



Engagement with natural beauty moderates the positive relation between connectedness with nature and psychological well-being



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ABSTRACT

Prior research has demonstrated that people who are more connected with nature report more subjective well-being. However, guided by the sensitization model of well-being, we expected that the positive relation between connectedness with nature and psychological well-being would only be significant for those who tend to engage in nature's beauty (i.e., experience positive emotional responses when witnessing nature's beauty). In Study 1, we found the positive relation between connectedness with nature and life satisfaction was only significant for individuals higher, and not those lower, on engagement with natural beauty. Study 2 conceptually replicated this finding using self-esteem as an outcome. Moreover, the results were not affected by age, gender, Big Five personality traits (Study 1) or social desirability (Study 2). Thus, the current research extends past literature and demonstrates that connectedness with nature *only* predicts well-being when individuals are also emotionally attuned to nature's beauty.

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"Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul."

- John Muir

1. Introduction

There is now robust evidence demonstrating that exposure to nature has positive psychological benefits. For instance, individuals who were exposed to nature (e.g. nature walks, daily exposure to nature environments and laboratory imageries), compared to urban settings, reported greater vitality (Ryan et al., 2010). Nisbet and Zelenski (2011) found that individuals who participated in a nature walk reported increased positive affect and decreased negative affect compared to participants that had an indoor walk. Further research substantiates the generalizability of these experimental findings. For example, using mobile electroencephalography (EEG) to record the emotional experience of participants, Aspinwall, Mavros, Coyne, and Roe (2013) found that individuals

experienced less frustration, engagement (i.e., alertness), arousal and higher meditation when walking in nature compared to urban environments. In a separate study of more than 10,000 individuals, researchers found that individuals that live in urban areas with greater green space reported greater life satisfaction and lower mental distress, even after accounting for multiple alternative explanations (e.g., income, age, marriage etc; White, Alcock, Wheeler, & Depledge, 2013). Additionally, post-surgery patients that were randomly assigned to a hospital room furnished with foliage and flowers consumed less postoperative pain killers, experienced lower systolic blood pressure, and reported less pain, anxiety, and fatigue than patients in a room without foliage and flowers (Park & Mattson, 2008). Together, these different lines of research converge to support the many psychological benefits of nature.

Current literature on connectedness with nature

Further, recent research has found that individuals vary in the extent to which they feel connected with nature (Mayer & Frantz, 2004). Mayer and Frantz (2004) developed the connectedness with nature scale that assessed people's belief about their connection to the natural world as an important part of their sense of self. Prior research has demonstrated its usefulness in understanding the human and nature relation. For instance, people who are more connected with nature reported greater

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environmentalism (e.g., “Environmental concerns outweigh all other concerns in my life”), ecological behaviors (e.g., “Turn off the lights when a room is vacant”) and dispositional perspective taking (Mayer & Frantz, 2004). In a separate study, farmers in Australia who felt connected to nature reported greater actions to protect the local vegetation (e.g., “Reduce stocking to encourage regeneration of plants”) and this effect was mediated by greater biospheric concerns (e.g., “Protecting native birds; Gosling & Williams, 2010). Additionally, recent studies have shown that connectedness with nature differs across individuals and is a malleable construct. For instance, individuals who are not environmentally conscious and were induced to feel heightened sense of self-awareness subsequently reported lower level of connectedness to nature (Frantz, Mayer, Norton, & Rock, 2005). Using the implicit association test on a mobile device, Schultz and Tabanico (2007) found that individuals that spent time in an animal park, a hiking trail or beach experienced increase in connectedness with nature. More importantly, however, cross cultural studies in Spain have replicated the internal consistency, convergent, discriminant validity of the connectedness with nature scale and its association with environmental concerns (Olivos, Aragonés, & Amérgio, 2011). Together, this emerging literature has documented the practical value, flexibility and cross-cultural validity of the connectedness with nature scale.

Particularly relevant to the current investigation is research on the link between connectedness with nature and psychological well-being. People who are connected with nature, compared to their less connected with nature counterparts, are more satisfied with life, reported greater happiness and positive affect (Mayer & Frantz, 2004; Tam, 2013). Additional research has shown that connectedness with nature is also associated with social well-being (e.g., social acceptance), mindfulness (Howell, Dopko, Passmore, & Buro, 2011), and meanings in life and vitality (Cervinka, Röderer, & Hefler, 2012). People who were exposed to nature, compared to urban settings, reported greater positive affect and this link was mediated by connectedness to nature (Mayer, Frantz, Bruehlman-Senecal, & Dolliver, 2009). More recently, in two separate studies, researchers demonstrated that mindfulness and spirituality mediated the relation between connectedness to nature and well-being (Howell & Passmore, 2013; Kamitsis & Francis, 2013). These results indicated that a dispositional tendency to connect with nature is imperative to individual's psychological well-being.

