



REVIEW

Beyond the roots of human inaction: Fostering collective effort toward ecosystem conservation

Elise Amel,^{1*} Christie Manning,² Britain Scott,¹ Susan Koger³

The term “environmental problem” exposes a fundamental misconception: Disruptions of Earth’s ecosystems are at their root a human behavior problem. Psychology is a potent tool for understanding the external and internal drivers of human behavior that lead to unsustainable living. Psychologists already contribute to individual-level behavior-change campaigns in the service of sustainability, but attention is turning toward understanding and facilitating the role of individuals in collective and collaborative actions that will modify the environmentally damaging systems in which humans are embedded. Especially crucial in moving toward long-term human and environmental well-being are transformational individuals who step outside of the norm, embrace ecological principles, and inspire collective action. Particularly in developed countries, fostering legions of sustainability leaders rests upon a fundamental renewal of humans’ connection to the natural world.

The ecological systems upon which humans rely for life support are in crisis, and human behavior is the root cause. These problems are thus not environmental, but rather related to how humans meet their needs and wants in ecologically disruptive ways. Manipulating, exploiting, and destroying nonhuman nature are not new activities for our species, but today

these occur at an unprecedented scale and escalating rate.

As the decades since the 1970s have revealed, merely educating people about what actions they can take does not dramatically shift behavior; nor does inspiring fear or guilt. Despite widespread awareness and concern, many people continue to engage in behaviors that further environmental destruction, both mindlessly and consciously. For example, nearly half of Americans are “concerned” or “alarmed” about global warming (1), yet those who can afford it routinely fly to vacation destinations, drive solo, and keep their homes at a constant 72°F (22°C). Further, messages about predicted environmental catastrophes may actually increase anti-environmental behavior as

individuals attempt to soothe their anxiety through materialistic pursuits (2). Psychological science can shed light on many such counterintuitive and counterproductive responses to our ecological predicament.

Human behavior is determined by forces both inside and outside of the individual. Internal factors such as emotions, beliefs, attitudes, and values influence behavior to some extent (3–5), but behavior occurs within a powerful context comprising cultural worldviews, social networks, status inequalities, policies, scripts, roles, and rules. Situations are such potent determinants of behavior that behavior-change campaigns focused solely on values, emotions, or knowledge are destined to fail if such change is not facilitated by an individual’s social milieu as well as the surrounding infrastructure.

Humans are driven by external circumstances, and yet all individuals have a hand in perpetuating or redirecting situational forces. The current ecologically destructive trajectory cannot be reversed without human action to radically transform the anthropogenic and anthropocentric systems that encourage, support, and reinforce overly consumptive, wasteful, and polluting lifestyles, particularly in the industrialized world. At present, these systems make truly sustainable living unappealing and impractical, if not impossible, for most individuals living in them. Thus, despite widespread recognition of the dangerous course that we are on as a species, humanity has not yet begun the radical transformations that are clearly needed.

Change is hard. Human beings are reticent to change their behavior even under the most compelling of circumstances, and environmental dangers do not tend to arouse the kind of urgency that motivates individuals to act. Mass transformation of unsustainable systems will be even more difficult than shifting individual behaviors, for unlike ants and bees, humans are not well equipped to coordinate behavior for common benefit. Armed with psychological self-awareness, however, people can address barriers to change. We summarize some of these barriers below, followed by discussions of the critical need for collective and organizational action, the role of individuals in creating large-scale change, and reconnection with nature as the foundation of true sustainability.

Why changing individual behavior is hard

To understand the roots of today’s environmental crises, one must first look to the evolutionary origins of human behavior. Urbanization, industrialization, and technological innovation have transformed the very foundations of human existence, creating a vastly different landscape and lifestyle from those in which the human species evolved, and to which our brains and bodies are adapted. Some psychologists argue that urban industrialized living compromises an individual’s sense of kinship with nonhuman nature (6, 7), thereby opening the door to environmentally destructive behavior. Simply put, humans don’t protect

¹Department of Psychology, University of St. Thomas, 2115 Summit Avenue, St. Paul, MN 55105, USA. ²Department of Environmental Studies, Macalester College, 1600 Grand Avenue, St. Paul, MN 55105-1899, USA. ³Department of Psychology, Willamette University, 900 State Street, Salem, OR 97301, USA.

