



## Short Communication

## Mindfulness meditation counteracts self-control depletion

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## ARTICLE INFO

## Article history:

Received 29 August 2011

Available online 5 February 2012

## Keywords:

Self-control depletion  
Mindfulness meditation  
Emotion suppression  
Attention control

## ABSTRACT

Mindfulness meditation describes a set of different mental techniques to train attention and awareness. Trait mindfulness and extended mindfulness interventions can benefit self-control. The present study investigated the short-term consequences of mindfulness meditation under conditions of limited self-control resources. Specifically, we hypothesized that a brief period of mindfulness meditation would counteract the deleterious effect that the exertion of self-control has on subsequent self-control performance. Participants who had been depleted of self-control resources by an emotion suppression task showed decrements in self-control performance as compared to participants who had not suppressed emotions. However, participants who had meditated after emotion suppression performed equally well on the subsequent self-control task as participants who had not exerted self-control previously. This finding suggests that a brief period of mindfulness meditation may serve as a quick and efficient strategy to foster self-control under conditions of low resources.

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## 1. Introduction

The literature on self-control depletion draws an unflattering picture of individuals low in self-control resources. They break their diets more readily (Vohs & Heatherton, 2000), give in to the allure of alcohol more easily (Muraven, Collins, & Nienhaus, 2002), cheat more often (Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009), manage their emotions less efficiently (Muraven, Tice, & Baumeister, 1998), perform poorer on intellectual tasks (Schmeichel, Vohs, & Baumeister, 2003), and spend more money on impulse (Vohs & Faber, 2007) as compared to individuals with more resources.

The psychological literature suggests that self-control failures contribute to many individual and societal problems such as obesity, drug use, aggression, unwanted pregnancies, or crime, to name just a few (for overviews, see Baumeister, Heatherton, & Tice, 1994; Vohs & Baumeister, 2011). Given the far-reaching consequences of self-control failures, one important challenge is to identify means fostering self-control even under conditions of low resources. The aim of the present study is to test the idea that a brief period of mindfulness meditation counteracts the deleterious effects of self-control depletion.

The strength model of self-control by Baumeister and colleagues posits that self-control in different domains relies on a common, limited resource (Baumeister, Schmeichel, & Vohs, 2007a; Baumeister, Vohs, & Tice, 2007b). According to this model, exerting self-control in one domain depletes this resource to a certain extent and increases chances of self-control failure in any other task requiring self-control thereafter. A host of studies delivered evidence consistent with this model (see Hagger, Wood, Stiff, & Chatzisarantis, 2010, for a recent meta-analysis).

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In light of the considerable consequences of self-control failures, researchers have recently begun to investigate the psychological and physiological processes that allow for good self-control even under conditions of low resources. Gailliot and colleagues (2007) showed that a dose of glucose improves self-control. The administration of glucose may be a reasonable strategy to improve self-control if the glucose derives from healthy products. Typically, healthy products contain glucose from polysaccharides. The metabolism requires considerable time to actually make glucose available from polysaccharides, which prevents many healthy products from serving as a quick counterstrategy to self-control depletion. More fast-acting glucose (from monosaccharides or disaccharides) is contained in many unhealthy sweet snacks or drinks that are often consumed in addition to one's regular diet. Therefore, the consumption of high-energy sweet snacks may not be a wise strategy to counter self-control depletion in the long run. However, not only glucose consumption counteracts low resources, but also internal psychological processes. An abstract information-processing mode activates and leads to a focus on personal standards and values, which in turn fosters self-control (Agrawal & Wan, 2009; Baumeister, DeWall, Ciarocco, & Twenge, 2005). For example, participants who had thought and written about one of their core values after having been depleted of self-control resources persisted longer on a tedious task (a numeric puzzle) than participants who had thought and written about the values of a different person (Schmeichel & Vohs, 2009).

In the present study, we investigated the possibility that a brief period of mindfulness meditation may be another way to boost self-control after resource depletion. Mindfulness meditation has been incorporated into several psychological interventions in medical and mental health settings with good efficacy (e.g., Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004; Hayes, 2004; Hoelzel et al., 2011; Kabat-Zinn, 1990) and in self-directed meditation trainings for laypersons in western cultures.

