



Mindfulness and mind wandering: The protective effects of brief meditation in anxious individuals



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ABSTRACT

Mind wandering can be costly, especially when we are engaged in attentionally demanding tasks. Preliminary studies suggest that mindfulness can be a promising antidote for mind wandering, albeit the evidence is mixed. To better understand the exact impact of mindfulness on mind wandering, we had a sample of highly anxious undergraduate students complete a sustained-attention task during which off-task thoughts including mind wandering were assessed. Participants were randomly assigned to a meditation or control condition, after which the sustained-attention task was repeated. In general, our results indicate that mindfulness training may only have protective effects on mind wandering for anxious individuals. Meditation prevented the increase of mind wandering over time and ameliorated performance disruption during off-task episodes. In addition, we found that the meditation intervention appeared to promote a switch of attentional focus from the internal to present-moment external world, suggesting important implications for treating worrying in anxious populations.

1. Introduction

Mind wandering accounts for almost half of our daily stream of consciousness (Killingsworth & Gilbert, 2010). A thought is identified as signifying mind wandering when it is: (1) unrelated to the current task, and (2) decoupled from the external environment (Stawarczyk, Majerus, Maquet, & D'Argembeau, 2011). For example, while writing an algebra exam in a large gymnasium, a thought about lemon pie would constitute mind wandering because it is both unrelated to the exam and independent of the external environment. Intuitively, we all know that mind wandering can cause us to make errors on important tasks (e.g., mailing an envelope without its contents), and consistent with this intuition, a considerable amount of research has demonstrated that mind wandering disrupts performance on numerous tasks that require focused attention (for a review see Mooneyham & Schooler, 2013). For example, mind wandering has been associated with an increased risk of injury and death while driving (Knowles & Tay, 2002), difficulties in educational settings (Seli, Wammes, Risko, & Smilek, in press), increased response variability in tasks assessing sustained attention (Seli, Carriere, Levene, & Smilek, 2013), and impaired performance in everyday life (McVay, Kane, & Kwapil, 2009).

Hence, there is an imperative need for strategies that not only reduce the occurrence of mind wandering but also ameliorate its disruptive impact on performance (Mooneyham & Schooler, 2013). A logical starting point is to investigate strategies that enhance mindfulness, a mental state that is, by definition, characterized by the absence of mind wandering. Mindfulness is commonly defined as “paying attention in a particular way, on purpose, in the present moment, and non-judgmentally” (Kabat-Zinn, 1994, p. 4). If mind

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wandering is a state characterized by the occurrence of task-unrelated and stimulus-independent thoughts (Stawarczyk, Majerus, Maquet, & D'Argembeau, 2011), then mindfulness, a state characterized by thoughts centred on the “here and now”, should be considered its opposite.

Indeed, research has found that individuals low in trait mindfulness report higher rates of mind wandering in everyday life (Carriere, Seli, & Smilek, 2013; Seli, Carriere, & Smilek, 2015). Meanwhile, several clinical trials have demonstrated that mindfulness-based therapy is effective in the reduction of both rumination and worry (i.e., a form of mind wandering) (for a review see Querret & Cropley, 2013). Despite these promising results, only a handful of studies have directly examined the impact of mindfulness training on mind wandering in a controlled experimental setting and research evidence is mixed. While mindfulness training appeared to be generally beneficial for unselected, healthy populations, it only exhibited protective effects for individuals with high negative affect.

Several studies have demonstrated that mindfulness training can reduce the frequency of mind wandering and ameliorate its disruptive impact on performance in general populations. In one such study (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013), university students who were given two weeks of mindfulness training showed improved performance on a GRE test and a working memory test, and reported less mind wandering during completion of both measures. In another study (Morrison, Goolsarran, Rogers, & Jha, 2014), university students who were given seven weeks of mindfulness training demonstrated higher response accuracy and reported more on-task thoughts during the Sustained Attention to Response Task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997). Similar results were revealed in more recent studies. Jazaieri et al. (2016) had a community sample complete a nine-week compassion meditation program, which led to significant reductions in their daily experience of mind wandering. Zanesco et al. (2016) conducted two studies in which unselected participants were given an intensive, residential mindfulness training for either one or three months and observed that participants engaged in less mind wandering and less mindless reading after training. Shorter mindfulness training delivered similar benefits. University students who practiced eight minutes of mindful breathing showed fewer attentional lapses during the SART, compared to those who received passive relaxation or a reading task (Mrazek, Smallwood, & Schooler, 2012).

