Effect of brief mindfulness meditation on expressive writing

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Effect of Brief Mindfulness Meditation
on Expressive Writing

A thesis presented to the Faculty
of the University at Albany, State University of New York
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy
College of Arts and Sciences
Department of Psychology

Alvin Poon
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Abstract

An impressive body of research indicates that expressive writing, which encourages participants to let go and explore their deepest thoughts and feelings while writing continuously, produces physical and psychological benefits. Mindfulness is defined as paying attention on purpose, in the present moment and nonjudgmentally, to the unfolding of experience moment by moment. Combining the concepts of expressive writing and mindfulness together, one could argue that an individual who is mindful is more capable of paying attention to the writing process in the present moment as well as to the experience of the actual event and to the internal and external events that followed. In addition, the literature suggests that mechanisms underlying the effectiveness of expressive writing, such as disinhibition, exposure to negative affect, and shifts in cognitive coping, are potential mechanisms that may also underlie the effectiveness of mindfulness interventions. The current study aimed to examine the effects of a mindfulness-enhanced expressive writing intervention among college students by introducing a brief mindfulness meditation prior to an expressive writing exercise. Results showed that individuals who practiced a brief mindfulness meditation training prior to writing experienced superior physical and psychological benefits relative to those in a comparison group who engaged in a listening activity, and they also reported an increase in mindfulness measured as a state. The study also replicated findings that individuals with higher baseline trait mindfulness scores responded better to expressive writing relative to those with lower baseline trait mindfulness scores.
Table of Contents

List of Tables..............................................................................................................iv
List of Figures.............................................................................................................. v
Introduction ..................................................................................................................1
Method ..........................................................................................................................17
Results .........................................................................................................................26
Discussion ....................................................................................................................34
Tables ............................................................................................................................46
Figures ..........................................................................................................................53
References.....................................................................................................................57
Appendix.......................................................................................................................80
List of Tables

Table 1. Means for Baseline and Follow-up of Outcome Measures by Condition.......46

Table 2. Zero-order Correlations Between Mindfulness and Outcome Measures at Baseline........................................................................................................47

Table 3. Zero-order Correlations Between Mindfulness and Outcome Measures at Follow-up........................................................................................................48

Table 4. Estimated Marginal Means of Follow-up Scores of Outcome Measures by Condition........................................................................................................49

Table 5. Estimated Marginal Means of State Mindfulness by Condition.............50

Table 6. Predicted Scores of Outcome Measures by Levels of Mindfulness........51

Table 7. Change in $\Delta R$ and F Value for Each State Mindfulness Measure in Regression Model........................................................................................................52
List of Figures

Figure 1. Change in TMS across Sessions by Condition.................................................53
Figure 2. Moderating Effect of Baseline FFMQ for PSQI.............................................54
Figure 3. Moderating Effect of Baseline FFMQ for PILL.............................................55
Figure 4. Moderating Effect of Baseline FFMQ for BSI.............................................56
Introduction

More than two decades ago, Pennebaker and Beall (1986) conducted the first expressive writing experiment. Results showed that participants who described the facts and expressed their deepest emotions about a traumatic event had better health outcomes four months later than participants in three other groups who were randomly assigned to different writing tasks. The ability of this parsimonious writing paradigm to confer health improvements has since garnered considerable empirical attention, and now over 400 expressive writing studies have been published.