*Corresponding author. Email: elamel@stthomas.edu

what they don't know and value. Indeed, numerous studies have found a significant positive correlation between feeling connected to nature and ecologically responsible behavior (4) and between "significant life experiences" in nature during childhood and later environmental advocacy (8). Experiencing the self as separate from nature is the foundation of humanity's damaged relationship to planetary resources.

The mismatch between humans' ancient origins and today's industrialized world leads to an array of other difficulties in recognizing and responding to environmental degradation. Humans evolved in a world where dangers were sudden and obvious, and thus our senses are ill equipped to detect largely invisible and gradually worsening ecological problems such as climate change or species extinction. Without a tangible sensory signal and attendant emotional jolt, these problems feel psychologically distant and do little to move us to action (9).

Also, because systemic problems like these do not represent an immediate threat to the individual, their associated long-term consequences are less motivating than consequences in the here and now (10). Many of today's environmentally damaging behaviors present just such a contingency trap, where personal benefits (or costs) are much more compelling than far-off and hard-to-detect ecological costs (or benefits). The salience of short-term consequences explains why individuals are unwilling to surrender the convenience of a personal car or to spend money on energy efficiency measures that not only save money in the long run but also help curb greenhouse gas emissions.

A similar dilemma arises when individuals are faced with a contradiction between self-interested behavior and what is ultimately best for the larger group (11, 12). The features that normally curtail selfishness and encourage cooperation are effectively missing in large-scale environmental commons dilemmas such as global climate change. Working together to conserve a common-pool resource is difficult in the absence of enforceable limits on who can access the resource, strong social connections among community members, and opportunities for face-to-face communication (13).

Even when individuals are willing to forgo immediate personal benefits in favor of the long-term greater good, efforts to change are stymied if a new behavior threatens psychological needs. Beyond basic physical requirements, human well-being depends on feeling competent, socially connected, and free to make choices (14, 15). Many behaviors are motivated by a desire to fulfill these needs, and humans tend to avoid activities and situations that compromise them. Adopting sustainable behavior that involves learning new actions (such as composting or a different method for commuting) can at first be intimidating, making individuals feel uncertain, incompetent, or fearful of others' disapproval or rejection.

Humans have a range of other psychological needs as well, such as a need for safety and security, and a desire to see the world as a stable and just place. Dire environmental news creates

a conflict with these deep-seated needs, as it implies that all is not well with the status quo (16) and, in the extreme case, may prompt unconscious and deeply uncomfortable fears of death (2). In response to these existential threats, people may turn to coping defenses such as denial or distraction (2), especially if they have little hope that action will make a difference (17).

The need for social connection is perhaps the most influential of all, yet individuals greatly underestimate the extent to which their behavior is subject to social influence (18). Concerns about social inclusion are undoubtedly rooted in the evolutionary past. For ancestral humans, acceptance by the group meant access to shared resources and protection. Modern humans retain a keen sensitivity to social dynamics; this manifests as strong emotional reactions to threats of rejection. Social norms, therefore, constrain human behavior; as the mere thought of doing something drastically different from what others are doing (descriptive norms), or what others appear to approve of (injunctive norms), can lead to intense feelings of discomfort, embarrassment, or shame. For environmentally relevant behaviors, these two types of norms are often at odds: Most people approve of sustainable behaviors but behave in unsustainable ways. Which norm exerts greater influ-

"Psychological research suggests that humans can move toward a sustainable society by creating conditions that motivate environmentally responsible collective action..."

ence depends on their relative salience in a given situation (19, 20).

Whether particular social norms are relevant to an individual depends on that person's group affiliations. Individuals identify with ingroups based on factors including demographic characteristics (e.g., race, gender); social circumstances (e.g., economic status, geography); and beliefs or values (e.g., politics, religion). Humans behave according to the norms of their affinity groups so as to fit in, and also to display this social identity to the world. Conforming to norms promoting sustainable behavior may actually feel threatening to individuals whose identity is perceived to be at odds with being "green."

