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Cooperation is in our nature: Nature exposure may promote cooperative and environmentally sustainable behavior

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ABSTRACT

Theory and correlational research suggest that connecting with nature may facilitate prosocial and environmentally sustainable behaviors. In three studies we test causal direction with experimental manipulations of nature exposure and laboratory analogs of cooperative and sustainable behavior. Participants who watched a nature video harvested more cooperatively and sustainably in a fishing-themed commons dilemma, compared to participants who watched an architectural video (Study 1 and 2) or geometric shapes with an audio podcast about writing (Study 2). The effects were not due to mood, and this was corroborated in Study 3 where pleasantness and nature content were manipulated independently in a 2 × 2 design. Participants exposed to nature videos responded more cooperatively on a measure of social value orientation and indicated greater willingness to engage in environmentally sustainable behaviors. Collectively, results suggest that exposure to nature may increase cooperation, and, when considering environmental problems as social dilemmas, sustainable intentions and behavior.

1. Introduction

We clearly face significant environmental challenges (e.g., climate change, pollution, accelerating extinctions). Although the causes and solutions are obviously multifaceted and complex, many have suggested that modern lifestyles contribute to environmental destruction—not only via excessive consumption, but also by disconnecting people from nature. This scholarship often draws on Wilson's (1984) biophilia hypothesis, which posits that humans have an innate need to associate with other living things due to our evolutionary history. We evolved in natural environments and, thus, they still support optimal human functioning (Kellert, 1997). We do not need to accept the specific innate need posited by biophilia to see a gap between humans' evolutionary environments and the current living conditions of people in modern societies. This gap may be a source of suboptimal well-being. Consistent with this idea, living near greenspace predicts higher happiness (White, Alcock, Wheeler, & Depledge, 2013) and longevity (Mitchell & Popham, 2008), and spending time in nature seems to provide a variety of cognitive, mood, and physiological benefits (reviewed by Hartig, Mitchell, de Vries, & Frumkin, 2014 and Selhub & Logan, 2012).

Despite nature's apparent benefits, most people spend the majority of their time indoors away from nature (MacKerron & Mourato, 2013). This physical disconnection may also foster a problematic psychological disconnection. That is, when humans do not feel like they are part of larger ecosystems, they may be less inclined to protect the natural environment (Schultz, 2000). Supporting this idea, individual differences in subjective connectedness with nature consistently predict pro-environmental attitudes and behaviors, as well as happiness (Capaldi, Dopko, & Zelenski, 2014; Mayer & Frantz, 2004; Nisbet, Zelenski, & Murphy, 2009; Tam, 2013). Ironically, our threatened natural environments may be critical to fostering the deep concern that would protect them.

Although suggestive, past research linking nature with sustainable behavior is mostly correlational, qualitative, or relies on subjective self-reports. In this research we take an experimental approach by manipulating exposure to nature and observing effects on a laboratory analog of sustainable behavior: a fishing-themed commons dilemma (Gifford & Gifford, 2000). Dawes (1980) described environmental problems as social dilemmas with two key features: individuals benefit by behaving selfishly (e.g., overharvesting resources, polluting) regardless of others' choices, and where all would benefit if everyone cooperated instead of pursuing immediate or narrow self interest (see also Parks, Joireman, & Van

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Lange, 2013). Said another way, broad participation and cooperation are essential to resolving many environmental problems. We hypothesize that participants exposed to nature will make more cooperative, and thus sustainable, choices. We view cooperative behavior as that which contributes to collective benefits (not necessarily without simultaneous personal benefit), and, in this context, sustaining resources.

This prediction is similar to ideas prevalent in environmental psychology—that time in nature and strong subjective connections with nature promote sustainable attitudes (Gifford, 2014). Nonetheless, it departs from most research in the area by suggesting that these effects can be observed over the course of a few minutes in the laboratory. The processes involved in a lifetime of accumulated nature experience may well differ, but we nonetheless draw on the personality-level correlations as part of the rationale for our prediction. Fleeson (2001) has suggested that associations at the trait level often apply at the state level too (e.g., trait extraversion predicts high positive affect and most people experience positive emotions when they behave in extraverted ways). Regarding nature and sustainability, part of the link has been established. Brief exposures to natural settings increase momentary feelings of nature relatedness (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2008; Nisbet & Zelenski, 2011; Schultz & Tabanico, 2007). Because trait nature relatedness is strongly associated with sustainable attitudes (Tam, 2013), state nature relatedness, caused by nature exposure, may be too.

