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Brick, C.; Nielsen, K.S.; Hofmann, W.

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INVITED SPECIAL SECTION

Opportunities for Emotion Research on Biodiversity

Cameron Brick *Psychology, University of Amsterdam, Amsterdam, The Netherlands*
*Psychology, Inland Norway University of Applied Sciences, Elverum, Norway***Kristian Steensen Nielsen***Department of Management, Society and Communication, Copenhagen Business School, Frederiksberg, Denmark***Wilhelm Hofmann***Psychology, Ruhr University Bochum, Bochum, Germany*

Abstract

We see unique opportunities to advance emotional research by studying an overlooked environmental problem. The biodiversity crisis is caused by land use, in particular by reducing and damaging habitats, such as deforestation for cattle grazing. Biodiversity processes are proximate and personally moving, like when a person is causing or experiencing changes to livelihood-providing ecosystems, and we suggest this affect-rich context is useful for studying social and psychological processes. In contrast, much research on far-away populations thinking about climate change effects involves more abstract and distant cognitions. We also suggest biodiversity-related emotions have consequential outcomes for health and behavior, and provide advice for shaping research programs on specific populations and wildlife interactions.

Keywords

biodiversity, environmental psychology, conservation

Climate change emotions are a mainstream topic (BBC, 2023). However, there is a curious gulf between the research topics of emotions and biodiversity conservation. The biodiversity crisis is caused by land-use change and habitat fragmentation, overharvesting, invasive species, and pollution and climate change, which have rapidly diminished ecosystem functions including the fundamental services humans depend on Díaz et al. (2018), IPBES (2019). These combined effects are producing extinctions and species threats at a scale unprecedented for millions of years (Ceballos et al., 2017).

These changes provide opportunities in fundamental research on emotional states. Our goal is to pinpoint how emotional researchers can contribute to biodiversity conservation by studying how people are causing and/or experiencing biodiversity loss. In contrast to the gradual and abstract nature of climate change (Brick & van der Linden, 2018; Maas et al., 2020), biodiversity issues may be more proximate,

visible, and personally moving (e.g., experiencing the loss or degradation of local ecosystems or the disappearance of cherished species). Biodiversity loss also threatens people's livelihoods, especially in the Global South, even though these communities are rarely the main cause of the loss (IPBES, 2019, 2022). Indeed, many biodiversity issues are caused by consumption demand in high-income countries (e.g., for beef and resource-intensive goods) where the harms can be perceived as more distant and abstract. The biodiversity interface thus provides a rich tableau of emotional processes to study both for the distant consumer and those directly affected, including fundamental questions like distinguishing emotional states and mapping their behavioral consequences.

Recently, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which is the IPCC equivalent for biodiversity, published their global assessment report on biodiversity and ecosystem services.

They recognized emotions as critical predictors (e.g., facilitators of learning and behavior; Li & Monroe, 2018) and as key outcomes (e.g., nature exposure affects mental health; Jimenez et al., 2021). Despite this acknowledgment, the literature on emotions and biodiversity is only emerging and mainly published in environmental science rather than psychology journals. Conservation researchers have resisted using emotions like compassion for why and how conservation occurs, potentially because of a perceived false dichotomy between emotions and reason (Batavia et al., 2021). Emotion researchers thus have a unique opportunity to direct this research area with their expertise.

Emotions are messy because they defy simple categorization and measurement (e.g., Barrett, 2006; Lench et al., 2011). Nonetheless, labile and transitory affective experiences remain linked to cognitions and behavior, which in turn can shape one's attitudes and sense of identity (Bem, 1967). For example, consistent with self-perception theory (Bem, 1967), an individual might feel empathy for a threatened species or ecosystem, infer that they are someone who cares for biodiversity, and therefore take action to protect biodiversity. Likewise, a person may feel anger or embarrassment in response to environmental damage, attribute lack of responsibility to the government, and engage in political protest (e.g., indigenous communities; Ford et al., 2020). Emotions may trigger impactful and durable changes to values and identities (e.g., "People like us care for biodiversity"), and these can result in consistent and generalized patterns of behavior (e.g., through positive spillover; Carrico, 2021; Gatersleben et al., 2014; cf. Geiger et al., 2021; Truelove et al., 2014). The quantitative evidence is mostly cross-sectional rather than longitudinal, so these causal patterns remain speculative. It also remains unclear when those processes occur instead of the opposite. For example, US residents are identifying less as environmentalists over time (Jones, 2016), perhaps due to political polarization (Hoffarth & Hodson, 2016; Iyengar et al., 2012).