Early expressive writing studies were conducted primarily with college samples, as reflected in the predominance of student participants in the first meta-analysis by Smyth (1998). Since then, expressive writing has been extended to a diverse range of populations, such as medical patients with asthma or rheumatoid arthritis (Kelley, Lumley, & Leisen, 1997; Smyth, Stone, Hurewitz, & Kaell, 1999), chronic pain (Norman, Lumley, Dooley, & Diamond, 2004), AIDS (Petrie et al., 2004), fibromyalgia (Broderick, Junghanenel, & Schwartz, 2005) and cancer (De Moor et al., 2002; Henry, et al., 2010; Low, Stanton, Bower, Gyllenhammer, 2010; Stanton et al., 2002). In addition, more specific life circumstances have been examined, including break-up with a romantic partner (Lepore & Greenberg, 2002), death of loved one (Kovac & Range, 2000), unemployment (Spera, Buhrfeind, & Pennebaker, 1994), natural disaster (Smyth et al., 2002), and general stressful events (Schoutrop, Lange, Hanewalk, Davidovich, & Salomon, 2002). In all of these studies, the expressive writing groups showed superior physical or psychological benefits when compared to control groups at follow-up, which supports the utility of expressive writing in various populations.
In contrast, there have been instances in which the expressive writing intervention yielded a negative outcome at follow-up -- beyond the increase in negative mood that typically occurs immediately following writing (Smyth, 1998) -- such as increased physiological symptoms or distress. In particular, this has been shown among participants with severe trauma history or with psychiatric disorders (Batten, Follette, Hall, & Palm, 2002; Gidron, Peri, Connolly, & Shalev, 1996; Richards, Beal, Seagal & Pennebaker, 2000). In addition, some expressive writing studies have found no effects on outcomes, i.e., no significant differences before and after writing (Austenfeld et al., 2006; Bower et al., 2003; Harris et al., 2005; Keefe et al., 2008; O’Connor & Ashley, 2008; Rivkin et al., 2006; Vedhara et al., 2007; Zakowski et al., 2004). A meta-analysis by Meads and Nouwen (2005) that reviewed 61 studies concluded that in general expressive writing did not produce improvement on most physical and psychological outcomes. However, a larger meta-analysis by Frattaroli (2006) reviewed 146 studies and reported an effect size of $r = .075$. Although the magnitude of the effect size differs considerably from that reported by Smyth (1998), the random effects approach adopted in Frattaroli’s (2006) meta-analysis is more generalizable in terms of extrapolating to other studies not in the analysis or future studies. Given the relatively short duration of expressive writing (typically 20 minutes per session for three days) and its cost effectiveness compared with hours of weekly psychological intervention techniques, an effect size of .075 is still impressive. As in the case of evaluating any psychological intervention, there is always the crucial question proposed by Paul (1967), “What treatment, by whom, is most effective for this individual with that specific problem, and under which set of circumstances?” (p. 111). It appears that the ‘what’ component has been confirmed
based on the effect size from meta-analyses, but the remainder of the question can only be answered by examining the intricacy of the expressive writing paradigm.

**Moderators in Previous Research**

Since Pennebaker’s review in 1997 and Smyth’s meta-analysis in 1998, many variations of expressive writing have been tested with different participants, procedures, and settings to maximize the utility of the intervention (Frattaroli, 2006). Moderating factors can enhance or attenuate the effect of a writing intervention. In some cases, the examination of moderators can even reveal the opposite of the desired effect in individuals. Among these efforts, individual differences play an important role, given that participants often respond differently to the intervention based on their personal characteristics. Many studies have attempted to predict which individual variables are beneficial in expressive writing. In an early review by Pennebaker (1997), no individual difference factors were found to moderate the effects of expressive writing. Since then, a plethora of research has identified personality markers that interact with outcomes of expressive writing. For example, Christensen and colleagues (Christensen & Smith, 1993; Christensen et al., 1996) found that participants high in hostility benefited more from expressive writing compared to those low in hostility. In an expressive writing study that examined optimism (Cameron & Nicholls, 1998), optimists improved in both the self-regulation and disclosure group, while pessimists showed improvement only in the self-regulation group. One study (Lewis et al., 2005) found that participants who were less open about their sexual orientation experienced reduced confusion and less stress two months after an expressive writing task. On the other hand, those who were more open about their sexual orientation reported more stress and confusion two months after
writing. Norman, Lumley, Dooley, and Diamond (2004) found that greater ambivalence over emotional expression predicted reduction in daily and physical disability among chronic pelvic pain patients assigned to an emotional disclosure condition, whereas ambivalence predicted an increase in daily and physical disability among controls. Avoidance, another potential moderator assessed by expressive writing researchers, has produced inconsistent findings. Stanton et al. (2002) demonstrated that women’s avoidance of thoughts and feelings related to cancer interacted with writing conditions in breast cancer patients. Women high in avoidance reported more distress when instructed to write about their deepest thoughts and emotions but less distress when instructed to write about positive thoughts and feelings. However, women low in avoidance experienced less distress when discussing their deepest thoughts and emotions but more uncomfortable describing their positive thoughts and feelings. In contrast, a similar study conducted by Smyth et al. (2002) with patients who had either asthma or rheumatoid arthritis found that avoidance did not moderate the benefits of expressive writing. Contrasting findings have also been found regarding repressive coping style. In one study, individuals with a repressive coping style responded less favorably to expressive writing (Lumley, Tojek, & Macklem, 2002), whereas in another study repressive coping style did not moderate the health benefits of expressive writing (Baikie, 2008).

