



# Introduction: New directions in conservation psychology at a critical time

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An understanding of what people do and why can help conservationists achieve the transformative social and behavioral changes needed to support biodiversity and sustainable livelihoods (e.g., Mascia et al. 2003; Saunders 2003; Díaz et al. 2019). As such, conservation researchers and practitioners have greatly increased the application of social sciences to observe, measure, and explain myriad cognitive, behavioral, social, and cultural phenomena. These efforts have provided new insights into human thought and behavior, yet revealed challenges associated with integrating these sciences into conservation and raised questions as to which disciplines and tools best apply in different contexts (St. John et al. 2014; Bennett et al. 2017; Teel et al. 2018).

In this special section of *Conservation Biology*, the focus is on the application of psychology to conservation practice. Psychology is the scientific study of the human mind and behavior; its origins are in physiology and philosophy (Wundt 1897). Contemporary psychology has numerous branches and subdisciplines that cover an extensive range of academic and applied topics that are studied using a diverse array of quantitative and qualitative methods. For example, social psychology tends to emphasize how human behaviors are shaped externally by others, including through modeling the behaviors of others and the social consequences of behavior (Aronson 1972; Savani et al. 2011; Hurley et al. 2018), whereas cognitive psychology stresses the role of internal drivers, such as memories (e.g., Thomas & Loftus 2002) and perceptions (e.g., Rattan et al. 2018).

We specifically focused the special section on conservation psychology, an applied branch of psychology that informs the science and practice of conserving Earth's biological diversity by improving understanding and promoting healthy and sustainable relationships with nature (Saunders 2003; Clayton & Saunders 2012). Consistent with this definition, 3 pillars regularly influence human behavior: the context in which behavior occurs, what one tends to do (e.g., as demonstrated by habits and behavioral tendencies), and one's aspirational goals regarding who one hopes to be (Clayton & Brook 2005). Thus, to improve the understanding of conservation-relevant human behavior, further inquiry is needed into the social, behavioral, and cognitive components of what and who people surround themselves with, what they do in different contexts, and the ways in which they make sense of and justify their actions.

## Three Pillars of Conservation Psychology

Authors in this special section investigated the first pillar of conservation psychology by identifying how context shapes behavior. These contexts included planners' use of social data in decision making about marine protected areas in the Pacific Northwest of the United States (Biedenweg et al. 2020 [this issue]), people's adaptability to external prompts about nature engagement while visiting nature preserves in Israel (Colléony et al. 2020 [this issue]), homeowners' compliance with techniques

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to reduce trash raiding by American black bears (*Ursus americanus*) in the Rocky Mountains (U.S.A.) (Lischka et al. 2020 [this issue]), and social influences on Tanzanian tradespeople's decisions to hunt wildlife to sell as bushmeat (Nielsen & Jacobsen 2020 [this issue]). Collectively, these authors demonstrate how context influences decision making among experts on the job, individuals at home or away, and community members making business-related transactions. Their results underscore the role of personal, social, and cultural drivers of conservation behavior (Medina et al. 2019) and the need to represent and respect diverse perspectives in conservation processes (Phillips & Loyd 2006).

The second pillar of conservation psychology highlights that humans regularly navigate the world based on heuristics derived from knowledge, established beliefs, or emotional responses that help simplify an overwhelming number of decisions (World Bank 2015). Such simplifications by individuals are typically based on positive or negative outcomes achieved directly through past experiences or as modeled by trusted or similar entities and individuals. Beliefs and thought processes are not observed directly and must, therefore, be derived by asking people about them or assessing and interpreting their responses to stimuli. Researchers most often ask about people's attitudes (Wallen & Landon 2020 [this issue]), which represent positive or negative evaluations of an object, place, person, group of people, or event (Eagly & Chaiken 1993). Responses to stimuli can be conceptualized in other ways as well, including support of or opposition to conservation actions and trust in individuals, organizations, or governing authorities.

Lischka et al. (2020) describe how trust (a positive evaluation) of local wildlife governing authorities and positive beliefs about bears' impact on quality of life led to decreased rates of compliance, whereas knowledge of neighbors' past experiences with trash-rummaging bears increased compliance. These results suggest that positive beliefs in the absence of prior experiences may inhibit the adoption of new conservation behaviors in routine contexts where habits have formed. Colléony et al. (2020) demonstrate that in relatively novel situations where habits are less established, such as visiting a nature preserve, proconservation behaviors and positive emotions can be prompted with specific messaging. Further research would need to determine the durability and generalizability of this type of behavior change. Finally, Nielsen and Jacobsen (2020) discovered that a desire to avoid negative feelings (in this case regret) dissuaded more people from hunting bushmeat than did an offer of increased salary, yet their results overall suggest different strategies worked for different people. Holistically, these results underscore a need to understand how both social context and individual beliefs operate together on conservation decision making and behavior.

