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When nature heals: Nature exposure moderates the relationship between ostracism and aggression

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ABSTRACT

Prior studies have consistently shown that ostracism promotes aggression. The present research investigated the role of nature in reducing aggressive responses following ostracism. Three studies provided converging support to the prediction that nature exposure can weaken the relationship between ostracism and aggression. Compared with ostracized participants who viewed nature pictures, ostracized participants who viewed urban pictures indicated a higher willingness to assign a longer and colder exposure of painful chilled water to another person (Study 1), reported elevated aggressive urges in hypothetical situations (Study 2), and showed a higher intention to assign a spicier and larger amount of hot sauce to a person who hated spicy food (Study 3). Taken together, these findings highlight the importance of nature in influencing aggressive responses following ostracism. Implications are discussed.

1. Introduction

> "It was in the forest that I found the peace that passeth understanding".
>
> Jane Goodall

The need to belong is one of the most important human needs because having positive and sustainable social relationships can promote well-being (Baumeister & Leary, 1995). People want to experience social acceptance to satisfy their belonging need, but ostracism, which is defined as being excluded or ignored, can detrimentally thwart this important need (Williams, 2007, 2009). In response to ostracism, people often engage in aggressive behaviors against those who ostracize them or even against innocent strangers (e.g., DeWall, Twenge, Gitter & Baumeister, 2009; Poon & Chen, 2016; Twenge, Baumeister, Tice & Stucke, 2001).

According to the basic motivational processes of need deprivation and intensification (e.g., Geen, 1995; Lundin, 1961; Shah & Gardner, 2007), people would be motivated to seek alternative ways to satisfy deprived important needs. Because ostracism deprives the fundamental need to belong, ostracized people have a high desire to regain a sense of belonging by reconnecting with other individuals. However, the aggressive and violent urges of ostracized people will likely lead to further ostracism (Juvonen & Gross, 2005; Kurzban & Leary, 2001). Therefore, it is important to identify strategies that can weaken the effect of ostracism on aggression, which can help people better cope with ostracism. The quote by Jane Goodall suggests that natural environments hold properties that can bring people into a peaceful state, which implies that nature exposure may have the capacity to reduce people's aggressive tendencies in provocative situations. The present research hence aims to empirically examine whether nature exposure can weaken the relationship between ostracism and aggression.

1.1. The negative impacts of ostracism

Ostracism is a ubiquitous experience that happens on a daily basis (Nezlek, Wesselmann, Wheeler & Williams, 2012). Previous studies have accumulated substantial understanding about its negative impacts. In particular, minimal signals of ostracism can immediately cause significant psychological and social distress

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(e.g., Garris, Ohbuchi, Oikawa & Harris, 2011; Wesselmann, Cardoso, Slater & Williams, 2012; Williams, Cheung & Choi, 2000; Wirth, Sacco, Hugenberg & Williams, 2010). People still feel hurt even when they know that they are ostracized by a computer (Zadro, Williams & Richardson, 2004) or by despised outgroup members (Gonsalkorale & Williams, 2007).

Brain imaging studies have further shown that ostracism and physical pain share common neurological underpinnings (see MacDonald & Leary, 2005). For instance, brain regions that are involved in processing the affective component of physical pain (e.g., dorsal anterior cingulate cortex) are also active when people experience ostracism in an online ball-tossing game (Eisenberger, Lieberman & Williams, 2003). Moreover, brain areas that are involved in processing the sensory component of physical pain are also active (e.g., dorsal posterior insula) when people view pictures of their ex-romantic partners after an unwanted romantic breakup (Kross, Berman, Mischel, Smith & Wager, 2011). Worse still, prior studies have shown that chronic feelings of ostracism carry long-term implications as it is a critical predictor of depression (DeWall, Gilman, Sharif, Carboni & Rice, 2012) and adverse physical condition (Miller, 2011).

As ostracism carries significant implications on people's well-being, it is important to understand how people would react after ostracism. The next section reviews evidence showing that people may behave aggressively after ostracism, which is followed by sections that discusses various benefits of nature exposure and the interactive relationship between ostracism, nature exposure, and aggression.

1.2. The relationship between ostracism and aggression

Aggression is defined as any behavior that is carried out with a desire to hurt another person (Anderson & Bushman, 2002; Bushman & Huesmann, 2010; DeWall, Anderson & Bushman, 2011). The literature has shown that ostracized people may engage in different forms of aggressive behavior when they cannot foresee potential sources of reconnection (see Leary, Twenge & Quinlivan, 2006; Williams, 2007, 2009). For instance, Leary, Kowalski, Smith, and Phillips (2003) provided qualitative evidence on the relationship between ostracism and aggressive behavior by systematically reviewing cases of school shootings and found that most killers had experienced chronic ostracism.