Research on the short-term consequences of nature exposure also suggests some reasons that nature could promote sustainability, particularly when we think of sustainable behaviors that are also cooperative behaviors. For example, nature exposure is often associated with good moods (Mayer et al., 2008; Nisbet & Zelenski, 2011). Intuitively, and generally consistent with the 'broaden and build' view of positive emotions (Fredrickson, 2001), good moods may facilitate cooperative or prosocial behavior, actions that would also be sustainable in resource dilemmas. Research on mood and cooperation, however, suggests that the link may be complex and depend on context (Hertel, Neuhof, Theuer, & Kerr, 2000). Considering another route, Kaplan and Berman (2010) reviewed nature's effects on attention restoration, crime reduction, subjective energy, frustration tolerance, etc., and suggested that they share the common core of improved self-control. Nature may facilitate cooperation in commons dilemmas by improving self-control, thus curtailing temptations to cheat or overharvest. Perhaps even more relevant, Weinstein, Przybylski, and Ryan (2009) manipulated nature exposure with photographs (nature vs. built environments) or plants (present or absent) and found that nature increased participants' intrinsic aspirations and generosity, and decreased extrinsic, materialistic aspirations. That is, nature caused people to report valuing others and prosocial behavior more, and wealth and fame less. This extended to actual behavior in the 'trust game'; participants exposed to nature gave more actual money to another person that they could have kept for themselves without negative consequence. These effects were mediated by feelings of (state) nature relatedness and autonomy, and were strongest among participants who felt most immersed in the nature. Similar effects may not require deep immersion, however. Mazar and Zhong (2011) found that participants merely exposed to green products in a consumer study gave away more money than participants who viewed more conventional products. Such effects contrast with findings that money primes make people more self-sufficient and less prosocial (Vohs, Mead, & Goode, 2006); nature may function oppositely (Nisbet & Zelenski, 2009). Although suggestive, none of this research has examined sustainability attitudes or behaviors. Commons dilemmas provide a link between nature effects and sustainability because they channel cooperation, trust, and prosocial motivations into sustainable behaviors.

To be clear, cooperative behavior is not always sustainable. Humans often cooperate in ways that ultimately threaten natural environments; most current environmental crises result from economic activity that requires some cooperation among individuals and groups. Moreover, not every sustainable behavior requires cooperative intentions. The environmental benefits may be diffuse (e.g., a reduction in greenhouse gasses benefits all), but the intentions may be completely local and selfish (e.g., thinking, 'a tree would look nice in my backyard'). Said another way, altruism is not required for cooperation or sustainable behaviors. Our primary focus is the confluence of cooperation and sustainability. Environmental problems are classic examples of commons dilemmas, and, thus, research on commons dilemmas has much potential to inform environmentally sustainable behavior and decision making. We have focused on an environmentally themed commons dilemma because it allows us to bridge different literatures in suggesting nature exposure as a potential aid to cooperative or sustainable behavior. We extend the theory and mostly correlational research that suggests a strong link between connecting with nature and sustainability by adding experimental manipulations that speak to causal direction more directly. We extend experimental studies' suggestive hints about nature's effects on mood, self-control, prosocial motivation, and trust by testing them in contexts more relevant to sustainability.

In sum, there are theoretical and empirical reasons to suspect that exposure to natural (vs. built) environments may promote cooperative, sustainable behavior. To test these ideas, we conducted three studies. In the first, we randomly assigned participants to view videos of almost exclusively natural or built environments. Participants were later asked to 'play a fishing game', an iterative, fishing-themed commons dilemma where they were paid for each fish harvested. We also included measures of mood, state nature relatedness, and state trust (as possible mediators), and trait measures of nature relatedness and trust as exploratory predictors or moderators. Study 2 reports a close replication. Study 3 provides a conceptual replication and extension; it begins to disentangle cooperation from sustainability by measuring these outcomes independently. We report how we determined our sample size, all data exclusions, all manipulations, and all measures in all studies (Simmons, Nelson, & Simonsohn, 2012).

2. Study 1

2.1. Method

2.1.1. Participants

Undergraduate students ($n = 111$) were recruited for a study titled 'Personality and Media' via our department online subject pool system. Our goal was $n = 120$ for an exploratory study, and we collected data to the end of a semester. The sample was 70.3% female with a mean age of 20.81 ($SD = 3.10$). Participants received course credit as compensation. They were also paid based on fishing performance, but learned this only after arriving for the study.

2.1.2. Materials

Videos. To manipulate exposure to natural vs. built environments, participants viewed one of two 12-min videos that included educational narration and background music. The nature video excerpted BBC's *Planet Earth* series, beginning in tundra forest with images of trees and animals. It then proceeded to areas around the world and showcased the plants and animals native to those areas, ending in a jungle. We chose this particular excerpt because there are no mentions of marine life or fish, as well as to avoid explicit