior analytic programs and faculty can strengthen students’ ability to pursue goals rooted in policy change by applying knowledge in verbal rules and equivalence relations directly to advocacy work.

Recommendation #2: Develop a Discipline-Specific ABAI Code of Ethics

ABAI’s Code of Ethics lacks its own content but “expects its members to uphold the highest standards of personal and professional behavior in the conduct of their work and the advancement of behavior analysis. ABAI embraces the diversity of professions within its membership; thus each ABAI member should adhere to the ethical standards that have been defined for his or her profession” (Association for Behavior Analysis International (ABAI), 2007) including The American Psychological Association’s Ethical Principles of Psychologists and Code of Conduct, The Behavior Analyst Certification Board’s Professional and Ethical Compliance Code for Behavior Analysts, The National Association of Social Workers’ Code of Ethics, and several others.

Most of these codes limit their focus to defining the boundaries of professional behavior. The APA ethics code, for instance, is intended to be narrow in scope by “provid(ing) a common set of principles and standards upon which psychologists build their professional and scientific work” (APA, 2017). Similarly, the BACB® Professional and Ethical Compliance Code for Behavior Analysts addresses only 10 areas of professional work behavior (BACB®, 2019). The NASW Code of Ethics (2017), on the other hand, explicitly mandates social action as an ethical imperative:

The primary mission...is to enhance human well-being...with (a)...focus on individual well-being in a social context and the well-being of society. Fundamental to social work is attention to the environmental forces that create, contribute to, and address problems in living....Social workers promote social justice and social change with...individuals, families, groups, organizations, and communities. Social workers...strive to end discrimination, oppression, poverty, and other forms of social injustice....(via) direct practice, community organizing, supervision, consultation, administration, advocacy, social and political action, policy development and implementation, education, and research and evaluation. Social workers seek to...promote the responsiveness of organizations, communities, and other social institutions to individuals' needs and social problems...” (emphases added)

The NASW code eliminates the artificial distinction between environmental determinism that affects individuals versus groups of individuals, leading to the logical

conclusion that social action to change oppressive environments is an ethical mandate both within and beyond the official professional work role. Social workers are enjoined in the Code to adopt the value to “challenge social injustice” and adhere to the ethical standard to accept their “Ethical Responsibilities to the Broader Society” including, specifically, “Social Welfare” and “Social and Political Action” (NASW).

As noted earlier, Skinner’s approach also strongly implies that behavior analysts have an ethical mandate to use their science to address social problems. The continuity in environmental determinism, which for behavior analysts is logically similar to rejection of unscientific distinctions between public and private responses, offers a philosophical compatibility with the NASW Code of Ethics that suggests it can serve as a good model for an ABAI code. In fact, from the inception of behaviorism and through its maturation,¹¹ the assumption of continuity of determinism has prompted wide-ranging social and cultural analyses and repeated calls for progressive cultural engineering (Rakos, 1992, 2013), even as the specific principles that determine behavior increase in complexity over time, from the stimulus-response psychology of Watson, to the operant conditioning of Skinner, to the newer concept of the metacontingency. This progressive ideology is seen not only in Watson’s and Skinner’s writings but in behavioral thinking more generally: Mills (1999) argues that behaviorism historically has exuded a social optimism that embraced behavioral science solutions because

“...behaviorists adopt a version of scientism. In common with their Progressive forebears, they see science not just as technology but as technology that must have social applications...they despise any characterization of science as the pursuit of pure truth” (p. 154).

The development of an ABAI Code of Ethics with environmental determinism as its *Weltanschauung* would exemplify how, as noted previously, leaders may modify or formulate new rules—the fifth metacontingency factor—that accommodate the requirements of consumer practices and that are consistent with the general cultural milieu (Houmanfar et al., 2009). Thus, an ABAI Code of Ethics that is formulated to increase the social action efforts of behavior analysts—the AP of the metacontingency—might begin with a Preamble along the lines of the following, which is adapted from the NASW document:

Behavior analysts use their professional skills to enhance the well-being of individuals, families, groups, organizations, and the larger society. Fundamental to behavior analysis is attention to the environmental forces at all levels of analysis that create, contribute to, and remediate problems in living.

Behavior analysts focus on the environmental contingencies and metacontingencies that promote individual and societal well-being. They strive to change the contingencies and metacontingencies that support discrimination, oppression, poverty, and other forms of social injustice and that prevent the empowerment of vulnerable and oppressed people.

¹¹Watson railed against eugenics, arguing for the preeminence of environmental determinism over genetic constitution at a time when essentially the entirety of the emerging profession of psychology, including the most eminent psychologists of the time like Terman, Goddard, and Yerkes, embraced eugenics and its socially discriminatory implications (Rakos, 2013).

Behavior analysts recognize the primary role the environment plays in producing individual and social problems and inequities. They promote social justice for and social change with individuals, families, groups, organizations, and communities through their professional activities, including education, research and evaluation, direct practice, supervision, consultation, administration, advocacy, social and political action, and policy development and implementation.

Two important general benefits appear attainable if ABAI were to organizationally embrace social activism via a “Code of Ethics.” First, a social action-focused Code would serve as a prompt to reinvigorate a discipline that has narrowed its vision considerably over the years in response to the demand in developmental and school contexts for masters-level, board certified applied behavior analysts. An embrace of environmental continuity would represent a contemporary return to the discipline’s Skinnerian roots—where social problems are argued to be correctable through scientific cultural analysis and design. In developing MOs and shared values that support social change efforts, such a Code also will establish a cultural milieu where teaching and research grapple again with “big ideas” that stimulate the imagination and offer new directions for growth, especially if education programs deliberately integrate systems-level training as advocated above. A second benefit to adopting a social action-oriented Code of Ethics will be its cumulative effect as with integrated social action training, society will experience an increase in the amount and diversity of scientific input into systems-level decision-making. This outcome will represent, for behavior analysis, a continuation and strengthening of its social action heritage established by Watson and Skinner—both of whom seemed to realize that impartiality in a deterministic world is a myth: “We must take sides. Neutrality helps the oppressor, never the victim. Silence encourages the tormentor, never the tormented. Sometimes we must interfere” (Weisel, 1986). This is particularly apt when scientific knowledge about environmental control can help the vulnerable and oppressed.

Final Word (and a Motivating Operation)

Mattaini (2013) iterates that “[c]ampaigns that focus on ending oppression but do not have a vision and plan for what is to be constructed should the campaign succeed are at high risk for producing limited benefit” (p. 21). The statement beseeches our involvement in the creation of a more equitable society, as behavior analysts are well equipped to turn a visionary plan into measurable goals. As our science and activism work moves beyond the classroom, onto university campuses, into the community, collaborating and problem solving with diverse groups, dedicated to a healthier society, we are working toward goals based in shared values. Collectively, we can then inform a new reality, based on construction instead of obstruction (Mattaini, 2013). To that end, activist behavior analysts might find themselves volunteering at a nonprofit or nongovernmental organization, running for office, serving on task forces, or embedding themselves in institutions or organizations

dedicated to social progress. If behavior analysts can help set and meet measurable societal goals related to shared values, in order to improve the human condition, then we are truly contributing to the evolution of a more just society by stimulating progressive change where we are able to impact the system.

The end of a research project or chapter is where our work begins.

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