Quantitative evidence supporting the association between ostracism and aggression come from several sources with different research methodologies. First, prior cross-sectional studies showed that individuals who have experienced much workplace ostracism tend to engage in more organizational and social deviant behaviors, along with less workplace prosocial behavior (e.g., Balliet & Ferris, 2013; Ferris, Brown, Berry & Lian, 2008). Second, a recent longitudinal study found that children with more ostracism at four years old would demonstrate higher aggressiveness two years later (Stenseng, Belsky, Skalicka & Wichstrøm, 2014). Third, a large amount of experimental studies have demonstrated the causal effect of ostracism on aggression (see DeWall & Bushman, 2011; Williams & Nida, 2011). In these experiments, compared with non-ostracized participants, ostracized participants reported higher levels of aggressive intentions in hypothetical scenarios, assigned more spicy hot sauce to individuals who despised spicy food, blasted louder unpleasant white noise to unknown strangers, gave a more negative job evaluation to a candidate who wanted to get a desired position, and exposed another person to painful chilled water for a longer period of time (e.g., Buckley, Winkel & Leary, 2004; Chen, DeWall, Poon & Chen, 2012; DeWall et al., 2009; Poon & Chen, 2014; Twenge et al., 2001; Warburton, Williams & Cairns, 2006; Wesselmann, Butler, Williams & Pickett, 2010).

Post-ostracism interpersonal experience can also influence people's behavioral responses. When ostracized people's feelings of connection are restored through situational social interactions with other individuals, they will no longer have elevated aggressive urges. For example, Twenge et al. (2007) found that a brief reminder of a pleasant social interaction can make ostracized people behave less aggressively because it can boost ostracized people's trust in others. Similarly, DeWall, Twenge, Bushman, Im, and Williams (2010) found that ostracized people behaved less aggressively when they experienced some social acceptance from the ostracizing group because these signals of acceptance can buffer the pain of ostracism.

In short, previous studies have demonstrated that people would become aggressive after ostracism (e.g., DeWall et al., 2009; Twenge et al., 2001), and ostracized participants whose feelings of disconnection are reduced would eschew aggressive behaviors (e.g., DeWall et al., 2010; Twenge et al., 2007). The present research aimed to extend current knowledge by testing whether nature exposure can weaken the relationship between ostracism and aggression.

1.3. The psychological impacts of nature exposure

According to the biophilia hypothesis (Kellert & Wilson, 1993; Wilson, 1984), humans have a strong innate motivation to connect to nature. People would experience various positive psychological outcomes when they feel connected to nature. For example, prior studies have shown that nature connectedness is positively associated with meaning in life, life satisfaction, innovative thinking, positive mood, mindfulness, and subjective well-being (e.g., Howell, Dopko, Passmore & Buro, 2011; Howell, Passmore & Buro, 2013; Leong, Fischer & McClure, 2014; Mayer & Frantz, 2004). Nature connectedness also carries behavioral implications as people who feel connected to nature are more inclined to behave in environmentally friendly ways (e.g., Davis, Le & Coy, 2011; Mayer & Frantz, 2004; Tam, 2013).

People's perceived connection with nature can be enhanced by exposing them to natural environments (e.g., Mayer, Frantz, Bruehlman-Senecal & Dolliver, 2009; Weinstein, Przybylski & Ryan, 2009; Zelenski, Dopko & Capaldi, 2015). Moreover, previous research has consistently shown that exposing people to natural environments carry various benefits (see Gifford, 2014; Keniger, Gaston, Irvine & Fuller, 2013 for reviews). For instance, in one study (Berman, Jonides & Kaplan, 2008; Study 1), people who walked in a natural environment for around 50 minutes showed an improvement in memory span when compared to those who walked in an urban area. Not only does being in an actual natural environment bring benefits, the mere viewing of nature stimuli can also lead to many positive consequences. In particular, viewing photos or videos of trees or landscapes can increase people's positive mood, memory and attention capacity, and subjective well-being (e.g., Berman et al., 2008; Berto, 2005; Craig, Klein, Menon & Rinaldo, 2015; Mayer et al., 2009).

Nature exposure can also help people cope better with life setbacks and stress. For example, recent studies showed that patients who engage in nature-related activities (e.g., walking in an area with a natural scene, having panoramic views of nature) tend to be less negatively influenced by their illnesses (e.g., Berman et al., 2012; Raanaas, Patil & Hartig, 2012). More broadly, prior studies showed that nature exposure can increase one's resilience in various stressful situations by increasing their positive emotions, reducing physiological reactivity, and improving executive functioning (e.g., Annerstedt et al., 2013; Hartig, Evans, Jamner, Davis & Garling, 2003; Ulrich, 1984; Ulrich et al., 1991).