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Emotions and the climate crisis:

A research agenda for an affective sustainability science

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Abstract

Climate change and loss of biodiversity are advancing rapidly, making a transition to a more sustainable lifestyle one of the most pressing tasks facing humanity. This special section shines a spotlight on how emotions shape and are shaped by the climate and biodiversity crises, and how they intersect with pro-environmental behavior. To this end, leading sustainability scholars and policy makers articulate what they believe are the most important questions that emotion research should answer to support a sustainable societal transition. Here we first provide an overview of the articles in the special section, which include a wide range of topics including global analyses of distress related to climate change and biodiversity loss, case studies on emotional experiences towards locally specific instances of climate change consequences and adaptation or mitigation efforts, discussions of the motivational functions of emotions and their potential to drive proenvironmental action, and reflections on how we can make affective science more salient to policy makers in the sustainability domain. In the second part, we summarize the emerging overarching themes that point to promising research objectives and questions for an affective sustainability science. Finally, we discuss how the study of sustainability can also be beneficial for the affective sciences. Our hope is that this special section will put sustainability on the research agenda of emotion researchers and stimulate more research in affective sustainability science.

Introduction

The diagnosis is as unequivocal as it is shocking: Human behavior is causing our planet to warm at an unprecedented rate and irreparably damaging many of our most precious natural habitats. Extinctions and biodiversity loss are altering key processes of the ecosystem. The crisis is becoming increasingly hard to ignore with recent increases of extreme weather events like heatwaves, droughts, and flooding, as well as the accelerating extinction of animal and plant species. To make matters worse, projections for the coming decades are even more harrowing.

But it is still possible to change course. Moreover, it is clear what needs to happen to avoid the worst scenarios: As stated in the latest report of the Intergovernmental Panel on Climate Change (IPCC, 2022), global greenhouse gas emissions must be reduced quickly and drastically. Accomplishing this goal is arguably the most important challenge of our times, but the strategies that have been tried so far have not been very successful, with emissions continuing to increase year by year (Forster et al., 2023). In this special issue, we seek to provide a fresh perspective on sustainability by highlighting the many ways that emotions shape and are shaped by the climate and biodiversity crises, as well as how emotions intersect with pro-environmental behavior. Our hope is that this will open up new routes for affective scientists to actively contribute their expertise to the pursuit of a just, sustainable transition.

We know that many scholars and students in the affective sciences are deeply concerned about the current environmental crises. Yet, only very little empirical or theoretical work relating to sustainability is published in the primary outlets for emotion research, and barely any sustainability research is presented at the major emotion conferences. Moreover, while the most recent IPCC report emphasises the importance of individual choices, social

norms, and culture for developing new climate change mitigation strategies, there is hardly any mention of emotion or affect (IPCC, 2022). However, the limited research conducted to date at the intersection of the affective sciences and sustainability clearly points to emotions as crucial predictors of climate change risk perceptions and climate policy support, which can be powerful drivers of individual and collective sustainable action (e.g., Brosch, 2021; Brosch & Steg, 2021; Harth, 2021; Schneider, Zaval & Markowitz, 2021). The goal of this special section is therefore to put sustainability on the research agenda of emotion researchers, and specifically to highlight impactful topics on which more research and theorizing is needed.

We opted for a somewhat unusual format for this special section. Rather than asking affective scientists to summarize the state of the field, we reached out to leading sustainability scholars and policy makers and asked them to articulate what they believe are the most important questions that emotion scientists could help answer to support a sustainable societal transition. We are thrilled with the results, which set out a multitude of paths for affective sustainability science. Grounded in deep expertise on sustainability from different perspectives and disciplines, the contributors highlight a plethora of varied research questions, while emphasizing the utility of different approaches. Below, we briefly summarize the articles in the special section, and then outline the emerging overarching themes in a section on proposed directions for future research.

Overview of the contributions in this special section

As the negative consequences of the climate and biodiversity crises become directly experienceable, it is not surprising that related emotions become salient. Climate anxiety has

been described as the biggest pop-culture trend of 2019 (McGinn, 2019), reflecting the increasing preoccupation of the public with the topic. Several articles in the special section highlight the need to gain a better understanding of the distress elicited by the climate and biodiversity crises. To encourage research in this area, van Valkengoed, Steg, and de Jong (this issue) propose a working definition as well as concrete indicators of climate anxiety, and point out research opportunities in establishing when, why, and how people experience climate anxiety. They propose that emotion researchers can contribute to developing new strategies to help people cope with climate anxiety and suggest that research should explore under what conditions climate anxiety can actually drive pro-environmental behaviour. Brick, Nielsen and Hoffman (this issue) focus on the role of emotions in the context of the biodiversity crisis. They note that the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has recently recognized the important role of emotions as predictors (e.g., emotions as facilitators of learning and behaviour) and outcomes (e.g.., the impact of nature exposure on affect and mental health) in the context of biodiversity and ecosystem services. As changing land use is a key driver of biodiversity loss, Brick and colleagues particularly call for research on the emotional experiences involved with *causing* biodiversity loss. They also point to the importance of studying biodiversity loss and its related emotions in the Global South where the deterioration is most pronounced.