The third pillar of conservation psychology recognizes that human behaviors are also shaped by people's fundamental life goals and aspirations. Theories conceptualize these goals as values (Rokeach 1973; Schwartz 2006) and moral foundations (Haidt 2012) that are, in part, a reflection of culture. Values, moral foundations, and other guiding principles of life help organize and give meaning to behaviors, which can also prompt identity-based conflicts (Hurst et al. 2020). Just how central values are to understanding human behavior in conservation contexts is highlighted by Wallen and Landon's (2020) systematic map of conservation psychology, which shows values are the second-most studied concept. Winkler-Schor et al. (2020 [this issue]) investigated relationships between a typology of values and self-reported conservation behaviors, finding that altruistic (i.e., concern for others' welfare), biospheric (i.e., concern about costs and benefits to ecosystems), and eudaimonic (i.e., concern about pursuit of meaning and self-realization) values are closely associated with private-sphere conservation behaviors that are more often reported than public-sphere behaviors. Values represent patterns of beliefs and behaviors typically associated with groups of people and are, therefore, not expected to predict every single behavior over an individual's lifetime. To illustrate, conservationists overwhelmingly embrace values that prioritize the needs of others, including wildlife (Bruskotter et al. 2019), yet also engage in environmentally harmful behaviors, such as owning more pets and traveling to work via gas-guzzling vehicles (Balmford et al. 2017). When narrowly focused on a single behavior or intention, or a single point in time, this discrepancy appears as a values-action gap (Blake 1999). Thus, we underscore the need to investigate when and how our aspirational goals shape conservation-relevant behaviors as part of a multipillar approach.

## Methods of Conservation Psychology

Ideally, conservation psychology research that builds from the 3-pillar approach would use methods—both in research design and analytical approaches (Kaplan 1964)—that address the human system of context, behavioral tendencies, and aspirational goals, such as values. Such approaches may require mixed, structural, or hierarchical statistical models to account for multilevel processes that assess the role of latent variables not directly observable (Kyle et al. 2020 [this issue]). The complexity of latent cognitive variables increases as cultural and temporal considerations increase, as demonstrated by Biedenweg et al. (2020), who describe how such complexity can be captured in a participatory cognitive mapping technique that enable comparison of the content and structure of participants' perceptions across

time and culture to improve marine conservation planning, evaluation, and collaboration.

Conservation social science researchers must carefully consider research design and analytical approaches (Newing 2011), which can affect the translation of research outcomes to conservation action and practice (Toomey et al. 2017). Kyle et al. (2020) highlight the researcher's responsibility to ensure reliable and valid inferences from statistical models, particularly those built on measures of latent constructs commonly employed in quantitative psychology. That responsibility includes transparency, because analyses should balance considerations of theory, observation, and previous evidence, and may require adjustments to modeling procedures for findings to be relevant (Whitehouse-Tedd et al. 2020). Wallen and Landon (2020) found a majority (58%) of conservation social science studies have been descriptive and a rare few (2%) have been experimental. Descriptive studies typically lack causal inference, which can limit the robustness of conclusions. Causal inference is an integral part of psychology's epistemological approach (usually by means of experimental control and systematic manipulation) to understanding human thought and behavior and could, therefore, play a central role in conservation psychology as well. Colléony et al. (2020) and Lishcka et al. (2020) effectively demonstrate that experiments and quasi experiments can be employed within cross-sectional (one time) and longitudinal (follow-up or repeated-exposure) designs when such designs have treatments and control groups, random assignment into groups, and treatments that are ethical in the conservation context (Newing 2011).

As conservationists seek to improve and sustain positive biodiversity and livelihood outcomes, it is worth critically assessing the rigor and efficacy of methods used (St. John et al. 2014). Cross-sectional quantitative and qualitative survey methods are commonly employed and seemingly most feasible due to time, logistical, and financial constraints, yet are not the only useful methods. Additionally, current training practices tend to support and promote these approaches, which may limit understanding of the role other methods can play in increasing understanding of psychological processes. Given policy and decision makers' biases about what constitutes reliable science and the complexity of research questions often needing to be addressed in conservation contexts, it is likely that experimental and longitudinal designs can help isolate causes and effects on choices and behaviors affecting biodiversity or the implementation of conservation programs.

