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# Mindful learning can promote connectedness to nature: Implicit and explicit evidence



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## ABSTRACT

Environmental problems have attracted increasing attention, yet individuals' connectedness to nature remains a significant concern for potential solutions to these problems. In this article, we propose a novel method to promote connectedness to nature: mindful learning. One hundred and thirty-four students participated in the experiment. First, baseline measurements using the Connectedness to Nature Scale were obtained. Participants were then assigned to either a *mindful* or *mindless* learning condition. Finally, as a posttest, participants completed the Implicit Association Test and the Inclusion of Nature in the Self Scale. The performance of the mindful-learning group was better for both measures. Participants in the mindful-learning condition performed better on the Implicit Association Test and scored higher on the Inclusion of Nature in the Self Scale. These results provide empirical evidence that mindful learning may promote connectedness to nature, both implicitly and explicitly.

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## 1. Introduction

Phenomenal descriptions and empirical evidence both highlight a number of growing dilemmas between humans and nature, such as resource depletion and environmental pollution. Such environmental problems have been increasingly drawing the attention of sociologists, ecologists, and psychologists. In psychology in particular, a great deal of research has shifted from mainly addressing very specific and local environmental issues, such as reusing material (Ditlev-Simonsen & Wenstøp, 2012) and limiting energy use in local areas (Pallak, Cook, & Sullivan, 1980), to broader conceptualizations of humans' relationships to nature.

Since the 1970s, researchers have increasingly realized that environmental problems are rooted in a "blind spot" (Nisbet, Zelenski, & Murphy, 2009; Vining, 2003), which is a denial of belonging to or existing as a part of nature. More fundamentally, our general perception of gender dualism (such as light/dark, body/mind; Booth, 1999) intensifies cognitive splitting between humans and nature. This separation is becoming worse as people enter into industrialized and urbanized society. Modern media and networks impede people's accessing and appreciating nature, creating an illusory distance from nature (Sukhdev et al., 2010). Thus, psychologists have proposed that a critical aspect of solving environmental problems is establishing harmonious relationships between humans and nature (McKenna, 2003). Considering the great dependence

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of humans on nature and the hinging of their identity mainly on nature in the distant past, a reconnection of modern people to nature is required.

The perspective of reconnecting to nature has incorporated the concept of “connectedness to nature”, a notion with a long philosophical history (e.g., “I am part of nature” (Callicott, 1999)) that has been built upon in the field of psychology. Previous studies have amply contributed to conceptualizations of connectedness to nature, placing varying emphasis on three cardinal dimensions of cognition, affect, and behavior. Primarily, many definitions emphatically describe the cognitive aspect of connectedness to nature. For example, Wilson (1984) initially argued for an evolved need among individuals to affiliate with nature that originates from our physiological dependence on it. From a more psychological perspective, Schultz (2001) first provided a specific definition of connectedness to nature: “the extent to which an individual includes nature within his or her cognitive representation of self”. Based on his definition, Schultz’s measure used one item to operationalize the cognitive construct of connectedness to nature, modified from previous research on interpersonal relationships (Inclusion of Nature in the Self Scale, INS; Schultz, 2001). This scale includes a choice of seven pairs of circles, ranging from entirely separate to nearly entirely overlapping.

However, some researchers hold that the above approaches to delving into environmental problems have overlooked an emotional role and have focused simply on cognitive beliefs. More recently, Mayer and Frantz (2004) developed the Connectedness to Nature Scale (CNS) to assess the extent to which people feel an affective connection and belongingness to nature, comprising 14 items (e.g., “I often feel a sense of oneness with the natural world around me”). Further, the emotional dimension of connectedness to nature has been shown to reliably predict environmental behaviors and subjective wellbeing.

In addition to the INS and CNS, which may be based on one dimension of connectedness, some other recent works are multidimensional. The concept of environmental identity was proposed by Clayton (2003), and grounded in the belief that the environmental role comprises a significant part of self-identity. The environmental role includes several dimensions: affections and feelings toward nature, the importance of and membership in nature, and individuals’ interaction with nature. According to Clayton, the Environmental Identity Scale (EID), which includes 24 items, is positively correlated with ecocentric attitudes (Clayton, 2003). Another construct is Nature Relatedness (NR), and it encompasses three dimensions: affective, cognitive, and experimental (Nisbet et al., 2009).

Numerous additional studies have indicated a positive relationship between connectedness to nature and pro-environmental behaviors. For example, Perrin and Benassi (2009) showed that connectedness to nature, as an aspect of personal attitudes, influenced environmental behavior. Moreover, recent environmental psychology research (Hinds & Sparks, 2008; Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009) has shown that people who score higher on measures of connectedness to nature are more emotionally attached to nature, and thus, are more likely to engage in pro-environmental behavior. In addition to environmental behaviors, connectedness to nature could be useful on a wider scale. Previous work has shown that connectedness to nature could satisfy our need for social connection and contribute to personal well-being (Howell, Dopko, Passmore, & Buro, 2011; Mayer et al., 2009). In a nutshell, connectedness to nature has been recognized as a robust determinant of pro-environmental behavior, and consequently, some researchers have suggested strategies to cultivate or improve connectedness to nature. These practices and strategies initially fall into two categories; one category encompasses outdoor activities including nature-based tourism, eco-adventure. For instance, encouraging people to go to a zoo more frequently is one means to encourage interactive contact (Bruni, Fraser, & Schultz, 2008) and has been shown to increase connectedness to nature.

Although these life experiences aim to make people feel better physically, which has been proven effective, they are incidental and intentional, varying according to time, space, and context (Zylstra, Knight, Esler, & Grange, 2014). Possible inconsistencies and instability cannot guarantee its application in education. Moreover, these experiences are difficult to conduct. On one hand, people living in the city cannot invest enough time to go to a zoo due to their fast-paced lifestyles; on the other hand, to ensure these opportunities work on a large scale requires adequate and sustained funds and energy, which is operationally difficult.

The second category centers on the provision of information about nature and how social media and formal education could contribute to satisfy people’s need to know more (Zylstra et al., 2014). Creating an educational environment that stresses biological principles instead of simply focusing on the infusion of knowledge can also work to promote connectedness to nature (Lieflander, Frohlich, Bogner, & Schultz, 2013). In addition to these attempts, several meaningful methods applying problem solving and social cognition have also been developed, such as perspective taking (Sevillano, Aragonés, & Schultz, 2007) and anthropomorphism (Tam, Lee, & Chao, 2013). In sum, these strategies give more attention to informational and affective dimensions. However, the aforementioned “blind spot”, which entails remaining blind to nature and other natural elements, may be attributed to a fundamental lack in accurate consciousness regarding the relationship between people and nature (Capra, 1997). Thus, reconnecting to nature requires cultivating a consciousness, indicating the need to find a complementary method that is directly rooted in cognitive aspects to improve connectedness to nature. In addition to all of these methods, we asked whether mindful learning can be a complementary method to improve connectedness to nature.

Strategizing about new issues or cognitive judgment is an integral part of what we are fraught with in daily life, and yet people are inclined to use past methods. In some cases, these old thinking patterns, to some degree, cannot adapt absolutely and effectively to new problems, and may even impede our ability to think creatively and critically. A substantial body of literature on the Einstellung effect (Hoffman, Burke, & Maier, 1963; Luchins, 1942) has indicated people’s predisposition to fall into a rigid and constrained mind-set using traditional problem-solving pattern(s) and even ignoring other simpler and better solutions.

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