While these first two contributions discuss the climate and biodiversity crises at the global level, another set of papers "zooms in" and focuses on emotional experiences towards locally specific instances of climate change consequences and adaptation or mitigation efforts. Michael (this issue) provides a powerful case study illustrating the role of group-level affect as a driver of climate migration behavior. This case study of migrants in India describes how emotions can shape the choice of migration as an adaptation strategy in the

context of climate change, and how emotions drive experiences of risks and vulnerability. Michael moreover notes the need for more research on causal pathways from emotions to climate action, including adaptation, and highlights the importance of centering the emotions, problems, and dilemmas faced by the people in the Global South. Russell and Firestone (this issue) also discuss the emotions people experience when dealing with changes in their local environment due to the changing climate. They specifically focus on the emotions that are elicited in the context of large-scale renewable energy projects (i.e., new wind and solar energy sites), since community perception can constitute major obstacles for renewable energy developments. They call for more research on how emotions relate to innovative technologies and emphasize the need for experimental methods to establish causal relationships, and longitudinal studies to examine changes over time. Henwood, Pidgeon and Smith (this issue) provide a detailed, multidisciplinary perspective on what it means to feel resistance as a psychological barrier to adaptive change. They draw on qualitative data from a project investigating the public understanding of industrial decarbonization, and probe how communities can benefit from their engagement with local amenities and spaces like parks and woodlands.

A third set of papers more closely investigates the potential motivational and behavioral consequences of emotions in the context of sustainability. In particular, they discuss under what circumstances we can leverage emotions and affective science research to promote sustainable action. Clayton and Ogunbode (this issue) discuss the emotions that are experienced around environmental problems such as climate change and biodiversity loss. They emphasize the communicative and social functions of emotions and point out the potential positive effects of emotions and shared affective experiences for solving environmental problems. Packard and Schultz (this issue) discuss the role of emotions in the

context of normative environmental behavior. They propose a framework in which specific emotions are linked to specific cases of conforming with or deviating from personal and social norms, and discuss how these emotions may impact subsequent pro-environmental behaviors. Given the importance of norms for pro-environmental behavior, they call for empirical tests of these predictions to understand how emotions facilitate and reinforce norms. Schneider and van der Linden (this issue) address the potential of emotions as drivers of sustainable behavior and decision-making. Specifically, they highlight the need for research into potential positive reinforcing feedback loops between anticipatory and experienced positive emotions relating to pro-environmental behaviours. They moreover draw attention to the importance of differentiating between low-impact (e.g., recycling) and high-impact (e.g., flying less) environmental behaviors, both at the conceptual and the empirical level of future emotion research. Goldberg (this issue) discusses the role of emotions in the context of climate communication. He illustrates how emotions influence the selection, processing, and effects of environmental communication, and calls for more research to establish causal and temporal relationships in this domain. He moreover emphasises the need to investigate emotions outside tightly controlled laboratory settings, given that field studies are essential for testing the efficacy of climate communication interventions.

The final two papers ask how emotions can be leveraged for sustainable action, with a special focus on how to make affective science research more relevant for policy making. Weber and Constantino (this issue) note that the topic of emotions is still insufficiently represented in the recent IPCC reports, and emphasize the need to increase attention to the role of emotions for sustainability in policy circles. They discuss the potential of the emotion of hope as a promising lever for motivating pro-environmental behavior, and outline concrete

recommendations on designing methodologically sound studies for future affective science research on sustainability. Michaud, Bonaccorsi and Galicia Cruz (this issue) also discuss how to better integrate insights from the affective sciences into the political process, specifically by considering the implementation of the United Nations' Sustainable Development Goals of the 2030 Agenda for Sustainable Development (SDGs). They point to potential emotional barriers to SDG enactment such as issue fatigue, and call for research helping to better understand how to share success stories in a way that fosters additional action rather than fuelling complacency. They moreover encourage affective scientists to get involved in intergovernmental processes to ensure that their expertise is utilized in an effective manner.

What's next (part I): How the affective sciences can contribute to sustainability

As outlined above, one goal of this special section is to put sustainability on the research agenda of emotion researchers, and thereby to hopefully motivate some readers to shift or expand their own research into topics related to sustainability and the current climate and biodiversity crises (see e.g., Aron, 2021). In this section, we try to summarize some of the overarching themes and topics that emerged from the varied contributions of the special section, in order to point to promising objectives and research questions for an affective sustainability science.

