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EDITORIAL



## Climate crisis mitigation and adaptation: educational and developmental psychology's responsibility in helping face this threat

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### ABSTRACT

**Objectives:** Human activities have caused major impacts on Earth's climate systems. Aply called the climate crisis, severe, pervasive, and irreversible impacts are occurring around the globe. Complementary multidisciplinary strategies that will result in successful mitigation of and adaptation to Earth's rapidly changing climate are needed, now more than ever. Education and human development play, and will continue to play, a fundamental role in mitigating and adapting to this crisis.

**Method:** This special issue aimed to present educational and developmental research addressing the climate crisis. The included papers emerged from a call to a communities of researchers investigating relations between humans and Earth's climate. All articles in this special issue underwent a process of robust peer review to ensure that only high-quality research was included.

**Results:** A total of twelve articles are included in this climate crisis special issue, showcasing educational and developmental psychology research that help address the current global climate crisis from the perspectives of mitigation and adaptation.

**Conclusions:** These articles present a meaningful array of findings from many who are doing important research about climate change understanding and action. This climate crisis special issue reflects what the community can do when collaboration is more purposeful, sustained, and systematic.

### KEY POINTS

#### What is already known about this topic:

- (1) The climate crisis, caused by human activities, has already begun and poses an existential threat to humanity.
- (2) Educational and developmental psychologists are well suited to meaningfully help humanity effectively mitigate and adapt to this climate crisis.
- (3) The purpose of this special issue is to feature innovative and meaningful research, suggesting promising steps for a sustainable future.

#### What this topic adds:

- (1) Four articles reveal that many people have superficial understanding, along with feelings of anxiety and uncertainty, but are willing to act on the climate crisis.
- (2) Six articles present specific strategies and interventions to deepen understanding and increase agency for mitigation and adaptation.
- (3) The final paper synthesises the research in this special issue, guiding us towards a better future for Earth and all its people.

### Now is the time to step up

It might be as simple as one, two, three. One, the *climate crisis* is upon us; two, this crisis is impacting Earth's entire environment; and three, humans – who are inexorably intertwined in Earth's complex environmental system – are the culpable actors causing the climate crisis. With more than 99% of peer-reviewed climate science research articles serving as undeniable evidence in support of these assertions (Lynas et al., 2021), the climate crisis has moved from what was once hypothetical speculation to what is now a factual claim and impending existential

threat (Gills & Morgan, 2020). Current climate change is characterised by causal factors that include massive deforestation and ever-increasing greenhouse gas emissions from industrialisation, and constitutes a suite of severe, pervasive and irreversible impacts occurring around the globe (Pierrehumbert, 2019).

Solving the climate crisis, however, is not a simple matter. Climate science has a long and complex history, with decades of research investigating the link between human activities and current climate change (IPCC, 2021). Through systematic methodologies and analyses, the

climate science community has carefully characterised and forecasted this crisis (Coen, 2020; Edwards, 2011). Current models indicate that it will be virtually impossible to mitigate emissions sufficiently to prevent adverse warming (i.e., 1.5–2.0 degree Celsius of additional global warming per the Paris Agreement goal; Tollefson, 2021). Recent extreme weather events, which have been directly linked to the climate crisis, have exacted a heavy price on humanity, with hundreds of thousands of lives lost and billions of dollars of damage (National Academies of Sciences, Engineering and Medicine [NASEM], 2016; Stott, 2016). Local and regional planners and policy-makers now face the task of adapting to mass migrations, disease outbreaks, collapsing ecosystems, and social and economic injustice caused by the climate crisis (Executive Order No. 14030, 2021; Rosenzweig et al., 2018).

Despite these high costs and impending challenges, much hope remains. Educational and developmental psychologists can turn hopelessness into hope and despair into agency and action. Now is the time for educational and developmental researchers and practitioners to join climate scientists, local and regional planners, and policy-makers – more fully – in the process of positioning humans to successfully mitigate and adapt to this existential threat (Nielsen et al., 2021). Our community's efforts have so far been scattered and sparse, but greater action has begun. For example, when taking the helm as Editor-in-Chief of the *Educational and Developmental Psychologist*, Allen (2020) sounded the clarion call, saying “While climate science may seem far removed from ... educational and developmental psychology, those of us working in this field need to seize the chance, perhaps the only chance, to make an important difference where we can” (p. 1).

The path ahead will not be easy. In responding to this climate crisis, educational and developmental psychologists will need to seek multidisciplinary collaborations that require us to be open to a variety of worldviews, theoretical frameworks and methodologies to facilitate innovation and collaboration. Furthermore, we must seek to further measure and characterise this crisis with an eye towards interventions and strategies that position children, adolescents, and adults to adaptively respond. Educational and developmental psychology must facilitate ways for people to become collaborative and productive agents for adapting to and mitigating the climate crisis, specifically via strategies that promote equitable, just, and democratic local, regional, and global solutions that facilitate well-being for all. In the spirit of initiating this productive enterprise, the aim of this special issue is to showcase educational and developmental psychology research addressing the current global climate crisis, from multiple worldviews and perspectives, and which

consistently voice a collaborative and collective purpose of preparing all for mitigating and adapting to the climate crisis.