Among the moderators identified in the expressive writing literature, perhaps the most studied is alexithymia, in which individuals have difficulty describing and identifying emotions. Studies examining alexithymia and expressive writing have presented a mixed picture. Participants who scored higher in alexithymia at baseline showed increased physical symptoms or impairment in the expressive writing condition.
at follow-up relative to baseline but less physical symptoms in the control condition at follow-up relative to baseline (Kelley, Lumley, & Leisen, 1997; Lumley, Naoum, & Kelley 2001). In a review paper, Lumley (2004) discussed marginally significant results from two studies that indicated expressive writing may be contraindicated for individuals who are unable to express emotions. In addition, Niles et al. (2013) also found participants who were low in emotion expressiveness had increase in anxiety after engaging in expressive writing. Although the above research appeared to support the notion that alexithymia interfered with the effects of expressive writing, other studies have suggested otherwise: expressive writing benefited participants who were high in alexithymia in several studies (Baikie, 2008; Lu & Stanton, 2009; Paez, Velasco, & Gonzalez, 1999; Solano et al., 2003), though another study (Smyth, Anderson, Hockemeyer & Stone, 2002) failed to support a moderating effect of alexithymia. Similarly, Wong and Rochon (2009) had men who tend to be emotionally restricted write expressively about best possible emotional connectedness with an imagined romantic partner and found decreased distress for the expressive writing group.

**Mindfulness**

In view of the conflicting findings that have emerged from studies of moderators such as alexithymia in expressive writing, it appears that more work is needed to clarify moderator effects. Recently, researchers have turned to mindfulness, which could be conceptualized as being related to alexithymia, considering that both describe how people handle and process their internal experience (Baer et al., 2006). More specifically, mindfulness has been described as paying complete attention to the experiences occurring presently, in a nonjudgmental way or an accepting stance (Bishop et al., 2004; Brown &
Ryan, 2003; Kabat-Zinn, 1994). Empirical research to date has supported the role of mindfulness in well-being. Using trait measures of mindfulness, mindfulness has been associated with various indices of mental and physical well-being. Roberts and Danoff-Burg (2010) found that trait mindfulness was correlated with perceived health, health-related activity restriction, and several health behaviors in college students, and that these relations were partially mediated by stress. Other researchers have also studied the association between mindfulness and well-being (Caldwell et al., 2011; Howell et al., 2011), as well as inverse relationships between mindfulness and psychological distress in college students (Hinterman et al., 2012; Jimenez et al., 2010; Masuda & Tully, 2012; Palmer & Rodger, 2009), and all of them pointed to the benefits of mindfulness. The mindfulness trait has been associated with lower levels of emotional disturbance (e.g., depressive symptoms, anxiety, and stress), higher levels of subjective well being (e.g., lower negative affect, higher positive affect, and satisfaction with life) and higher levels of eudaimonic well being (e.g., vitality, self-actualization) (Brown & Ryan, 2003; Carlson & Brown, 2005; Carmody & Baer, 2008; Howell et al., 2008). Mindfulness has also been shown to correlate inversely with a variety of indicators of psychopathology, including dissociation, alexithymia, and general psychological distress (Baer et al., 2006; Cash & Whittingham, 2010; Walach et al., 2006). In addition, mindfulness has been positively related to extroversion (Brown & Ryan, 2003) and negatively related to neuroticism (Bear et al., 2006); both of these personality dispositions have been linked to affective well-being (Diener, Suh, & Lucas, 1999).

There is some indication that, aside from benefits of a mindful disposition, simply being in a mindful state is associated with greater well-being. For example, a heightened
state of mindfulness was associated with higher positive affect and lower negative affect, after controlling for variance attributable to trait mindfulness (Brown & Ryan, 2003), suggesting that the benefits of mindfulness are not limited to those with a general disposition to be mindful. The blossoming possibilities of mindfulness as both a trait and state have led researchers to utilize brief experimental inductions of a mindful state to examine its effects on the regulation of affect and behavior. These include reduced negative affect (Arch & Craske, 2006; Broderick, 2005; Erisman & Roemer, 2010; Feldman et al., 2010; Huffziger & Kuehner, 2009) and increased pain tolerance (Kingston, Chadwick, Meron, & Skinner, 2007; Zeidan, Gordon, Merchant, & Goolkasian, 2010).