Understanding (and normalizing) the experience of negative climate emotions

As is evident in many of the contributions of the special section, most research on emotions in the context of the climate and ecological crises is – understandably – focused on

negative emotions. Nevertheless, there is still much work to be done in this space. For instance, there is currently no validated taxonomy of climate emotions and different forms of climate distress (but see Pihkala, 2022 for first steps in this direction). Sorting affective phenomena into meaningful types can reduce complexity, facilitate integration across bodies of work, and yield novel hypotheses (Desmet, Sauter & Shiota, 2021). Additional empirical work is needed to map out which climate emotions are elicited in whom under what circumstances, and theoretical work is needed to integrate these findings into prediction-generating frameworks.

Affective scientists can also contribute by helping the public understand that anxiety, distress, or even panic, are appropriate reactions to an existential threat such as climate change. Negative emotions elicited by the climate crisis thus need to be normalized and may in fact be essential for initiating and sustaining necessary climate action. In 2019, the climate activist Greta Thunberg told an audience at the Davos World Economic Forum: "I don't want you to be hopeful, I want you to panic. I want you to feel the fear I feel every day and then I want you to act." Affective scientists can offer informed accounts of the rationality and potential utility of climate distress, which may help to de-stigmatize such feelings.

Although climate distress is an understandable reaction to the crises we face, such intense negative emotions can nevertheless be enormously debilitating, and even overwhelming. Indeed, the emotional suffering experienced by many – especially young – people around the world can in itself be considered a major negative impact of the climate crisis (Hickman et al., 2021; Ojala et al., 2021). Affective scientists can assist in developing and testing interventions for different forms of climate distress, and by formulating recommendations for interventions. Informed by work on emotion regulation, as well as

clinical affective science, they can help provide tools to allow people to better manage their negative climate emotions.

Leveraging the motivational functions of emotions

Emotions play a key role in motivational systems and many of the contributions to this special issue see the potential of emotions as fuel for positive change. Both negative and positive emotions can potentially motivate pro-environmental behaviors. Under specific circumstances, affective processes may even drive positive reinforcing feedback loops, resulting in self-perpetuating pro-environmental behaviors. A key contribution of affective science research would be to understand and establish the conditions that can catalyze such spirals (Brosch & Steg, 2021).

Importantly, pro-environmental behavior can occur in a wide range of different domains. While it is important to investigate emotional factors in the context of sustainable personal consumption, it is also crucial to investigate sustainability when people act as investors, role models, organizational participants, or citizens (Nielsen et al., 2021). Substantial empirical research is needed to establish how and under which circumstances emotions can motivate pro-environmental behaviors across different domains and at various levels of environmental impact.

What's next (part II): How the the study of sustainability can contribute to the affective sciences

Our main motivation for putting together this special section was to shine a light on how the affective sciences can contribute to sustainability. At the same time, we – and indeed a number of the contributors to the special section – note that the climate and ecological crises also provide an opportunity for emotion researchers to better understand the phenomena they study. The changed social and physical context of our world is yielding new emotional phenomena, and climate emotions need to be described and understood, which affective scientists are well placed to do. The climate and biodiversity crises provide an ecologically relevant elicitor of genuine, intense emotions. The most obvious example is the despair of climate distress, but there are also opportunities to investigate intense positive climate emotions like the powerful pride of making a sustainable life choice or the exhilarating excitement of being involved in collective climate action. Another example is the "new" emotion of flight shame, which became known in 2018 as a hashtag on social media and very quickly gained a large reach. Previous research shows how studies conducted in the context of collective stressors like natural disasters and the COVID-19 pandemic can, for example, help further our understanding of helping behavior during acute stress (Zaki, 2020) and the efficacy of different emotion regulation strategies (Pauw et al., 2023). The climate crisis may similarly provide a context that could accelerate our understanding of a wide range of affective phenomena and mechanisms. Finally, the applied research that is intrinsically involved in investigating sustainable behaviour change may facilitate outreach and enhance the public's understanding and appreciation of the affective sciences.

Conclusion

The natural sciences have established the physical changes that our planet is going through, and mapped out the trajectories for the decades, decennia, and millennia to come.

Those models are continuously refined and updated in light of new data, innovation and the implementation of climate change mitigation strategies. In recent years, increasing research attention is being directed towards the role of human judgment and behavior in the sustainable transition. Over the coming years, we will need research to help us understand the ways that emotions direct the sustainable actions of individuals and groups. Our hope is that the insights gained from a new affective sustainability science will become an important resource for practitioners, policy makers, and future IPCC reports.

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