Current approach on engagement with nature's beauty

Although the connectedness with nature literature has demonstrated the importance of connecting the self with the natural world, recent philosophical approaches have advocated for the need to also engage with nature's beauty. Some theorists have argued that being attuned to the beautiful elements of nature may have evolutionary roots and adaptive values (Etcoff, 2011). For instance, Dutton (2009) has suggested that the ability to experience beauty enhances survival chances because beautiful natural environments signaled a nourishing food source in our evolutionary history. Others have underscored a link between beauty and virtue. In *The Sovereignty of Good over Other Concepts*, the philosopher Iris Murdoch (1967) reasoned that beauty can lead to what she called *unselfing* – a process that motivates the individual to transcend self-interest and become more generous and kind. While these theorists suggest that observing natural beauty may lead to positive psychological benefits, the literature lacked an individual difference measure that reliably assesses people's dispositional tendency to perceive nature's beauty. Consequently, Diessner, Solom, Frost, Parsons, and Davidson (2008) developed the Engagement with Beauty Scale, which contains a subscale that measures the degree to which individuals perceive natural beauty and be emotionally

aroused by nature's beauty. Diessner et al., (2008) found the four items scale internally consistent ($\alpha \leq .80$) and demonstrated a strong test–retest correlation of .84. More recently, there is an emerging line of research that points to a positive relation between individual's tendency to perceive natural beauty and well-being. For instance, individuals who perceive nature's beauty reported greater life satisfaction, gratitude, and less materialism (Diessner et al., 2008). Additionally, perceiving nature's beauty is correlated with extraversion and gratitude (Diessner, Iyer, Smith, & Haidt, 2013), two of the strongest predictors of subjective well-being (DeNeve & Cooper, 1998; Zhang & Howell, 2011). These evidences suggest that individuals prone to perceiving natural beauty also tend to experience higher well-being.

Distinguishing connectedness with nature from engagement with nature's beauty

On the basis of the domain similarity between the two scales (both on the topic of nature), it is expected that they will be strongly positively correlated. Nevertheless, important distinctions between the two scales can be found at the item level. For instance, Perrin and Benassi (2009) conducted a content analysis of the connectedness with nature items and showed that they do not focus on emotional connection but rather is a cognitive assessment of people's belief about their connection to nature. That is, even though the connectedness with nature scale uses the word *feel* in some of the items, it does not actually measures emotional states. In comparison, the engagement with natural beauty scale refers to the emotional and physiological arousals in response to the perception of beauty in the natural world (Diessner et al., 2008). For instance, the core items of the scale examine whether people felt bodily changes (e.g., lump in my throat), emotions associated with nature (e.g., awe, wonder etc) and common humanity (e.g., love of the entire world) when they perceive natural beauty. One study has provided some initial results that engagements has unique predictive validity. In a survey study of 846 community adults, Zhang, Piff, Iyer, Koleva, and Keltner (2014) found that connectedness with nature and engagement with nature's beauty are positively correlated ($r = .64$). However, they were both significant independent predictors of agreeableness, perspective taking and empathic concern.

In sum, connectedness with nature and engagement with natural beauty are conceptually different at the item level and some initial findings have delineated their empirical distinctiveness. However, both are robustly linked to well-being, such that endorsing greater connectedness with nature and engaging with natural beauty are both associated with psychological well-being. These findings, then, presents two disparate hypothesis that individual's well-being is either predicted by the tendency to connect with nature or perceive nature's beauty. In the present research, we integrate these two lines of research and present a rival hypothesis that the relation between connectedness with nature and well-being is moderated by engagement with natural beauty. That is, rather than viewing them as independent predictors, we expected them to augment each other's role in enhancing individual's psychological well-being. Specifically, we predicted that individuals who are more connected with nature will report more life satisfaction (Study 1) and self-esteem (Study 2) *only if* they also engage with natural beauty as well. This hypothesis falls in line with Bem and Funder's (1978) argument that individuals respond to those features of a situation that are important to one's disposition (e.g., what they called “template matching”) and the sensitization model of well-being. As described by Reis, Sheldon, Gable, Roscoe, and Ryan (2000), individuals high on various trait-level constructs will show the strongest association with similar traits and well-

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