Strong identity affiliations can also erupt into intergroup conflict, evident in the anger and antipathy between those who embrace the scientific consensus on climate change and its skeptics (21). This divide, found in several Western countries, falls largely along ideological lines, with followers of conservative parties showing far less concern

for the issue than supporters of liberal parties (22). Even as climate science data have accumulated and consensus of grave risk has grown in the scientific community, concern about climate change has decreased among those with a conservative worldview (23).

The striking difference in response to climate change stems in part from motivated cognition. Rather than neutrally receiving information, human brains privilege that which supports their preexisting worldview. Given limited mental resources for processing the boundless information available in the world, evolution favored cognitive efficiency. New information is processed through the filters of personal beliefs, first-hand experiences, and social identities. Ideas are dismissed or assimilated on the basis of a quick but biased heuristic of whether they line up with what is already perceived to be true. It is difficult to escape bias, even when exerting conscious mental effort. Ironically, it appears that those with the highest science literacy may exhibit more ideology-based bias than others, because their familiarity with science makes them better equipped to find supporting evidence for their preconceived view (24).

Psychological tools for individual change

These and other psychological "dragons of inaction" (25) explain why humans are failing to take sufficient action to address environmental degradation. Social scientists are developing psychologically informed strategies to overcome barriers and encourage pro-environmental behavior (10, 26). Specific tools include framing information about an issue such as climate change to emphasize current and local impacts (27), creating incentives that increase the short-term rewards of a sustainable action (28), and encouraging social modeling to reset the perceived social norm around a pro-environmental behavior.

Devising behavior-change interventions is complex and time-consuming because the effectiveness of a particular tool varies widely depending on what, and whose, behavior is at stake (29). Each individual behavior comes with a unique set of barriers and benefits, and each person approaches these with varying levels of motivation. Despite increased attention from behavioral scientists, few resources exist to guide practitioners about when and how to apply specific psychological tools (28, 29). One exception is community-based social marketing (CBSM) (30), a five-step community-level approach that matches appropriate tools of change to the exact barriers, both physical and psychological, that inhibit a specific sustainable action (28).

CBSM has been used to address sustainable behavior in communities around the world and remains a promising strategy for individual change. Yet, given the scale and pace of continued environmental destruction, psychologists need to move beyond targeting individuals' private-sphere choices and focus on how to foster collective action (Fig. 1).

Individuals and collective action

The power of the individual to mitigate environmental harm is severely constrained by physical and social contexts, such as the industrial infrastructure for growing and transporting food, generating energy, and producing goods; the urban structures built for living, working, and playing; and the rules and policies of the many groups and organizations to which people belong. Above and beyond the ecological damage inflicted by individuals' personal behaviors is the damage from the inefficient and wasteful industrial systems and processes through which individuals meet their daily needs.

For example, one study estimated that just 90 businesses have generated 63% of the cumulative, global greenhouse gas emissions (31). Even incremental improvements in systemic processes and infrastructure will have much broader impacts than will individual efforts (32, 33). Thus, it is critical that efforts to overcome individuals' barriers to change focus not only on motivating them to behave sustainably in their personal sphere, but also on inspiring them to participate in collective efforts to change the larger systems and infrastructure (34). Recent research in political psychology has begun to provide important insights for facilitating involvement in such systems-level change (35).

Unlike changing personal behaviors, transforming systems requires individuals to participate in public dialogue and activism in both informal and formal social collectives. If they embrace change at all, most people gravitate toward private, individual behavior and avoid potentially uncomfortable public advocacy and action (36). Individual change is already challenging. It takes even greater courage and perseverance to openly question the dominant worldview that forms the bedrock of cultural norms (Fig. 2).

