Approaching 1.5 °C of Global Warming: Introduction to the Special Section on Behavior and Cultural Systems Analysis for Climate Change, Part I

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In late 2021, Behavior and Social Issues (BSI) invited papers for a special section on behavior and cultural systems analysis related to the human response to climate change, global warming, and related challenges. Despite efforts of scientists and citizens across the globe to educate and motivate action on climate change, atmospheric greenhouse gasses (GHG) continue to rise as economies recover from COVID-19 and fossil-fuel consumption resumes. Climate catastrophes are increasing in frequency (IPCC, 2018, 2021), and populations worldwide are experiencing greater numbers of climate-related disasters, such as wildfires, hurricanes, floods, droughts, disruption of communities, and other catastrophes. Strategies and recent global commitments (COP26 UN Climate Change conference, 2021, https://ukcop26.org) designed to alter the emissions trajectory remain insufficient, with progress happening too slowly.

The population of the planet just reached 8 billion people and requires enormous infrastructure to feed, house, employ, and energize economies. The trajectory is grim. Due to Russia’s invasion of Ukraine, Russian gas supply to Europe is restricted, causing mounting worries about facing winter. Alternative energy sources are being pursued but are currently insufficient to meet needs. Thus, European countries are building coal fired plants to replace lost natural gas supplies and pursuing new fossil-fuel sources. Worldwide gasoline costs are rising, producing wide-spread dismay about the economic cost. These challenges are overshadowing efforts to cut fossil-fuel use and reduce GHG emissions, steps that are urgently needed to limit
warming to 1.5 °C. The global situation calls even more for behavioral approaches to reduce GHG emissions and prevent further climate change, adapt to changing climate conditions, and increase resilience to climate catastrophes.

Behavior analysts/scientists have a long history of applying principles of behavior to environmental problems and recent work builds on decades of effort. In 2010, a special section of *The Behavior Analyst* titled “The human response to climate change: Ideas from behavior analysis,” sought innovative strategies for applications of behavior-analytic principles that might be adopted by policy makers (Heward & Chance, 2010). ABAI held a special conference that year (“Behavior Analysis for a Sustainable World” – BASW), gathering behavior and climate scientists to discuss challenges and promote action. Thompson (2010) succinctly described three options: (1) prevent, (2) adapt, or (3) suffer, as human responses to climate change. In the decade since BASW and the TBA 2010 special section, much work has been done warranting an update on efforts. Thompson’s three options help frame discussion.

Since 2010, climate-change intervention has remained mainstage in behavior analytic discussion. As of 2019, the ABAI-established culturo-behavior science (CBS) verified course sequence offers recognition of scholarly excellence in (CBS) applications (see Alavosius et al., 2022). Continued collaborative thinking has yielded novel resources (e.g., Bonner & Biglan, 2021; Cihon & Mattaini, 2020; Gelino et al., 2020; Houmanfar et al., 2022) to guide the field’s next endeavors. Efforts culminated in the 2020 gathering, “Culturo-Behavior Science for a Better World,” an online ABAI platform by which the collective work in CBS was showcased, during which discourse around CBS was cultivated, and from which novel ideas have blossomed.

To highlight the breadth of new scholarship on climate change by behavior analysts, for this BSI special section we sought papers of various types, from laboratory experiments to reviews of the literature, and from diverse areas related to climate change. The expedited review/publication process for the special section no doubt limited submissions to manuscripts already in progress with data collected and/or analyses at least underway. Despite this, we received a number of provocative papers and called on many capable reviewers to fast-track consideration of submissions. The quantity and timing of papers received for this special section on climate change prompted an expansion of the special section into two parts. Thus, what follows will serve as Part I of the special section of BSI. Part I presents six manuscripts consisting of theoretical and conceptual analyses, research articles, and research reviews:

**1. Rule-Governed Behavior and Climate Change: Why Climate Warnings Fail to Motivate Sufficient Action**

Pietras (2022) provides an informative review of the traditional and contemporary literature on rule governance and considers many factors that can affect rule following with respect to climate change. The analysis considers how these factors might impact responses to climate change and provides possible solutions and strategies for cultural behavior change. Behavior analysis provides units of analysis and assessment tools that may guide potential solutions to the most serious challenges that humanity faces. This timely paper considers the important role leaders’ verbal behaviors play to develop
2. Relational Verbal Behavior and Eco-Friendly Purchasing: A Preliminary Translational Analysis and Implications

Matthews et al. (2022) examine the utility of Relational Frame Theory for understanding how verbal learning histories and subtle contextual cues alter responding in ways not predicted by the Matching Law or models of economic rationality. The study explores antecedent manipulation of verbal relations to shift price sensitivity in consumer behaviors related to the perceived environmental impact of purchasing options. The pairing of salient “branding” symbols with pro- or anti-environmental products produced a shift in simulated purchasing behavior. Results indicate participants began to favor products labeled pro-environmental in choice paradigms even where prices were manipulated to favor anti-environmental products.

