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Toward a social ecology of prosociality: why, when, and where nature enhances social connection

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A vast literature in social psychology documents that people's actions are influenced by their social environment (e.g., other people). But how are people affected by the relatively 'asocial' natural environment? We review a growing body of evidence finding that nature can enhance social connection. Incidental exposure to the natural environment can increase attention to others, facilitate collective engagement, and enhance prosociality—tendencies to care for, help, and assist others. We discuss how nature enhances connecting to others, in part, via awe and beauty. We conclude by analyzing boundary conditions, discussing the social implications of environmental decline, and outlining pressing questions for future research.

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> " . . . in every walk with Nature one receives far more than he seeks." — John Muir, *Steep Trails*, 1918

From parks to pristine wilderness, humans are deeply linked to nature and derive many benefits from it. Time in nature is associated with many positives: it can enhance mood [1–3], increase well-being [4], and improve physical health [5]. Adults who spend at least 30 min a week in nature report reduced depression [6], and children with Attention Deficit Disorder show fewer symptoms after playing outside in a park versus indoors [7]. A recent meta-analytic review of nature's impacts on physical health found that nature exposure was associated with a litany of positive health outcomes, including decreased stress, blood pressure, hypertension, asthma, stroke, and heart disease [8]. Nature, it would seem, is good for you.

But do the benefits of nature extend beyond the self? An emergent body of evidence suggests they do, enhancing one's relationships to others and strengthening social collectives. Here we review studies documenting that experiences with nature facilitate greater social connection and solidarity, including other-oriented views of the self and patterns of social categorization, increased sensitivity to the needs of others, and enhanced prosocial behavior. We go on to describe the processes that in part underlie these effects and outline emerging areas of inquiry.

Experiences with nature are linked to greater orientation to others and social relationships. For instance, the presence of urban greenspace such as tree cover is associated with increased perceptions of social cohesiveness within one's neighborhood (e.g., self-reported feelings that 'this is a close-knit neighborhood'; [9]) and volunteering behavior such as fundraising [10]. In another study, pre-school children exhibited greater prosocial actions and fewer emotional, peer, and conduct problems the more connected and engaged with nature they were [11]. Further, self-reported feelings of connection to nature are linked to enhanced perspective taking—the tendency to see the world from others' points of view [12].

Experimental work documents that exposure to nature can directly cause increased engagement with the needs of others and greater prosocial behavior. In one field experiment, passersby were more likely to pick up and return a confederate's dropped glove after walking through a park than those tested before they had entered the park [13]. Another study found that sitting in a park for just 5 min boosted feelings of interconnectedness (e.g., 'feeling connected with a greater whole'), relative to sitting indoors [14]. Even incidental exposure to nature in the lab can enhance social orientation and prosociality. In one representative line of research, viewing images of nature, versus images of urban environments, increased participants' other-focused aspirations (e.g., wanting 'to work toward the betterment of society'), decreased self-focused aspirations (e.g., wanting 'to be financially successful'), and facilitated greater donations in an economic trust game. A follow-up experiment found that participants seated in a lab with plants present were more generous than participants in a room without greenery [15].

Awe-inspiring and beautiful nature

Insofar as exposure to the natural environment elicits an increased orientation to others and their needs, what factors might drive this effect, and is this relationship the same across all forms of nature? Research documents two psychological processes—certain qualia of the natural environment—that in part account for the effects of nature on human sociality: feelings of awe, and perceptions of beauty.

Awe may be a driver of nature's effects on social connection. Awe involves positively valenced feelings of wonder and amazement triggered by vast stimuli that transcend current frames of reference and require new schemata to accommodate what is being perceived [16]. Awe can arise from many different stimuli—including architectural marvels, religious epiphanies, and music—but, at least within Western cultures, awe most typically arises in encounters with nature (e.g., sunsets, mountain ranges, scenic vistas) [17,18]. Importantly, a budding literature on awe documents that awe can enhance connections to others and engagement with their needs, effects attributed to awe's ability to diminish the sense of the self, reduce preoccupation with everyday concerns, and shift focus toward others and the collective [17–19].