## Next Steps for Conservation Psychology

The papers in this special section demonstrate the potential of conservation psychology to enhance conser-

vation theory and practice. Psychology can help identify the contextual, individual, and cultural factors that have a powerful influence on human behavior and outline strategies that support behavior change. However, traditional psychological research often focuses on simplified behaviors in a laboratory setting rather than complex behaviors occurring in real-world contexts, and on short time frames rather than lasting impacts. As is the case in its parent discipline, conservation psychology research is also disproportionately focused on Western and developed countries and conducted by Westerners (Henrich et al. 2010). Psychological research that can forge multidisciplinary and cross-cultural collaborations can help develop and test theories and interventions through a range of investigative methods to create more effective and lasting behavior changes across time and space (Nielsen et al. 2020).

With this special section, we, the guest editors, sought to demonstrate the theoretical, methodological, and practical aspects of conservation psychology. Initially, we received 84 submissions and ultimately selected and edited the final submissions in this section with assistance from external reviewers. We believe the high number of submissions underscores the significant interest in conservation psychology, despite past publication rates being low (Selinske et al. 2018). Our efforts are not an all-inclusive demonstration of the breadth and depth of conservation psychology. For example, the review process resulted in quantitative studies, primarily surveys, being overrepresented when qualitative, mixed-methods, replication, and meta-analysis studies are equally important. Likewise, contributed papers represent research conducted on 3 continents, yet greater representation of the Global South is needed (Wallen & Landon 2020).

Our prioritization of diverse psychological aspects across manuscripts did not result in directly uplifting the work of diverse authors. As such, we sought to cite diverse scholars in this introductory essay and further encourage others to support and feature the work of scholars from underrepresented groups (Puritty et al. 2017; Miriti et al. 2020). For conservation psychology to improve—in terms of theory, methods, practitioners, application, and embracing of diversity—we believe it should be recognized as a hub science (Boyack et al. 2005) that serves conservation with and for all. Conservation psychology can ultimately permeate and inform diverse approaches to collaboration, planning, analyses, policy, and problem solving for improved outcomes.

## Literature Cited

- Aronson E. 1972. *The social animal*. W.H. Freeman, New York. [https://en.wikipedia.org/wiki/The\\_Social\\_Animal\\_%28Aronson\\_book%29](https://en.wikipedia.org/wiki/The_Social_Animal_%28Aronson_book%29).
- Balmford A, Cole L, Sandbrook C, Fisher B. 2017. The environmental footprints of conservationists, economists and medics compared. *Biological Conservation* 214:260–269.