3. Saving the Water in California: A Call for Behavior Analytic Action

Benjamin Hoppin and Meshes (2022) consider behavior analytic approaches to water conservation in drought-stricken areas, addressing California in particular as that state is especially challenged. The paper details the importance of water to life on earth, describes drought conditions in California, and explains how California’s water use is tracked. A summary of previous behavior-analytic research in the areas of water conservation and neighboring electricity conservation ends with a nod to advanced technologies (telecommunications technology) and a call to action for behavior analytic researchers to revisit potential water conservation interventions.

4. Exploring the Use of Behavioral Principles in Serious Games for Energy Efficiency: A Systematic Review and Content Analysis

Delemere and Liston (2022) examine experimental gamification literature for efforts to address energy use (i.e., use of a “game”-style of engagement for intervention delivery and/or evaluation; see also Morford et al., 2014; Schneider & Sanguinetti, 2021). In so doing, their paper lays out the behavioral techniques at play in work
spanning the behavioral science subdisciplines. The ensuing categorization offers an excellent breakdown of extant efforts and recorded efficacy of behavioral principles as applied in gamification arrangements. Readers will find a powerful resource to inform subsequent gamification literature entries.

5. Influencing the Climate Point of No Return: A Preliminary Analysis of Delay Discounting of Reinforcement Loss and Framing of Taxation

Behavioral economics has become a valuable approach to understanding health-related decisions (e.g., Bickel et al., 2014), and several studies have demonstrated the relevance of this approach to climate-change decisions (e.g., Berry et al., 2017; Kaplan et al., 2018). In this vein, Belisle et al. (2022) extend methods for analyzing delay-discounting to choice for climate-change policy having delayed outcomes. The study investigated choice between two public policies that differed in the extent to which they would delay the “Point of No Return” (PNR; the date at which climate-change impacts are irreversible). One policy would not implement a tax on automobile driving, whereas the other would tax driving above a mileage target, but also further delayed the PNR. They compared choice when the tax policy only included punishers for driving above the mileage target (a non-redistributive policy), or when it also included reinforcers for remaining below the mileage target (a redistributive policy). They found that choice was sensitive to the PNR delay and policy type. The sensitivity of choice to PNR delay resembled sensitivity to other delayed commodities. Their study not only provides further evidence for the applicability of behavior-economic analyses to climate-relevant decisions but illustrates how these methods can inform policy development by quantifying the impact of policy features on preference. This is a promising direction for further behavior-analytic contributions.

6. Climate Change and Six Americas: What Can Behavior Analysts Do?

Meshes et al. (2022) discuss use of a brief survey to guide strategic behavior change. The Six Americas’ measure categorizes respondents according to their climate change opinions, and authors argue these outcomes could be used to more effectively plan interventions. Their paper details target approaches for each population category and lays out exemplar interventions that leverage survey insights. In addition to their widely encompassing summary of viable behavior change targets, readers will find suggestions for scaling interventions for contact with prospective policy science.

The six papers above comprise Part I of this special section and highlight progress in the application of behavior analysis to climate change. The papers suggest targeted applications of evidence-based behavior-change to diverse climate-relevant behaviors (water conservation, renewable energy, food choice), and
incorporate new behavioral technologies (games) and behavior tools (behavioral economics and methods of self-reported climate concern) into climate-change mitigation efforts. They also illustrate the importance of considering verbal processes both in the understanding of responses to climate change and in methods to change climate-relevant behaviors. Moreover, the papers draw attention to cultural-level contingencies that must be changed to adequately orchestrate behaviors relevant to the climate crisis (e.g., Thompson’s three options – present, adapt, ameliorate suffering). As with any growing research area, these papers find gaps in the literature and identify areas where greater contributions of behavior science are needed, from improving existing behavior-change technologies and developing more effective verbal strategies, to enhanced dissemination, scaling of interventions, and analyses in areas such as public policy and advocacy. More work is needed to develop and integrate efforts on the path ahead and we look forward to promoting those efforts in Part II.

Additional papers are in process for Part II of the special section on climate change in 2023. New submissions, including papers that comment upon or extend the analyses in Part I, may be considered for inclusion. As always, BSI will continue to welcome submissions on behavior science related to climate change. Based on the activities evident in the manuscripts published and in process, we are confident that accumulating effort will continue to provide fodder for accelerated progress. We hope this special section inspires behavior scientists to assess how they can also contribute to ongoing climate change efforts, as urgent effort is needed.

Papers may be submitted via the BSI portal (https://www.editorialmanager.com/bsis/default1.aspx). Be sure to indicate the submission is for consideration in the special section on behavior and climate change.

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