Revisiting the promise of conservation psychology

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Article impact statement: Continued development of conservation psychology is essential to addressing the challenges of biodiversity conservation.

Conservation psychology was first described as a field of research nearly 15 years ago (Saunders 2003) and such was the optimism for psychology to impact upon conservation science that, in 2006, Conservation Biology published the Saunders et al. article ‘Using Psychology to Save Biodiversity and Human Well-Being’. Conservation psychology developed as an offshoot from environmental psychology, itself a field that evolved from social psychology in the 1950s. While environmental

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psychology is the study of people and their interactions with their environments, both built and natural, it initially did not concern itself with matters of conservation. As conservation issues gained prominence, research into the psychological dimensions of conservation proliferated and, in 2003, the term ‘conservation psychology’ was adopted to differentiate this field from the earlier ‘environmental psychology’. However, despite differences in scope, environmental psychology and conservation psychology are sometimes used interchangeably (Clayton and Saunders 2012).

Managing human behavior is essential for biodiversity conservation. It is therefore timely to consider the uptake and impact of conservation psychology, by examining how the publishing record in this field has changed over time, and how its content relates to biodiversity. We performed a literature via Web of Science (www.webofknowledge.com) for articles containing ‘conservation psychology’ in keywords, abstracts and titles, identifying 68 articles published in peer-reviewed journals between January 2003 (the year the field was described) and December 2016. Six of those 68 (8.8%) related to energy and water conservation—topics generally considered within the broader field of environmental psychology.

To capture further relevant papers that did not contain the term ‘conservation psychology’, we used the root terms: biodivers* AND (psycholog* OR 'behavi* change'). This returned 155 relevant articles, of which 141 were unique to the additional search. Of the total relevant articles from the two searches \( n = 203 \) (Fig. 1), 18.1% (37) were published in leading conservation journals, Conservation Biology (14), Ecological Economics (8), Biological Conservation (7), Conservation Letters (4) and Society and Natural Resources (4). Over the last 13 years those five journals have published a total of 12,880 articles. Our results suggest that only 0.28% of those are related to psychology. While there are likely additional terms that could be used to explore the conservation psychology literature, our results indicate that despite perceptions of growth in conservation psychology, behavioral research has not yet penetrated mainstream conservation science. Additionally, only five articles in our search came from environmental psychology journals, Environment and Behavior and Journal of Environmental Psychology, which equates to just 0.36% of their output during the same period.
Our results reveal that 1) “conservation psychology” has not become an umbrella term for interdisciplinary research that integrates biodiversity conservation and psychology; 2) while the number of related research articles is increasing, the impact of psychology on conservation science is still relatively small; and 3) biodiversity issues have received limited attention in environmental psychology. As with social sciences generally, structural barriers, such as past and potentially current publishing and funding biases, have hindered the uptake of conservation psychology and use of psychology in conservation science (Bennett et al. 2017). Changes to any science, of course, take time (Kuhn 1962). The rate of uptake of psychology within conservation science might be compared to transformations in economics. Recognition that cognitive and behavioral factors that influence human decision-making were inconsistent with standard economic models emerged in the 1960s but took 40 years to be accepted by the economic community (arguably culminating in the 2002 award of the Nobel Prize in economics to Daniel Kahneman) and integrated into policy and practice (a subsequent Nobel economics prize to Richard Thaler in 2017).

Similarly, despite its highly relevant, practical benefit there remains comparatively little psychology research addressing the conservation of biodiversity. The structural barriers noted above have likely contributed to this. However, we believe there are a number of additional reasons for the lack of attention to biodiversity behaviors, which we detail here, focusing on the differences between biodiversity conservation and water and energy conservation behaviors to highlight our claims.

The challenges of biodiversity behaviors

Biodiversity issues are often context-specific (e.g. overharvesting, human-wildlife interactions) or diffuse (e.g. consumption-related), and identifying threats and individuals or populations whose behavior is driving the threat is difficult but important (Reddy et al. 2016). Typically, the major drivers of threats to biodiversity — biological resource use and agriculture (Maxwell et al. 2016) — are the consequence of multiple behaviors by multiple actors and are generally spatially and temporally diffuse, making the link between behavior and biodiversity impact difficult to examine. While biodiversity loss is a global issue, few individual biodiversity-related problems (or solutions)
are as universal as household water and electricity consumption. Owing to the globalized economy, the world’s population in both developed and developing nations has a limited perception of how their consumptive behaviors will impact biodiversity. As a result, these behaviors are harder to translate compared to behaviors that have direct influences or a higher degree of tangibility.

The majority of the world's population now lives in cities, where disconnection from nature is an increasing phenomenon (Soga et al. 2016): urban residents struggle to link biodiversity conservation issues with actions undertaken at the household level. Feedback mechanisms, in which the user has a direct link between their action and the outcome, are essential for promoting pro-environmental behavior change (Faruqui et al. 2010). Water and electricity meters and bills provide feedback that allows individuals to see the efficacy of their actions. But there are no biodiversity meters or bills, and feedback mechanisms are further complicated by the indirect way in which biodiversity impacts, and is impacted by, people's lives.

Where water and energy conservation generally lead to personal financial efficiencies, biodiversity actions are more likely to have negative financial impact on the user. For example, biodiversity-friendly products are often more expensive, and engaging in private land conservation by placing a permanent conservation contract on farmland may reduce its financial value or incur a significant opportunity cost (Farrier 1995). Furthermore, biodiversity conservation behaviors are not typically easy for an individual to undertake due to societal structures. Information about the actions individuals can take to reduce impacts on biodiversity can be confusing, conflicting and unreliable, leaving it to the individual to invest time and effort to identify impactful pro-biodiversity behaviors and source biodiversity-friendly products.