Recommended Research Questions

We recommend that researchers study individuals either experiencing or causing specific biodiversity impacts. For example, consider the research question: "Which emotions are associated with biodiversity loss in Brazil?" This question is incoherent because of too much aggregation between nature interactions (hiking vs. logging) and environmental processes (ecosystem functioning, pollution, or extinction). Instead, pick a specific biodiversity impact and the context will determine the appropriate population, emotions, and methods (Nielsen, Cologna et al., 2021; for a moving qualitative example, see Clissold et al., 2022). One promising technique is threat change modeling, which is "a simplified summary of knowledge of the reasons for the unfavorable status of a species or ecosystem, from changes in ecological dynamics to the socioeconomic mechanisms thought to be

responsible, and their underlying drivers" (Nielsen, Marteau, et al., 2021, p. 552). This technique can help identify the main actors in the chain, the behaviors that should be changed to reduce a particular threat to biodiversity, and the most promising points for intervention.

Recommended Settings

Affective states could be useful for classifying human-wildlife interactions at multiple levels of analysis such as local/global, individual/collective, and immediate/abstract. The study of biodiversity loss and human-wildlife interactions is especially relevant in the Global South where biodiversity loss is felt most severely. Impacts primarily arise from the degradation and fragmentation of ecosystems (e.g., deforestation, pollution, harvesting) and from lower resilience to associated harms (e.g., food insecurity, human-wildlife conflicts, or extreme weather).

When livelihoods are threatened, the loss of ecosystems and wildlife has profound individual, community, cultural, and religious significance. Examples include communities being forced off land to clear rainforest for agriculture; threats to safety, property, or crops from conflicts with wildlife with degraded habitats (e.g., elephants in Kenya; Munyao et al., 2020); illegal wildlife poaching (e.g., pangolin scale and rhino horn; 't Sas-Rolfes et al., 2019); and the deterioration of ecosystems like wetlands or coral reefs and their services (e.g., for subsistence, recreation, or protection). Such consequences and experiences can induce strong emotional and psychological responses (e.g., grief, anger, stress, depression) with potentially severe impacts on health. Perceived (ecological) injustice can trigger strong and diverse emotional reactions in victims, observers, and perpetrators (Lecuyer et al., 2019), including anger, moral outrage, disgust, and guilt. The need to study Global South populations also helps resolve the perennial challenge of external validity in the social sciences. Ecosystem and wildlife interfaces have the advantage of providing a direct justification for studying more globally representative populations (Ghai, 2021). Prioritizing deep collaboration with local scientists and practitioners builds the most effective, enduring, and targeted interventions (Asase et al., 2022).

There also remain good reasons to study populations that are geographically distant from the impacts. High-income countries are the primary cause of biodiversity loss (IPBES, 2019), making the thoughts and feelings of high-income populations particularly consequential. In addition, distant individuals can create powerful emotional connections to ecosystems and wildlife based on personal experience or abstract valuations of nature and animals (Hanisch et al., 2019; IPBES, 2022). Nature exposure reliably causes positive affective responses (Bratman et al., 2019) and conservation activities can increase people feeling connected to nature (Furness, 2021). These positive emotional links could help achieve the newly adopted global framework for biodiversity at COP15 in Montréal, which requires extensive protection

and restoration of nature including in high-income countries (*Kunming-Montreal Global Biodiversity Framework*, 2022).

Some research questions are suitable for populations near and far, like about attachment to wildlife or ecosystems. For example, how do people come to love certain species, and what are the personal consequences of emotions about those species? Researchers can also study human–nature interactions through zoos (Clayton et al., 2014) and the more complex contexts of sports and trophy hunting (Mkono, 2023; Packer et al., 2009), which can have positive or negative effects on biodiversity. Little is known about the mix of emotions that hunters may experience and how the emotions shape attributions and consequential behavior.

Conclusion

We argued that affective states such as joy at a fluttering bird, or horror at depending on a forest and seeing it disappear, are regularly experienced around biodiversity and that these reactions likely have large consequences for beliefs, identities, and behavior. Biodiversity impacts are accelerating, and we expect the personal impacts and affective responses to also intensify, which provides emotional processes ripe for study. We recommend researchers identify a specific wildlife or ecosystem interaction, and use this context to determine the appropriate sample and measures.


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ORCID iD

Cameron Brick  <https://orcid.org/0000-0002-7174-8193>

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