Numerous studies link experiences of awe to greater orientation to others [18]. In one study, exposure to awe-inspiring nature caused participants to be more humble: they mentioned fewer strengths when listing their own strengths and weaknesses, and they were more likely to factor external forces into their explanations of their own life successes, reflecting a less grandiose sense of self and heightened awareness of the strengths and contributions of others [19]. In other work, awe-inspiring nature caused participants to report increased feelings of oneness with others [20]. In a field study of awe among military veterans and underserved youth while white-water rafting, awe was specifically linked to increased social well-being—feeling that one belongs to a community, has something important to contribute to society, and has warm and trusting relationships with others [21•]. In a cross-cultural examination, exposure to awe-inspiring nature (e.g., Yosemite National Park) heightened feelings of belonging in one's community among US and Chinese participants [22••].

Experiences of awe in nature can also foster prosocial behavior [23••]. In one study, participants who watched an awe-inspiring 5-min video of grand nature scenes (e.g., massive canyons, scenic vistas) shared more lottery tickets for a cash prize with a stranger, relative to participants who viewed a neutral or amusing video. In another study, participants stood in a grove of towering eucalyptus trees and were asked to either gaze up toward the trees—an experience validated to specifically elicit feelings of awe—or at a comparably tall but less awe-inspiring big building for 60 s. Those who gazed at the trees reported more awe, felt less entitled, and were more willing to help an experimenter pick up pens ostensibly dropped by accident. In related work, participants reported greater prosocial values after seeing awe-inspiring images than after seeing average or mundane nature images [24]. By shifting focus away from the self toward others and the larger entities of which one is a part, experiences of awe in nature facilitate social connection and enhance prosocial behavior.

As we review above, awe is a mechanism by which nature enhances social connection. Environments that vary in terms of how much awe they evoke can trigger differing degrees of social connection. However, awe is not the only dimension along which natural environments vary; some environments are also more beautiful than others. And as with awe, select studies find that perceptions of beauty in nature can trigger increased social connection. Importantly, although experiences of awe and perceptions of beauty in nature are related, they are conceptually and empirically distinct [for a relevant discussion, see Refs. 16,25].

Individuals prone to perceiving beauty in nature report greater concern for others' well-being [26] and increased prosocial tendencies (e.g., agreeableness, empathy, perspective taking) [27,28••]. In one set of experiments, participants who viewed images of beautiful nature were more generous toward others in an economic game than were those who viewed more mundane nature images, and participants exposed to beautiful plants (versus ordinary plants) in a laboratory setting provided more help to an experimenter by constructing origami figures for tsunami victims [28••]. Across studies, these effects were mediated by positive mood: participants exposed to natural beauty reported increased positivity and, in turn, behaved more prosocially. Beautiful nature boosts happiness and, as a consequence, the willingness to incur costs for others' benefit.

Future directions

The evidence we have reviewed converges on a central claim: nature, a relatively asocial entity, can foster social connection. Even incidental exposure to nature can bolster prosocial patterns of self-definition, social attention, and prosociality. Moreover, these effects are particularly pronounced in nature that is beautiful or awe-inspiring.

There are several important questions that should guide future research in this area. For example, studies should delineate other dimensions of natural environments—beyond awe and beauty—that may influence social connection. Certain qualities of nature such as the presence of resource abundance versus scarcity [29], evidence of purity versus pollution [30], and the ratio of green

(vegetation) to blue (water) spaces [31] may trigger self-oriented versus other-oriented patterns of cognition and behavior, including competitive versus cooperative motivations. Moreover, little is known about how enduring the effects of nature exposure are—are they fleeting and short-lived or sustained over time, and how might this vary as a function of the type of nature to which one is exposed? In what follows, we review three central areas that we deem particularly pressing and promising in guiding future research on nature's effects upon the social realm: pro-environmentalism, environmental decline, and technological advancement.

