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The protective effects of brief mindfulness meditation training

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ABSTRACT

Mindfulness meditation has gained a great deal of attention in recent years due to the variety of physical and psychological benefits, including improved working memory, decreased mind wandering and reduced impact of stress on working memory. The current study examined a 1-week at home mindfulness meditation intervention compared to an active control intervention. Results suggest that mindfulness meditation does not increase working memory or decrease mind wandering but does prevent stress related working memory impairments. Mindfulness meditation appears to alter the factors that impair working memory such that the negative impact of mind wandering on working memory was only evident at higher levels of negative affect. The use of cognitive mechanism words in narratives of stressful events did not differ by condition but predicted poorer working memory in the control condition. The results support the use of an at home mindfulness meditation intervention for reducing stress-related impairments.

1. Introduction

Mindfulness meditative practices focus on experiencing present-moment awareness without attempts to suppress, judge, or emotionally react to any stimuli (Kabat-Zinn, 1994). A wide variety of practices can be considered mindfulness meditation. However, these practices can be classified in two major groups that attempt to improve awareness through increases in focused attention and through open monitoring of sensations without reactivity to the sensations or thoughts (Davidson & Goleman, 1977). Mindfulness meditation techniques designed to improve focused attention include instructing participants to focus on their breath or bodily sensation. Techniques designed to improve open monitoring strategies focus on improving the individual's ability to experience thoughts without attempts to suppress or react to unwanted thoughts (Lutz, Slagter, Dunne, & Davidson, 2008). Mindfulness based meditation impacts a variety of cognitive functions, including reductions in the impact of repetitive thoughts (Feldman, Greeson, & Seville, 2010), decreases in emotional interference on cognitive tasks (Ortner, Kilner, & Zelazo, 2007), increases in sustained attention (Morrison, Goolsarran, Rogers, & Jha, 2014), mood and attention (Baer, 2009; Jha, Krompinger, & Baime, 2007), working memory (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; Mrazek, Franklin, Phillips, Baird, & Schooler, 2013), and decreases in mind wandering (Morrison et al., 2014; Mrazek et al., 2013). Of specific interest to the current study are changes in working memory (WM) and mind wandering.

Impairments in WM have been shown to occur following psychosocial stressors (Oei, Everaerd, Elzinga, Van Well, & Bermond, 2006) and self-reported negative life stress (Klein & Boals, 2001). Psychological stress related WM impairments may be due to intrusive thoughts regarding the negative life event (Klein & Boals, 2001). Intrusive thoughts or a more general

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form of task-unrelated thoughts (TUTs), mind wandering, impairs performance on WM (Klein & Boals, 2001) and sustained attention tasks (Banks, Tartar, & Welhaf, 2014; McVay & Kane, 2009).

Negative affect may be responsible for impaired WM following a psychological stressor. Stressful events result in increases in negative affect (Stawski, Sliwinski, Almeida, & Smyth, 2008). Increases in negative affect increase mind wandering (Smallwood, Fitzgerald, Miles, & Phillips, 2009) and impair WM (Curci, Lanciano, Soleti, & Rime, 2013). It is possible the impact of mind wandering on WM is greatest when negative affect is high. Interventions that prevent increases in negative affect or alter the impact of mind wandering on working memory may prevent impairment in working memory from occurring.

Mindfulness meditation may help prevent stress related decreases in WM. Specifically, mindfulness meditation that aims to improve open monitoring of thought may provide a greater reduction in stress related decreases in WM. An 8-week brief mindfulness meditation training with an active duty military cohort during a stressful pre-deployment period, demonstrated improvements in WM in individuals that practiced the meditation intervention most (Jha et al., 2010). Cognitive benefits resulting from mindfulness meditation interventions may be due to reductions in mind wandering. A 2-week mindfulness training with college students evidenced increases in WM, GRE reading comprehension scores and decreases in TUTs during the GRE task compared to participants in a control condition who completed a nutrition class (Mrazek et al., 2013). WM performance improvements were mediated by reductions in TUTs. Similar increases in sustained attention and decreases in TUTs were observed following a 7-week training, but no increases in WM occurred (Morrison et al., 2014).

Although prior work (Mrazek et al., 2013) has provided important clues as to the mechanism by which mindfulness meditation improves cognitive functioning, the control group did not sufficiently control for participant expectancy. Controlling participant expectancy is critical for studies examining cognitive benefits of mindfulness meditation because the intervention stresses focus of attention and minimizing distractions. The use of an active control reduces participant expectancy concerns only when expectation of improvement is similar across conditions (Boot, Simons, Stothart, & Stutts, 2013). The current study will address this concern by using an active control group that produces similar participant expectations.

The current study focused on examining the impact of a mindfulness meditation training (MMT) intervention on WM and mind wandering. To this end, we examined the impact of an acute 15-min intervention on WM and TUTs, in comparison to a relaxation training (RT) intervention designed to generate equivalent expectancy. The two interventions are similar in that they both include focused attention meditation practices that instructed the individual to focus on their breath during the training. However, the MMT extends beyond the breathing techniques and includes open monitoring meditation training. Specifically, participants were instructed to notice instances of mind wandering in a non-judgmental manner and redirect attention rather than suppress the thought. We hypothesized that MMT condition participants would evidence increases in WM and reductions in TUTs following the 15-min intervention but similar changes would not occur in the RT condition. We were also interested in examining the impact of a 1-week MMT completed at home. We hypothesized MMT condition participants would experience further increases in WM and decreases in TUTs, while similar changes would not occur in the RT condition.

Finally, we examined the ability of a brief mindfulness meditation to prevent the negative impact of stress on WM. Participants engaged in a brief psychological stressor involving writing about a personal negative life event. We hypothesized that MMT condition participants would not experience changes in WM or TUTs following the psychological stressor. However, we hypothesized that RT condition participants would experience decrements in WM and increases in TUTs following the stress manipulation. Specifically, we hypothesized that following the stressor, impairments in WM would be predicted by rates of TUTs and negative affect in the RT but not MMT condition.

The written narratives produced during the stressor will be examined to determine if word use predicts changes in WM. Narratives about stressful events include a greater percentage of cognitive mechanism words (e.g. words about cause and insight) than narratives about less stressful events (Boals & Klein, 2005). It has been argued that higher levels of cognitive mechanism word use reflects an active search for meaning (Klein & Boals, 2010) and an attempt to engage in a meaning making process (Boals, Banks, Hathaway, & Schuettler, 2011). We believe the search for meaning will result in impaired WM due to intrusive thoughts about the event rather than focus on a subsequent task. Therefore, we hypothesized that rates of cognitive mechanism words would be negatively related with WM following the writing in the RT but not the MMT condition.

2. Methods

2.1. Participants

Eighty meditation-naive undergraduate students from Nova Southeastern University participated for partial course credit and were randomly assigned to the MMT condition ($n = 40$) or RT condition ($n = 40$). Sixteen participants failed to return within the required 10-days between sessions and two participant's Session 2 data was lost due to computer malfunction. Resulting in a sample of 62 participants at Session 2 (48 Female) with 34 in the MMT condition ($M = 21.91$ years old, $SD = 7.89$; 25 Female; 17 Caucasian, 10 Hispanic, 6 African–American, 1 other) and 28 in the RT condition ($M = 19.82$ years old, $SD = 4.21$; 22 Female; 13 Caucasian, 7 Hispanic, 5 African–American, 2 Asian–Pacific Islander, 1 other). Participants who failed to return did not differ from those who returned on any Session 1 measures, p's > .05. Procedures were approved by the Nova Southeastern University Institutional Review Board. Two exclusion criteria were applied to the current sample.