**Mindfulness-based Interventions**

There are a number of interventions that incorporate mindfulness skills and meditation as part of treatment. These interventions were developed for different target populations and many of the treatment approaches are conducted in group settings. The common thread that unites the various mindfulness-based interventions is a focus on the primary mindfulness skill of attending to emotions, cognitions, and bodily responses in a non-judgmental, accepting manner. Outcome studies of the first modality, Mindfulness-Based Stress Reduction (MBSR), began appearing in the medical and psychological literature three decades ago (Kabat-Zinn, 1982). Other approaches have followed since that time, including Mindfulness-Based Cognitive Therapy (MBCT; Teasdale et al., 2000), Acceptance and Commitment Therapy (ACT; Hayes et al., 1999), and Dialectical Behavior Therapy (DBT; Linehan, 1993).
Mindfulness intervention research has provided evidence for reductions in a variety of psychopathological symptoms, while enhancing mental health and well-being. Randomized clinical trials (RCTs) of MBSR with nonclinical populations show that MBSR is effective in reducing self-reported distress (Astin, 1997; Monti et al., 2005; Nyklicek & Kuijpers, 2008; Shapiro, Schwartz, & Bonner, 1998; Tacon et al., 2003; Williams, Kola, Reger, & Pearson, 2001), stress symptoms, and mood disturbance (Speca, Carlson, Goodey, & Angen, 2000), while increasing affect regulation (Tacon et al., 2003) and trait mindfulness (Cohen-Katz et al., 2005). Supporting the role of mindfulness enhancement itself in producing MBSR effects, Speca et al. (2000) showed that more time spent in home-based and group mindfulness practices was associated with greater reductions in stress symptoms and mood disturbance. In addition, RCT studies of ACT showed reductions in symptoms and rehospitalizations in psychotic patients (Bach & Hayes, 2002) as well as reduced self-harming behaviors and improved measures of emotion regulation, mental health, and stress in borderline personality disorder patients (Gratz & Gunderson, 2006). In healthy stressed populations, ACT has been shown to be effective in reducing psychological symptoms (Bond & Bunce, 2000) and in reducing stigmatizing attitudes and burnout in counselors (Hayes et al., 2004). In clinical populations with psychiatric disorders, case studies, multiple baseline treatment studies, and a single randomized clinical trial provide evidence that ACT is an effective treatment for anxiety disorders, including obsessive compulsive disorder (Twohig et al. (2010), social anxiety disorder (Dalrymple & Herbert, 2007), panic disorder (Eifert et al., 2009), generalized anxiety disorder (Wetherell et al., 2011) and posttraumatic stress disorder (Orsillo & Batten, 2005). Two well-conducted RCTs have shown that MBCT is effective
in reducing depression relapse rates in participants with a history of three or more depressive episodes (Ma & Teasdale, 2004; Teasdale et al., 2000). In addition, Kuyken, Byford, and Taylor (2008) suggested that MBCT produces comparable outcomes in people using antidepressant medication in terms of relapse and superior outcomes concerning residual depressive symptoms, psychiatric comorbidity and quality of life. Controlled studies of DBT in borderline personality disorder samples have shown that DBT reduces distress symptoms (Bohus et al., 2004; Turner, 2000), suicidal ideation (Koons et al., 2001) and improves social adjustment (Bohus et al., 2004; Linehan et al., 1999) and global mental health functioning (Turner, 2000).

Aside from psychological symptoms and mental health, there is now accumulating evidence that mindfulness, and specifically, mindfulness-based interventions, may also have salutary effects on physical health more generally. Controlled studies of MBSR and MBCT demonstrated effectiveness in reducing medical symptoms and increasing health-related quality of life in healthy stressed (Monti et al., 2005), multiple sclerosis (Grossman, Kappos, & Gensicke, 2010), rheumatoid arthritis (Pradhan, Baumgarten, & Langenberg, 2007), and cancer patient populations (Carlson, Speca, & Patel, 2003; Foley et al., 2010; Williams et al., 2001). Research also suggests that MBSR may produce changes in markers of health such as skin clearing after phototherapy (Kabat-Zinn et al., 1998) and reduction in resting and systolic blood pressure (Barnes, Davis, Murzynowski, & Treiber, 2004). Controlled studies have also shown positive effects of mindfulness interventions on immune system functioning. Davidson et al. (2003) found that MBSR participants had enhanced immune responsiveness compared to control participants. The responses were associated with
greater EEG-assessed left-sided neural activation to an experimental mood induction, suggesting a neural basis for enhanced affect regulation and immune adaptation.