In mindfulness meditation, meditators strive to bring their complete attention to the present moment in a non-judgmental, accepting way (Kabat-Zinn, 1990). In a successful mindfulness meditation, meditators experience current feelings, thoughts, and bodily sensations with all senses very clearly and plainly, as something that passes by, without judging or evaluating it, and without having to act on these sensations. In a typical mindfulness exercise, meditators aim to focus their attention on a particular experience and become fully aware of this experience such as one's breath and the sensations it evokes in various parts of the body. Practiced regularly over a longer time span of months and even years, this state of mindfulness is considered to convert into a stable, dispositional tendency to be mindful (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown, Ryan, & Creswell, 2007).

The effects of mindfulness meditation have mostly been investigated in the context of clinical practice and research where it has been proven useful for a great number of psychological disorders and well-being in general (for an overview, see Brown et al., 2007). In recent years, growing evidence suggests that mindfulness meditation may also be beneficial for mechanisms involved in self-control. For example, it has been shown to improve emotion regulation (Baer, Smith, & Allen, 2004; Brown & Ryan, 2003) and aspects of attention regulation (Hodgins & Adair, 2010; Jha, Krompinger, & Baime, 2007), which is a crucial aspect of self-control processes (Baumeister et al., 1994; Metcalfe & Mischel, 1999). In addition, it is associated with improvements in executive functioning such as working memory and response inhibition (Chan & Woollacott, 2007; Zeidan, Johnson, Diamond, David, & Goolkasian, 2010) that subsequently led to improved socioemotional functioning and emotion regulation (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; Sahdra et al., 2011). More generally, there is preliminary evidence that meditation training can result in increased control and more efficient use of limited brain resources (Slagter et al., 2007).

Most of the published work has investigated the effects of mindfulness as a trait (as assessed with established mindfulness inventories, e.g., Baer et al., 2006; Brown & Ryan, 2003), often comparing experienced meditators with non-meditators, or employed meditation interventions usually lasting over periods of several weeks or months that compared the effects of these interventions with control groups (e.g., waiting lists; Brown et al., 2007; Hölzel et al., 2011). Much less research has investigated the effect of brief mindfulness interventions (lasting only several minutes) on various indicators of emotional, cognitive, and behavioral functioning (Brown et al., 2007). Some of these studies support the idea that even briefly introduced states of mindfulness could foster self-control. For example, participants who had engaged in a brief mindfulness meditation exercise showed a reduced negativity to repetitive thoughts (Feldman, Greeson, & Senville, 2010), a reduced dysphoric mood compared to a rumination and a distraction control groups (Broderick, 2005), and better emotion regulation as indicated by lower self-reported negative affect in response to negative pictures and a greater willingness to expose oneself to negative pictures (Arch & Craske, 2006, see also Erisman & Roemer, 2010).

Most relevant for present purposes are two studies that can be interpreted as reporting preliminary evidence for an improved ability to control a dominant response tendency after a mindfulness induction. First, a 9-min focused breathing exercise led to less spider-avoiding behavior as compared to control conditions in spider fearful participants (Hooper, Davies, Davies, & McHugh, 2011). Second, participants who were made mindful by means of a raisin-eating task (Kabat-Zinn, 1990) displayed less aggressive behavior after a social-rejection feedback than participants in a control condition, withstanding a possible impulse to aggress against the person who delivered the negative feedback (Heppner et al., 2008).

In sum, growing evidence demonstrates relations of trait mindfulness and mindfulness training studies on outcomes associated with executive functioning and self-control. Additional preliminary evidence points to the possibility that even very brief mindfulness manipulations may temporarily foster self-control. The present study adds to this work by focusing on the immediate effects of mindfulness meditation on self-control. That is, we investigated effects of a single, brief period of mindfulness meditation on self-control performance. Importantly, while extant research has focused on the effects of mindfulness under 'normal' conditions, the present research adds a dynamic element by examining the potential benefits of

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