Perceived social risks, such as fear of appearing biased or incompetent, fear of rejection, or the belief that others disagree about the issue, inhibit many from speaking out about critical issues. People tend to underestimate how many others share their opinion, which hampers willingness to be vocal (37). Emerging evidence suggests, however, that when individuals realize they are not alone in their beliefs about a contentious issue, they become willing to speak out. Specifically, self-censorship about anthropogenic climate change decreases when people understand just how many others acknowledge its reality and are concerned about it (38).

Individual behaviors such as voting, contacting elected representatives, and supporting issue-focused organizations are essential to functional democracies. These acts ultimately affect local, national, and even international policy. Evidence suggests that political activism about conservation, like many behaviors, requires the belief that political action is necessary, influences others, and can actually change environmental outcomes (36).

Emerging evidence points to several key ingredients that must be in place before individuals enter into more public collective efforts on behalf of the environment. Alignment with social iden-

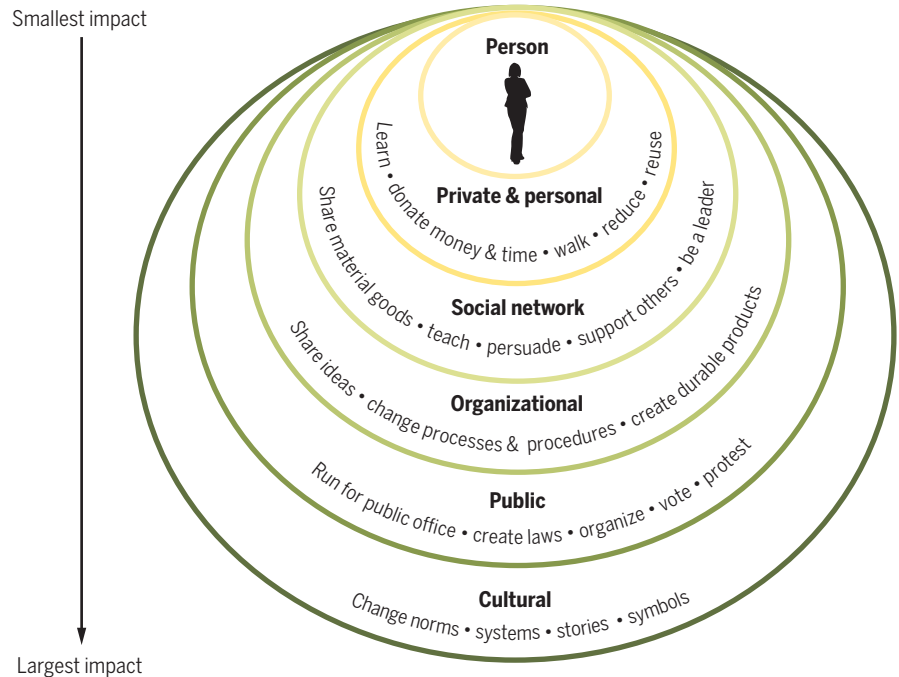


Fig. 1. An individual's spheres of influence. Individual actions have the greatest effect when they influence broader systems.

tity is critical, and the deeper the identification, the greater the individual's commitment to the success of the group. In addition, people only join efforts if they believe that their individual contributions can make a difference (39). Similarly, in the case of climate change activism, individuals need not only a sense of urgency about the issue, but also confidence that solutions are possible (36).

In addition to grassroots initiatives, efforts within preexisting social groups can also drive change. For example, faith communities, hobby groups, and neighborhoods bring people together through shared values, rituals, or connection to place, and can energize larger-scale conservation actions through these common connections. Place-based collectives, such as neighborhood associations, can shift attention away from ideological differences to focus on tangible community-level action, such as creating a shared wind farm (40). Efforts within faith-based communities likely motivate through alignment with spiritual values, and can have wide reach through the larger networks of interfaith organizations.

Although psychological research has examined what motivates people to volunteer and cooperate for social causes, or mobilize around political campaigns, the results have yet to be applied to collective efforts for conservation.