## Overview of the climate crisis special issue

When sending the call of this special issue, we were particularly interested in research investigating (a) psychosocial impacts of the climate crisis, including intersections between individual, social, and cultural contexts; (b) values, attitudes, emotions, and beliefs about the current and future states of Earth's climate; (c) critical thinking, problem solving, and reasoning about mitigation and adaptation, and (d) measures and interventions to gauge and promote agency at local, regional, and global scales. The articles included in this special issue have largely answered this call and addressed many of these research topics.

The review by Ceyhan and Saribaş (2022) opens the special issue, surveying communications about and public understanding of the climate crisis over the past 10 years. Given that climate communications in this past decade have been situated within the context of the “post truth” and “alternative facts” era, Ceyhan and Saribaş found that studies focusing on climate crisis communications seldom include the perspectives of educational and developmental psychology. Simon et al. (2022) present a focused look at psychometric properties related to climate crisis anxiety. This study involved Filipino youth, a population that is already experiencing appreciable climate change impacts, and found that increased proximity to such experiences is related to increased worry and anxiety, but also a greater willingness to act. Torsney and Matewos (2022) similarly probed the relations between emotions and willingness to mitigate the climate crisis, looking at connections between values and attitudes about sustainability and the environment. These researchers found that individuals who placed a greater value on and exhibited positive attitudes promoting sustainability for a just and equitable future demonstrated adaptive environmental behaviours via concrete action plans. Nonggay et al. (2022) found that, although youth may want to act, they may not be aware of and understand the full breadth the climate crisis. In this study, first-year undergraduates in South Africa expressed a general understanding that human activities are causing climate change, but they are not connecting this understanding to their current experiences and challenges. However, greater levels of experience with nature were related to stronger emotions about the climate crisis and greater expressions of action. Overall, these four articles suggest that communications focusing on humans' culpability in climate change have resulted in

relatively superficial understanding, along with feelings of anxiety and uncertainty. Yet, these studies also suggest that youth and adults may be willing to act on the climate crisis in a way that will help their communities thrive.

The next six articles in the special issue examine strategies and interventions to deepen students' understanding about and agency towards mitigating and adapting to the climate crisis. Heddy et al. (2022) measured undergraduate students' epistemic emotions and judgements about and knowledge of climate change and related these to their reported levels of climate crisis moral convictions and engagement. When students were primed that it is a moral imperative to act in response to the climate crisis, they learned more, shifted towards a more scientific stance, and deepened their scientific climate knowledge. Similarly, Vaupotič et al. (2022) found that intellectual humility (e.g., perceiving a solution as more complex and willingness to consider issues from multiple perspectives) can be primed when an expert is perceived to have more advocacy. Expert advocacy on a controversial position (e.g., are we actually in a climate crisis) deepened trust in scientific claims and lessened trust in competing claims. This increased level of intellectual humility also promoted a greater willingness to act on behalf of the climate. Bailey et al. (2022) examined students' evaluations of competing scientific claims about the climate crisis and found that scaffolding, particularly scaffolding that is more autonomy supportive, can facilitate adolescents' movement towards a more scientific stance and increase their knowledge about climate, human-induced climate change, and connections between extreme weather events and the climate crisis. Such scaffolded instruction helped promote more scientific evaluations between lines of evidence and alternative explanations about climate phenomena. Herrick et al. (2022) also examined the effectiveness of instructional scaffolding in classroom settings. In their study, early adolescents used photos to facilitate connections between their experiences and more distal/abstract impacts of the climate crisis. Use of this scaffolded technique may have helped deepen students' engagement around the topic of climate change, driving them to learn more.

The effectiveness of individual instructional scaffolds suggests that more integrated curricular scope and sequencing involving such strategies may help to systematically increase engagement and understanding about climate science. Such was the case with McGowan and Bell's (2022) study examining instructional tools and environments that facilitated ecological caring, hope, and agency in response to the climate crisis. These researchers designed and tested sustained instructional contexts where adolescent students imagined

ecologically just and thriving futures for the complex Earth system via scientific modelling and storytelling, where humans are embedded among all living and non-living entities. Long et al. (2022) likewise posited that broader pedagogies and instructional sequences should focus on expanding colloquial legacies and contexts to enrich a wider and more inclusive worldview. They acknowledged that such a proposition is tricky given that many world regions are captured within polarised discourses and that broad inclusion for collective, democratic, and socially just learning and action may often be discouraged at local and national levels. Both studies, looking at integrated and sustained climate crisis education, hope to facilitate students' individual and collective well-being and development.

The special issue concludes with Sinatra's (2022) commentary and synthesis. Sinatra links the research presented here to the broader context of the psychology of climate change, climate change education, and how research-like that presented in this Special Issue will help us adaptively seek and promote climate crisis solutions.

## A path forward

The articles in this special issue provide a glimpse into the meaningful research conducted by educational and developmental psychologists as they help respond to the climate crisis. But these are only a glimpse, just a reflection of those many who are also doing important research on climate change understanding and action. These articles reflect what the community can do when collaboration is more purposeful, sustained, and systemic. It is not really as simple as one, two, and three; the climate crisis is daunting, and the path forward requires a determined and patient effort. Collaborative teams can help by offering a broader perspective that brings the climate crisis research agenda to educational and developmental psychology's forefront. Many of these teams should go beyond the traditional boundaries of educational and developmental psychology via the integration of psychological, health, social and natural sciences, all working together to transcend traditional disciplinary boundaries (see, for example, Lombardi et al., 2021; NASEM, 2021). Together we can and must position humans, as part of Earth's ecosystem, to mitigate and adapt to the climate crisis in creating a brighter future where we all – together – will thrive.

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