Impediments to behavior change are likely tied to a number of social-psychological and cognitive factors and biases (Table 1) that potentially have a number of common underlying mechanisms. Behaviors that impact biodiversity derive from complex interactions between values, social and individual norms, attitudes and a number of perceived and real behavioral controls that subvert behavioral intentions. While numerous psychological measures of the relationship between
individuals and nature exist (e.g. new ecological paradigm [Dunlap et al. 2000], environmental concern [Schultz 2001] and connectedness to nature [Mayer & Frantz 2004]), it is not yet clear how and in what circumstances to use existing psychological measures for biodiversity issues, how they relate to biodiversity behavior change, their effectiveness at predicting biodiversity behaviors and when/how to develop novel or case specific measures (St John et al. 2010; Clayton et al. 2016).

**Bringing conservation psychology into the mainstream**

Biodiversity conservation researchers and practitioners are aware of the importance of psychology in solving biodiversity issues, and we acknowledge that there are dedicated psychology and conservation scientists working in this space. Our analysis of the literature shows that these numbers are still low, presenting a number of challenges but also highlighting opportunities. Psychologists may be missing unique research opportunities for understanding human behavior. Conservation psychology is not simply another applied psychology domain; biodiversity issues are multi-layered and generate novel psychological questions and concepts (e.g. biophilia, environmental amnesia, environmental hyperopia). The domain of conservation provides opportunities for psychologists to engage in long-term studies over which to observe significant institutional and cultural shifts.

A deeper integration of psychology into conservation science could capitalise on these opportunities. Some recommendations for integrating conservation and psychology and social sciences already exist (e.g. Schultz 2011; Pearson 2013; Clayton et al. 2016; Stenseke 2016; Bennett et al. 2017). Specific ideas include encouraging conservation scientists and psychologists to attend each other’s conferences, greater inclusion of psychologists in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, a prioritization of behaviors that drive the greatest global biodiversity threats and are most amenable to change, and continued development of conservation psychology courses for students from both disciplines to help produce truly interdisciplinary researchers that understand both fields. Promising approaches also include the Society of Conservation Biology's Conservation Marketing Working Group's advancement of marketing and communication techniques underpinned by theory and impact evaluation (http://conbio.org/groups/working-groups/conservation-marketing-working-group), the Conservation Psychology Institute at Antioch University (https://www.antioch.edu/new-
As our literature search reveals, the term conservation psychology is not widely used in the context of biodiversity conservation, and when associated with issues relating to the conservation of water and energy, may also be conflated with environmental psychology. However, behaviors impacting biodiversity are contextual and complex, and psychological theory or tools developed for other environmental issues may not be applicable. Given the urgent need to bring attention to biodiversity issues, as a starting point we encourage those who apply psychology to conservation research (e.g., conservation messaging, human dimensions of wildlife, conservation marketing, zoo engagement research, applied psychology in all conservation contexts) to use the term ‘conservation psychology’ in key words selection to highlight their work, its breadth, and importance to understanding and impacting biodiversity issues and initiatives. While there is great potential for conservation psychology to help address current and future biodiversity challenges, this must be jointly cultivated by conservationists and psychologists in order to fulfil this promise.

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**Works Cited**


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Table 1. Examples of psychological dimensions of biodiversity conservation drawn from an exploratory search of the literature (a fully referenced version of this table is available in supplementary material)

<table>
<thead>
<tr>
<th>Description and potential impact on biodiversity</th>
</tr>
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<tbody>
<tr>
<td><strong>Environmental amnesia/ Shifting baselines</strong></td>
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<tr>
<td>Ecological changes or disappearance of species can create an environmental amnesia within individuals who forget their past personal experiences of nature, or generations who are unaware of what was lost previous to their understanding of their environment. This influences how people perceive the naturalness of current ecological conditions and may potentially accelerate under climate change.</td>
</tr>
<tr>
<td><strong>Environmental cognitive dissonance</strong></td>
</tr>
<tr>
<td>People seek consistency between their beliefs and actions. When people hold beliefs and behave in a way that does not align with these beliefs, a mental discomfort occurs and potentially leading to an adaptation of the belief or attitude or a rationalization of behavior. Cognitive dissonance may explain the values-action gap that we find in biodiversity behaviors.</td>
</tr>
<tr>
<td><strong>Environmental hyperopia</strong></td>
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<tr>
<td>The perception that environmental issues at further distances (e.g. rainforest loss in remote areas) have greater impacts than local issues and can lead to a sense of hopelessness associated with a lack of self-efficacy in the ability to positively impact biodiversity conservation.</td>
</tr>
<tr>
<td><strong>Extinction of experience</strong></td>
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<tr>
<td>The loss of interaction with nature may correspond with a decrease in proenvironmental attitudes and behaviors in a bi-directional relationship, potentially creating a negative feedback within an individual and amongst a society. It has also been shown that just a few engagements with nature may actually protect against this decline of proenvironmental attitudes.</td>
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<tr>
<td><strong>Governance trap</strong></td>
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<tr>
<td><strong>Moral licensing</strong></td>
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<td><strong>Psychological distance</strong></td>
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<td><strong>Psychic numbing/Collapse of compassion</strong></td>
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<td><strong>Self-efficacy</strong></td>
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<td><strong>Status quo bias</strong></td>
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Figure 1. Key results from literature search: (a) number of publications per year; the number of these articles published in (b) conservation science journals and (c) environmental psychology journals; and the percentage these articles represent out of the total publications between 2003 – 2016 for (d) conservation science journals and (e) environmental psychology journals.
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