Leveraging formal organizations to influence individuals

Formal organizations can serve as vehicles to quickly mobilize collective action toward sustainability. Governmental units, educational in-

stitutions, and businesses large and small are designed to guide the actions of many toward a coherent purpose. Organizational culture, by way of norms, values, policy, and leadership, powerfully influences individual members (41). Additionally, organizations determine the "choice architecture," or the situational contexts that guide actions and decisions (33). A "green" organizational culture effectively relieves individuals from the effortful thinking required to recognize and respond in sustainable ways. For instance, purchasing policies can prioritize vendors that meet sustainability criteria, and technology policies can set machine defaults to efficiency modes. Individuals no longer have to have background knowledge, do research, and evaluate myriad choices for every behavior relevant to sustainability.

The problem is, as with individuals, the fundamental assumptions that drive organizations reflect the worldview of the broader culture. In today's world, businesses tend to assume a growth economy based on a take-make-waste model, many religions elevate the value of humans over other beings, and schools often fail to prepare graduates to understand ecology. Thus, the goals, operations, and resulting organizational behavior run contrary to ecological realities.

Although organizations are currently major contributors to worldwide environmental degradation, they in fact have the capacity to move in new, ecologically sound directions. They can empower their members to innovate, take risks, and take the long-term view together (42). First, however, a catalyst must influence organizational

Modern-industrial worldview vs. Ecologically grounded worldview

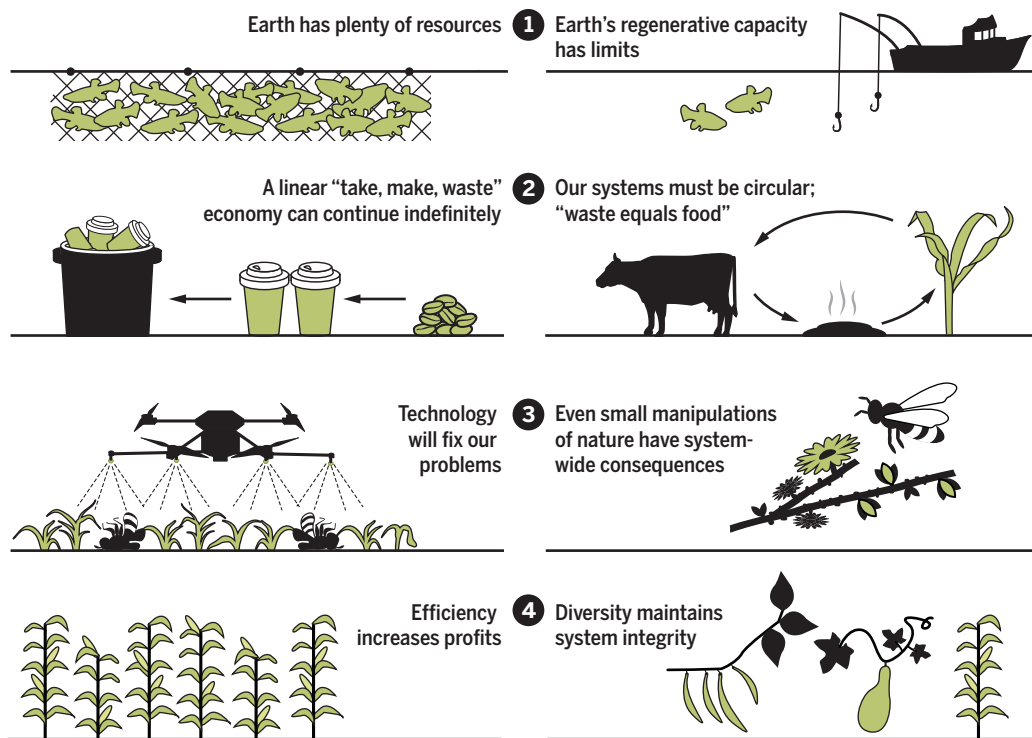


Fig. 2. Some of the contrasting assumptions of modern-industrial and ecologically grounded worldviews depicted in the context of food systems. Similar assumptions underlie transportation, energy generation, water use, and material consumption. [Adapted from (57)]

direction. In any group or organization, the entity itself is not the actor. Individuals—informal and formal leaders, decision-makers, workers, volunteers, and members—are the underlying force. So, the onus is on individuals to initiate and implement change in these collectives. This is easier said than done.