- Bennett N, et al. 2017. Conservation social sciences: understanding and integrating human dimensions to improve conservation. *Biological Conservation* **205**:93–108.
- Biedenweg K, Trimbach D, Delie J, Schwarz B. 2020. Using cognitive mapping to understand conservation planning. *Conservation Biology* **34**:1364–1372.
- Blake J. 1999. Overcoming the ‘value-action gap’ in environmental policy: tensions between national policy and local experience. *Local Environment* **4**:257–278.
- Boyack KW, Klavans R, Börner K. 2005. Mapping the backbone of science. *Scientometrics* **64**:351–374.
- Bruskotter JT, Vucetich JA, Dietsch AM, Slagle KM, Brooks JS, Nelson MP. 2019. Conservationists’ moral obligations toward wildlife: values and identity promote conservation conflict. *Biological Conservation* **240**:108296.
- Clayton S, Brooks A. 2005. Can psychology help save the world? A model for conservation psychology. *Analyses of Social Issues and Public Policy* **5**:87–102.
- Clayton S, Saunders CD. 2012. Introduction: environmental and conservation psychology. Pages 1–10 in Clayton S, editor. *The Oxford handbook of environmental and conservation psychology*. Oxford University Press, New York.
- Colléony A, Levontin L, Shwartz A. 2020. Promoting meaningful and positive nature interactions for visitors to green spaces. *Conservation Biology* **34**:1373–1382.
- Díaz S, et al. 2019. Pervasive human-driven decline of life on Earth points to the need for transformative change. *Science* **366**:6471.
- Eagly AH, Chaiken S. 1993. *The psychology of attitudes*. Harcourt, Brace, & Jovanovich, Fort Worth, Texas. <https://psycnet.apa.org/record/1992-98849-000>.
- Haidt J. 2012. *The righteous mind: why good people are divided by politics and religion*. Vintage, New York. [https://en.wikipedia.org/wiki/The\\_Righteous\\_Mind](https://en.wikipedia.org/wiki/The_Righteous_Mind).
- Henrich J, Heine SJ, Norenzayan A. 2010. Most people are not WEIRD. *Nature* **466**:29.
- Hurley EA, Salvador CE, English KA. 2018. Self-construal and communalism in Costa Rica: subjective attitudes vs. implicit behavioral tendencies. *Current Psychology* **65**:1–9.
- Hurst K, Stern MJ, Hull RB, Axsom D. 2020. Addressing identity-related barriers to collaboration for conservation through self-affirmation theory and moral foundations theory. *Conservation Biology* **34**:572–580.
- Kaplan A. 1964. *The conduct of inquiry: methodology for behavioral science*. Chandler Publishing Company, San Francisco. <https://academic.oup.com/sf/article-abstract/44/1/126/2227875?redirectedFrom=fulltext>.
- Kyle G, Landon A, Vaske J, Wallen K. 2020. Tools for assessing the psychometric adequacy of latent variables in conservation research. *Conservation Biology* **34**:1353–1363.
- Lischka SA, Teel TL, Johnson HE, Larson C, Breck S, Crooks K. 2020. Psychological drivers of risk-reducing behaviors to limit human-wildlife conflict. *Conservation Biology* **34**:1383–1392.
- Mascia M, Brosius JP, Dobson TA, Forbes B, Horowitz L, McKean M, Turner N. 2003. Conservation and the social sciences. *Conservation Biology* **17**:649–650.
- Medina V, DeRonda A, Ross N, Curtin D, Jia F. 2019. Revising environmental belief and behavior among ethnic groups in the U.S. *Frontiers in Psychology* **10**:629.
- Miriri MN, Bailey K, Halsey SJ, Harris NC. 2020. Hidden figures in ecology and evolution. *Nature Ecology and Evolution*. <https://doi.org/10.1038/s41559-020-1270-y>.
- Newing H. 2011. *Conducting research in conservation: a social science perspective*. Routledge, Abingdon, Oxfordshire. 376 pages. ISBN 978-0-415-45792-7.
- Nielsen MR, Jacobsen JB. 2020. Effect of decision rules in choice experiments on hunting and bushmeat trade. *Conservation Biology* **34**:1393–1403.
- Nielson K, Clayton S, Stern P, Dietz T, Capstick S, Whitmarsh L. 2020. How psychology can help limit climate change. *American Psychologist*. <https://doi.org/10.1037/amp0000624>.
- Phillips KW, Loyd DL. 2006. When surface and deep-level diversity collide: the effects on dissenting group members. *Organizational Behavior and Human Decision Processes* **99**:143–160.
- Puritty C, et al. 2017. Without inclusion, diversity initiatives may not be enough. *Science* **357**:1101–1102.
- Rattan A, Savani K, Kommaraju M, Morrison M, Boggs C, Ambady N. 2018. Meta-lay theories of scientific potential drive women and minorities’ sense of belonging in science. *Journal of Personality and Social Psychology* **115**:54–75.
- Rokeach M. 1973. *The nature of human values*. Free Press, New York. <https://archive.org/details/natureofhumanval00roke>.
- Saunders C. 2003. The emerging field of conservation psychology. *Human Ecology Review* **10**:137–149.
- Savani K, Kumar S, Naidu NVR, Dweck CS. 2011. Beliefs about emotional residue: the idea that emotions leave a trace in the physical environment. *Journal of Personality and Social Psychology* **101**:684–701.
- Schwartz S. 2006. A theory of cultural value orientations: explications and applications. *Comparative Sociology* **5**:137–182.
- Selinske MJ, Garrard GE, Bekessy SA, Gordon A, Kusmanoff AM, Fidler F. 2018. Revisiting the promise of conservation psychology. *Conservation Biology* **32**:1464–1468.
- St. John FAV, Keane A, Jones J, Milner-Gulland E. 2014. Robust study design is as important on the social as it is on the ecological side of applied ecological research. *Journal of Applied Ecology* **51**:1479–1485.
- Teel TL, et al. 2018. Publishing social science research in conservation biology to move beyond biology. *Conservation Biology* **32**:6–8.
- Thomas A, Loftus EF. 2002. Creating bizarre false memories through imagination. *Memory & Cognition* **30**:423–431.
- Toomey AH, Knight AT, Barlow J. 2017. Navigating the space between research and implementation in conservation. *Conservation Letters* **10**:69–625.
- Wallen KE, Landon AC. 2020. Systematic map of conservation psychology. *Conservation Biology* **34**:1339–1352.
- Whitehouse-Tedd K, Abell J, Dunn A. 2020. Evaluation of the use of psychometric scales in human-wildlife interaction research to determine attitudes and tolerance toward wildlife. *Conservation Biology*. <https://doi.org/10.1111/cobi.13599>.
- Winkler-Schor S, van Riper CJ, Landon AC, Keller R. 2020. Determining the role of eudaimonic values in conservation behavior. *Conservation Biology* **34**:1404–1415.
- World Bank. 2015. *World development report 2015: mind, society, and behavior*. World Bank, Washington, D.C.
- Wundt W. 1897. *Outlines of psychology*. G.E. Stechert, New York. <https://archive.org/details/cu31924014474534>.