The threat posed by climate change to the planet and modern society [32] highlights the need for the mitigation of humanity's environmental footprint [33]. Research indicates that nature exposure can elicit environmentally sustainable behavior [34•]. In a series of studies, individuals exhibited greater pro-environmental behavior in a decision game (e.g., commons dilemma, public goods) after watching videos of pristine nature [35] or destroyed natural scenes (e.g., polluted beaches) [36], relative to those who watched videos of built environments (e.g., buildings, city streets). In other research, individuals reported sustained increases in conservation behaviors after engaging in nature daily for 30 days [37], and adults who spent more time outdoors as children display greater pro-environmental behavior [38]. Future work should continue to examine the dynamic interplay between environmental stewardship and experiences in nature. For example, engaging in environmentally sustainable behaviors might serve to deepen one's appreciation of nature, which might lead to even greater and sustained pro-environmental tendencies—a reciprocal positive feedback loop between nature experiences and sustainability. It will also be interesting to explore the possible human social network benefits of individual experiences in nature and whether they can lead to pro-environmental behaviors (e.g., reduced meat consumption, decreased air travel) [39] that spread virally within social collectives, yielding significant benefits for the environment and society [40].

It will also be important to understand how large-scale societal shifts in nature exposure and access shape broad social outcomes. As the world's population has grown exponentially, cities have become increasingly urbanized and dense [41], often to the detriment of natural spaces [42]. Moreover, people, particularly in the West, are spending less and less time in nature [43•,44,45]. Societal declines in both access to and time spent in nature may lead to a host of unintended pernicious social ills. For example, to the extent that nature can curb self-interest and entitlement and facilitate collective engagement [21•,23••], decreased exposure to nature may be accompanied by societal increases in individualism and decreases in communal engagement, empathy, and cooperation [46]. By contrast, social policies and practices that prioritize—even incentivize—experience in nature may not only improve individual well-being but also lead to enhanced collective outcomes, including improved social trust and collective efficacy.

Finally, accelerating technological advancements, from the proliferation of mobile phones and social media usage to virtual and augmented reality, may either impair or enhance people's connection to nature. On the one hand, just as urbanization limits people's access to nature, mobile devices may, too, distract them from spending time outdoors and detract from how awe-inspiring or beautiful nature can be, particularly when experienced via digital screens. Moreover, social media may enhance people's desires to seek out and flaunt extraordinary nature experiences, which may distance them from one another as opposed to foster social connection [47]. On the other hand, technology may make nature exposure more prevalent and widely available. Social media (e.g., Instagram) may expose people to natural beauty they may not otherwise experience. New technologies, like virtual or augmented reality, could provide awe-inspiring access to hitherto inaccessible environments (e.g., the amazon, the deep ocean) without opening them up to tourism or overuse. Indeed, there is emerging evidence that nature experienced through immersive virtual reality can trigger feelings of awe [48,49•]. Technology may pave the way for 'open access' forms of nature exposure that can help make nature more available to all and mitigate unequal access to nature, providing beneficial experiences to those who may lack the physical or economic means to personally visit nature [41]. In sum, future work should explore the positive and negative impacts that technological advancement may have on nature exposure and its social effects.

Conclusion

Can nature exposure facilitate social connection? Research indicates it can. Interactions with nature, whether sustained or fleeting, can increase orientation toward others, social cohesion, and prosocial behavior, effects that are in part driven by nature's awe-inspiring or beautiful qualities. Future work should add to these insights by examining how nature can contribute to efforts to mitigate climate change, the potential negative impacts of increased urbanization and decreased nature exposure, and the role that technology's growing prevalence might play in accessing nature and its benefits. Such work will contribute to an ever-deepening socioecological understanding of humans' relationship to the natural environment and the myriad benefits they derive from it.

Conflict of interest statement

Nothing declared.

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