"Individual change is already challenging. It takes even greater courage and perseverance to openly question the dominant worldview that forms the bedrock of cultural norms."

Psychologists do not yet know why some are willing or able to take a bold stand for change in the same situations that drive others to support the status quo or to simply withdraw (43). What they do know is that resisting the pressure to conform, especially in the context of formal organizations, requires nothing short of heroic effort (43).

Yet, it is possible to empower ordinary people to successfully face such challenges. Recogniz-

ing this, a group of influential psychologists has founded an initiative to educate the public about negative social influence and provide individuals with the psychological tools to act with moral courage (44).

Although change can begin anywhere in an organization, people in leadership roles are arguably best positioned to activate a major shift toward sustainability (45). Unfortunately, though well-intentioned, leaders who possess the prevailing modern-industrial worldview may only make their processes or products "less bad" (46). To radically change a group's trajectory, leaders must think differently; they must internalize an ecologically grounded worldview and integrate it into the vision they set for others (47).

Certainly, some leaders have experienced epiphanies, recognizing the inconsistency between the dominant industrial worldview and ecological systems. The late carpet magnate Ray Anderson often spoke of the "spear in the heart" moment when he realized his business was endangering future generations (48). Humanity cannot, however, depend on spontaneous individual insight to propel institutions forward; more methodical approaches are in order. Through mentorship (49) and applied, inquiry-based educational programs (50), youth and adults alike can learn to understand the ecological underpinnings of society. Science-based programs such as The Natural Step (51) have been designed to support ecolog-

ically consistent organizational learning. Additional research is needed to understand how to enhance the pace and depth of worldview change.

Building ecological understanding through connection with nature

The tenacity of the dominant worldview in the developed world belies a more fundamental problem: Human beings in industrialized nations are so disconnected from the natural systems they depend on that they do not know what they do not know.

Human behavior can be responsive to local environmental conditions, as demonstrated by the use of traditional ecological knowledge (TEK) by indigenous cultures around the world (49). TEK, however, relies heavily on experiential information (49). This suggests that developing an ecologically consistent worldview may benefit from reconnecting with nature so that humans actually experience and develop a dynamic understanding of the world's systems and human-environment interdependence.

Although worldwide trends toward accelerating urbanization have generally meant fewer opportunities to encounter and build

a connection to nature, urban dwellers need access to nature in order to rediscover their interdependence with it and deepen their sense of place. This, in turn, fosters understanding of the natural environment (50) and inspires efforts to protect and preserve landscapes and their inhabitants (4).

Valuable nature experiences do not require trips to "wild" nature such as old-growth forests, but can be found in urban areas as well (52). Fortunately, new trends in urban design may help heal the human-nature divide. Recognizing both conservation and public health benefits, urban planners and architects are increasingly incorporating green features such as community gardens, walking and biking paths, and green roofs (53) and integrating "biophilic" designs, which echo natural forms and patterns (i.e., nonhuman animal and plant), in built environments (54).

Expanded access to urban green space not only enhances human understanding of natural systems, it provides critical contact with environments to which we are best adapted and in which we can thrive both physically and psychologically. Research affirms that engaging with nature improves both mental and physical well-being (55) and promotes healthy child development (53, 56).

Conclusions

Environmental degradation ultimately stems from human behavior. Fundamental behavioral

changes are thus needed to stop damaging the natural world and adapt to a permanently altered environment.

Psychological research suggests that humans can move toward a sustainable society by creating conditions that motivate environmentally responsible collective action—conditions that help people surmount cognitive limits, create new situational drivers, foster need fulfillment, and support communities of social change.

Individuals whose actions are informed by a deeper understanding of how the planet really works can galvanize collectives to change the larger systems that drive so much of human behavior. To radically alter the way humans think and live; educate the next generation; and design physical, governmental, and cultural systems, humans must experience and better understand their profound interdependence with the planet.