Moreover, Creswell et al. (2009) provided initial evidence that MBSR can buffer CD4+ T lymphocyte declines in an ethically diverse sample of HIV-1-infected adults. Finally, an effect size analysis in clinical samples performed in 2010 (Hoffman, Sawyet, Witt, & Oh) suggests that MBCT has a high effect size, while MBSR has a moderate effect size, in improving anxiety and mood symptoms from pre- to post-treatment. Moreover, a meta-analysis (Öst, 2008) showed mean effect sizes of 0.68 and 0.58 for ACT and DBT, respectively.

*Connection between Mindfulness and Expressive Writing*

Mindfulness can be seen as overlapping with expressive writing in a number of ways. One of the proposed explanatory mechanisms of expressive writing is that it mirrors exposure therapy (Bootzin, 1997). A key element of exposure therapy is the development, through repeated imaginary exposure, of a coherent and meaningful account of a traumatic event (Foa & Kozak, 1986). Expressive writing can serve as a context that allows a person, through several writing sessions, to repeatedly confront, describe, and relive the thoughts and feelings about one’s traumatic event, and eventually the repetition will contribute to corrective processing of the experience (Pennebaker, 1997). Thus, expressive writing shares some characteristics with mindfulness in this regard, since mindfulness requires sustained attention to current experiences as they occur (Bishop et al., 2004), and the voluntary exposure to aversive stimuli may lead to a reduction in emotional reactivity and more adaptive behavioral responses (Brown, Ryan, & Creswell, 2007).
Conceptualizing expressive writing in an exposure framework also may explain the cognitive changes produced by the intervention. As Brody and Park (2004) suggested, expressive writing involves an increased awareness. As the writing progresses, a person may gain insight into the trauma and discover previously masked feelings and thoughts (Pennebaker, 1993). Expressive writing researchers have emphasized that the processing of a traumatic experience requires producing a coherent narrative that involves changing existing schemas (Danoff-Burg, Mosher, Seawell, & Agee, 2010; Pennebaker, 1997; Pennebaker & Segal, 1999; Ramirez-Esparza & Pennebaker, 2006; Smyth & Pennebaker, 1999; Smyth, True, & Souto, 2001). The formation of a coherent narrative is thought to organize and integrate the traumatic event in order for benefits to occur. In fact, the cognitive processing perspective was first introduced in Piaget’s cognitive development theory (1983), wherein individuals can either assimilate the experience into their existing schema or accommodate their schema to the new experience. More specifically, one has to assimilate the traumatic experience into one’s conceptual system or alter one’s schema so that the traumatic experience can be accommodated (Sloan & Marx, 2004). Within the expressive writing paradigm, the accommodation of one’s existing schema to the traumatic event is thought to be a reason for the salutary effect (Pennebaker & Seagal, 1999). Along the same lines, mindfulness involves acceptance and awareness that fosters a willingness to face and accept thoughts and emotions (Brown, Ryan, & Creswell, 2007); therefore, the attribute of being able to accept and be aware of one’s internal experience will facilitate the accommodation process that produces expressive writing’s positive effects.
Moderating Effect of Mindfulness in Expressive Writing

A recent study examined this potential connection between mindfulness and expressive writing in a college student sample, but the intervention did not result in significant differences between the expressive writing group and the control group (Moore, Brody, & Dieberger, 2009). The authors reported an association of higher baseline mindfulness with reduction of depression and distress in the control condition and also an association of change of mindfulness scores with reduction of depression and distress in the expressive writing condition. Other researchers (Poon & Danoff-Burg, 2011) conducted a study similar to Moore et al. (2009) and found a different pattern of results. First, expressive writing was associated with benefits in physical and psychological health compared to a control condition. Second, mindfulness influenced the extent of benefits produced by expressive writing. Participants who scored higher in trait mindfulness at baseline benefitted more from disclosing their emotions and thoughts regarding stressful experiences than did those with lower levels of trait mindfulness.