However, for individuals experiencing high negative affect, available studies have only shown protective effects of mindfulness training on mind wandering. Jha et al. (2015) had two military cohorts complete eight weeks of either didactic-focused or practice-focused mindfulness training during a high-demand interval of pre-deployment training, while a third military cohort and a civilian sample received no training and served as control groups. Mindfulness training did not improve performance on the SART but prevented attentional lapses from increasing over the course of pre-deployment training, with the practice-focused intervention group outperforming the didactic-focused group (Jha et al., 2015). In a similar study, Jha, Stanley, Kiyonaga, Wong, and Gelfand (2010) delivered eight weeks of mindfulness training with daily practice to a military cohort during a stressful pre-deployment interval, while another pre-deployment military cohort and a civilian sample served as control groups. Results indicated that mindfulness training prevented degradations in working memory over the pre-deployment interval. However, this protective effect was only present for those who spent more time practicing mindfulness. The same results were replicated in a study conducted by Banks, Welhaf, and Srouf (2015). Participants who received one week of mindfulness training (15 min of guided practice plus daily home practice) showed no increase in working memory or decrease in mind wandering as measured during the working memory test. However, mindfulness training prevented working memory from decreasing following experimentally induced stress. It was concluded that mindfulness training was effective in reducing the negative impact of mind wandering only at low to moderate levels of negative affect (Banks et al., 2015).

Therefore, research has rendered mixed results on the specific impact of mindfulness on mind wandering. For the general population, mindfulness training appears to be effective in reducing the occurrence of mind wandering and improving task performance, regardless of its intensity. In contrast, for individuals experiencing high negative affect, mindfulness training did not reduce the occurrence of mind wandering and only prevented performance degradations. Taken together, existing research suggests that the extent to which mindfulness is effective in reducing mind wandering might be conditional on the characteristics of its target population. Mindfulness training only demonstrated protective effects for individuals encountering high stress either in real life (Jha et al., 2010, 2015) or in a laboratory setting (Banks et al., 2015). Unfortunately, research on this topic is limited and no conclusion can be drawn at this point.

People who are high in trait anxiety experience high levels of negative affect. However, to the best of our knowledge, no published study has investigated the effectiveness of mindfulness as a remedy for mind wandering in anxious people. Given anxious individuals tend to experience more off-task thoughts and have greater difficulty managing their wandering minds (for a review see Aldao, Nolen-Hoeksema, & Schweizer, 2010), it is particularly important to examine the extent to which mindfulness training is beneficial for this population. Moreover, research of this kind would provide more insight into the hypothesis that mindfulness training only has prophylactic effects for individuals experiencing high stress (Banks et al., 2015).

Despite some encouraging findings from recent studies, research examining the impact of mindfulness on mind wandering is still in a preliminary stage. The underlying mechanism(s) by which mindfulness attenuates mind wandering is left entirely to speculation. One promising line of research focuses on motivational states (Unsworth & McMillan, 2013). Recent research from our lab suggests that higher motivation to succeed on a laboratory task was associated with less mind wandering and better performance (Seli, Cheyne, Xu, Purdon, & Smilek, 2015). Given the absence of research linking mindfulness to motivation, the current study served as an attempt to explore this possible association.

The goal of the current study was to: (1) examine whether a brief mindfulness meditation would have protective effects on mind wandering among anxious individuals, and (2) explore the extent to which mindfulness might influence one's motivational states. In particular, undergraduate students high in trait anxiety completed two blocks of the Metronome Response Task (MRT), which

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