Further psychological research needs to elucidate how to accelerate the adoption of ecologically grounded worldviews and how to activate ecologically compatible engagement, especially leadership, for the collective work needed to become more sustainable. The future of humanity—and indeed, all life on Earth—depends on it.

REFERENCES

- C. Roser-Renouf, E. Maibach, A. Leiserowitz, S. Rosenthal, "Global Warming's Six Americas and the Election, 2016" (Yale Program on Climate Change Communication, New Haven, CT, 2016); <http://climatecommunication.yale.edu/publications/six-americas-2016-election/>.
- J. L. Dickinson, *Ecol. Soc.* **14**, 34–50 (2009).
- S. Bamberg, G. Möser, *J. Environ. Psychol.* **27**, 14–25 (2007).
- R. Gifford, A. Nilsson, *Int. J. Psychol.* **49**, 141–157 (2014).
- L. Steg, J. I. M. De Groot, in *The Oxford Handbook of Environmental and Conservation Psychology*, S. D. Clayton, Ed. (Oxford Univ. Press, 2012), chap. 5, pp. 81–92.
- P. H. Kahn Jr., P. H. Hasbach, Eds., *Ecopsychology: Science, Totems, and the Technological Species* (MIT Press, 2012).
- P. H. Kahn Jr., P. H. Hasbach, Eds., *The Rediscovery of the Wild* (MIT Press, 2013).
- L. Chawla, V. Derr, in *The Oxford Handbook of Environmental and Conservation Psychology*, S. D. Clayton, Ed. (Oxford Univ. Press, 2012), chap. 28, pp. 527–555.
- E. U. Weber, *Wiley Interdiscip. Rev. Clim. Change* **7**, 125–134 (2016).
- M. van Vugt, V. Griskevicius, P. W. Schultz, *Soc. Issues Policy Rev.* **8**, 1–32 (2014).
- G. Hardin, *Science* **162**, 1243–1248 (1968).
- R. Osbaldiston, K. M. Sheldon, in *Psychology of Sustainable Development*, P. Schmuck, P. W. Schultz, Eds. (Springer, 2002), pp. 37–57.
- T. Dietz, E. Ostrom, P. C. Stern, *Science* **302**, 1907–1912 (2003).
- L. Tay, E. Diener, *J. Pers. Soc. Psychol.* **101**, 354–365 (2011).
- R. M. Ryan, E. L. Deci, *Am. Psychol.* **55**, 68–78 (2000).
- I. Feygina, J. T. Jost, R. E. Goldsmith, *Pers. Soc. Psychol. Bull.* **36**, 326–338 (2010).
- S. S. Li, *J. Environ. Educ.* **45**, 243–257 (2014).
- R. B. Cialdini, *Psychol. Inq.* **16**, 158–161 (2005).
- R. B. Cialdini, *Influence: The Psychology of Persuasion* (Harper Business, revised ed., 2006).
- N. J. Goldstein, R. B. Cialdini, V. Griskevicius, *J. Consum. Res.* **35**, 472–482 (2008).
- A. M. Bliuc et al., *Nat. Clim. Chang.* **5**, 226–229 (2015).
- Pew Research Center, "Global concern about climate change, broad support for limiting emissions" (Pew Research Center, 2015); www.pewglobal.org/files/2015/11/Pew-Research-Center-Climate-Change-Report-FINAL-November-5-2015.pdf.
- J. T. Carmichael, R. J. Brulle, J. K. Huxster, *Clim. Change* **141**, 599–612 (2017).
- D. M. Kahan et al., *Nat. Clim. Chang.* **2**, 732–735 (2012).
- R. Gifford, *Am. Psychol.* **66**, 290–302 (2011).
- S. van der Linden, E. Maibach, A. Leiserowitz, *Perspect. Psychol. Sci.* **10**, 758–763 (2015).
- Center for Research on Environmental Decisions, *The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public* (Center for Research on Environmental Decisions, New York, 2009); <http://guide.cred.columbia.edu/>.