An explanation of how mindfulness facilitates expressive writing is that an individual who is mindful will be more capable of paying attention to the writing process in the present moment and perhaps was more capable of paying attention to the experience of the actual event and to the internal and external events that followed. The ability to attend mindfully to the writing process and willingness to reimagine past stressful or traumatic experiences are both advantageous in expressive writing (Brody & Park, 2004; Sloan & Marx, 2004). As Brody and Park (2004) argued, expressive writing shares similarities with mindfulness-based interventions such as MBSR (Kabat-Zinn, 1982) and MBCT (Teasdale et al., 2000)
that involve practicing mindfulness skills to facilitate change. First, both focus on the present; participants in mindfulness-based interventions pay attention to their here-and-now experiences, whereas participants in expressive writing interventions write about their current thoughts and feelings about a stressful or traumatic event. Second, the mechanisms underlying both interventions may be similar. Theories of expressive writing mechanisms reviewed by Sloan and Marx (2004) and Fratteroli (2006) such as exposure, cognitive change, and self-regulation mirror the theories of how mindfulness confers benefits (Baer, 2003, 2007). Therefore, it is not surprising that individuals who were mindful reaped more benefits from expressive writing than those who were less mindful. As much as expressive writing might have in common with mindfulness-based interventions, the writing process did not result in any significant change in mindfulness in either study (Moore et al., 2009; Poon & Danoff-Burg, 2011). However, considering that both studies measured mindfulness as a trait, it is not surprising that there was no change in mindfulness as opposed to increases over time in mindfulness found in studies of mindfulness-based interventions (e.g., Carmody & Baer, 2008; Carmody, Reed, Kristeller, & Merriam, 2008).

Present Study

There is support for the notion that expressive writing is an intervention that in general confers physical and psychological benefits. The literature also provides support that mindfulness is associated with physical and psychological well-being. Furthermore, the experimental induction of a mindful state, through mindfulness-based interventions, has been shown to bring about physical and psychological benefits. In light of the
possible connection between expressive writing and mindfulness, including relevant studies that demonstrated a moderation effect of mindfulness in expressive writing, the present study examines whether the induction of a mindful state will have an enhanced effect in expressive writing.

The purpose of the present study is to extend previous research with mindfulness as a moderator of expressive writing by examining whether brief mindfulness meditation will enhance expressive writing’s impact on physical and psychological outcomes. Previous research has established the moderating effect of mindfulness in expressive writing, but the writing process did not result in change in mindfulness (Moore et al., 2009; Poon & Danoff-Burg, 2011). On the other hand, most mindfulness-based intervention studies have found an increase in mindfulness after the intervention (Carmody & Baer, 2008; Carmody et al., 2008; Klatt, Buckworth & Malarkey, 2009; Shapiro, Brown, Thoresen, & Plante, 2011). For example, a brief mindfulness meditation training that consisted of 3-day 20 minutes sessions showed an increase in trait mindfulness after the training (Zeidan, Gordon, Merchant, & Goolkasian, 2010). This type of training is used to induce a mindful state in the present study, given its simplicity and the fact that other interventions such as MBSR or DBT incorporate multiple treatment components in addition to mindfulness. The present study examined whether the delivery of brief mindfulness mediation training will result in an increase in mindfulness and whether such an increase will then enhance the effects of the subsequent expressive writing.

To further explore the connection between expressive writing and
mindfulness in the current study, a brief mindfulness meditation training was utilized as a tool to increase participants’ general mindfulness skill. The brief mindfulness meditation training then paves way for the subsequent expressive writing, in which participants were reminded to write in the state they just experienced during the brief mindfulness training. During the expressive writing activity, participants were expected to benefit from the mindfulness meditation training they had just received.

The present study consisted of two groups: an experimental group that engaged in a brief mindfulness meditation exercise followed by expressive writing, and a comparison group that engaged in a listening activity (as a control) followed by expressive writing. Although it is common for expressive writing studies to include a neutral writing control group, we decided not to include one given that (a) expressive writing’s benefits are well-documented and (b) the present study is focused on whether mindfulness training enhances the effect of expressive writing.

Research Hypotheses

*Hypothesis One*

It was predicted that at 1-month follow-up, participants in the experimental (mindfulness meditation and expressive writing) group would show a significant increase in physical and psychological benefits relative to the comparison (listening to audio book and expressive writing) group.

*Hypothesis Two*

It was predicted that participants in the experimental (mindfulness
meditation and expressive writing) group would show a significant increase in state mindfulness across writing sessions relative to participants in the comparison (listening to audio book and expressive writing) group.