- R. Osbaldiston, J. P. Schott, *Environ. Behav.* **44**, 257–299 (2012).
- P. W. Schultz, *Eur. Psychol.* **19**, 107–117 (2014).
- D. McKenzie-Mohr, N. Lee, P. W. Schultz, P. Kotler, *Social Marketing to Protect the Environment: What Works* (Sage, Thousand Oaks, CA, 2012).
- R. Heede, *Clim. Change* **122**, 229–241 (2014).
- M. F. Maniates, *Glob. Environ. Polit.* **1**, 31–52 (2001).
- C. R. Sunstein, L. A. Reisch, *HELR Harvard Environ. Law Rev.* **38**, 127–158 (2013).
- K. O'Brien, *Science* **350**, 1170–1171 (2015).
- M. van Zomeren, *Polit. Psychol.* **37**, 87–114 (2016).
- C. Roser-Renouf, E. W. Maibach, A. Leiserowitz, X. Zhao, *Clim. Change* **125**, 163–178 (2014).
- C. J. Glynn, M. E. Hume, in *The Spiral of Silence: New Perspectives on Communication and Public Opinion*, W. Donsbach, C. T. Salmon, Y. Tsafati, Eds. (Routledge, 2014), pp. 65–72.
- N. Geiger, J. K. Swim, *J. Environ. Psychol.* **47**, 79–90 (2016).
- S. Bamberg, J. Rees, S. Seebauer, *J. Environ. Psychol.* **43**, 155–165 (2015).
- J. A. Nevin, *Behav. Anal.* **33**, 189–191 (2010).
- Y. Inoue, P. Alfaro-Barrantes, *Bus. Soc. Rev.* **120**, 137–160 (2015).
- E. Van Velsor, L. Quinn, in *Managing Human Resources for Environmental Sustainability*, S. E. Jackson, D. S. Ones, S. Dilchert, Eds. (Jossey-Bass, Somerset, NJ, 2012), chap. 10.
- P. Zimbardo, *The Lucifer Effect: Understanding How Good People Turn Evil* (Random House, 2007).
- Z. Franco, P. Zimbardo, "The banality of heroism" (Greater Good, University of California, Berkeley, 2006); http://greatergood.berkeley.edu/article/item/the_banality_of_heroism/.
- J. L. Robertson, J. Barling, *J. Organ. Behav.* **34**, 176–194 (2013).
- M. Braungart, W. McDonough, *Cradle to Cradle* (Random House, 2009).
- S. Schein, *A New Psychology for Sustainability Leadership: The Hidden Power of Ecological Worldviews* (Greenleaf, Sheffield, UK, 2015).
- R. C. Anderson, R. White, *Confessions of a Radical Industrialist: Profits, People, Purpose—Doing Business by Respecting the Earth* (Macmillan, 2009).
- J. Mistry, A. Berardi, *Science* **352**, 1274–1275 (2016).
- M. E. Krasny, C. Lundholm, S. Shava, E. Lee, H. Kobori, in *Urbanization, Biodiversity and Ecosystem Services: Challenges And Opportunities*, T. Elmqvist et al., Eds. (Springer Netherlands, 2013), pp. 629–664.
- B. Natrass, M. Altomare, *The Natural Step for Business: Wealth, Ecology, and the Evolutionary Corporation* (New Society, Gabriola Island, BC, Canada, 2013).
- S. Clayton et al., *Conserv. Lett.* **10**, 1111/cont.12337 (2017).
- T. Hartig, P. H. Kahn Jr., *Science* **352**, 938–940 (2016).
- S. R. Kellert, J. Heerwagen, M. Mador, *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life* (Wiley, 2011).
- T. Hartig, R. Mitchell, S. de Vries, H. Frumkin, *Annu. Rev. Public Health* **35**, 207–228 (2014).
- P. H. Kahn, S. R. Kellert, Eds., *Children and Nature: Psychological, Sociocultural, and Evolutionary Investigations* (MIT Press, 2002).
- B. A. Scott, E. L. Amel, S. M. Koger, C. M. Manning, *Psychology for Sustainability* (Routledge, ed. 4, 2016), chap. 3.

10.1126/science.aal1931