Hypothesis Three

It was predicted that the physical and psychological benefits experienced in both the experimental (mindfulness meditation and expressive writing) group and comparison (listening to audio book and expressive writing) group would be moderated by individual differences in trait mindfulness. Specifically, it was anticipated that participants in the experimental group who were higher in baseline trait mindfulness would show a more positive response to expressive writing, based on previous studies’ findings that mindfulness facilitated the process of expressive writing.

Hypothesis Four

It was predicted that the experimental (mindfulness meditation and expressive writing) group’s narratives would show a significant increase in use of present tense, cognitive processing words, and positive and negative emotion words across writing sessions relative to the comparison (listening to audio book and expressive writing) group as analyzed with Linguistic Inquiry and Word Count software (LIWC; Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). This text analysis program evaluates narratives using a dictionary of more than 2,300 words/word stems that are grouped into 74 categories. The program provides percentages of total words used that fall into each category, thus controlling for absolute text length. Previous studies have examined the linguistic predictors in
expressive writing that are related to the concept of mindfulness. Moore and Brody (2009) found that an increase in cognitive processing words from the first to third narrative and an increase in present tense predicted an increase in mindfulness. In addition, Tausczik and Pennebaker (2010) suggested that verb tense could indicate temporal focus of attention and psychological distance and usage of present tense can show an immediate attention and decrease psychological distance. Finally, Pennebaker, Mehl, and Niederhoffer (2003) found that participants who used a high number of positive emotion words and a moderate number of negative emotion words were more likely to benefit from expressive writing. The present study posits that mindfulness meditation will allow participants to more readily accept their emotional experiences.

Method

Participants

A total of 128 undergraduate students enrolled in psychology courses at the University at Albany were recruited through the Psychology 101 Research Pool. The experiment was described to the participants as a 4-session study in which participants would complete questionnaires, listen to a recording, and write about a personal event. Eligible participants were: (a) at least 18 years old; (b) able to write in English for 20 minutes; and (c) had no previous experience with meditation. A power analysis was conducted based on two groups and an estimated medium effect size of $d = 0.47$. To determine if an effect is present, with alpha set at .05, power at .80, and beta at .20, 57 participants per group are required. The estimated effect size was based on studies using similar mindfulness inductions without expert instructions (Broderick 2005; Erisman &
Roemer, 2010; Feldman, Greeson, & Senville, 2010). Out of the 128 participants, eight were excluded from the data set (three withdrew after the first session, and five did not complete the follow-up questionnaire.) Thus, data from 120 participants (55 male, 65 female) who completed the baseline, listening and writing tasks, and follow-up questionnaires were included in the analysis.

Participants ranged in age from 18 to 26+ years ($M = 19.28$, $SD = 1.36$), and the ethnic distribution of the participants was as follows: 58% Caucasian, 18% Hispanic, 13% African American, 8% Asian/Asian-American, 3% Other.

**Procedure**

All procedures were approved by the University’s Institutional Review Board. The study took place in a computer laboratory (up to eight persons) and was conducted by the principal investigator. At the beginning of the first session, the consent form was administered. All participants were informed that they were asked to participate in a study that involved completing questionnaires, listening to a recording, writing on three different days within a two-week period, and then returning one month later to complete follow-up questionnaires. Participants were told that all responses provided were kept anonymous and confidential and that they could withdraw from the experiment any time. After providing informed consent, participants were given instructions about how to create a personal identification code for the experiment in order to ensure anonymity (Appendix A). Participants were instructed to use the code on every questionnaire across the entire study. After creating the personal code, each participant completed the baseline questionnaire (Appendix B & C). Participants were randomly assigned to an experimental group or a comparison group, in which prior to expressive writing they listened either to a
mindfulness meditation recording or to a portion of an audiobook as a control. The randomization was done prior to the recruitment of participants, using a random number generator that produced a table and assigned up to 140 participants to one of two conditions. Both recordings were 20 minutes long and administered via pre-recorded audio to ensure better reliability and control.

Participants listened to the recordings via individual headphones in the computer laboratory. Participants who were randomly assigned to the experimental group listened to a mindfulness meditation recording by Jon Kabat-Zinn (Appendix D). Following a portion of Zeidan et al.’s (2010) protocol, participants listened to three sessions of Jon Kabat-Zinn’s mindfulness meditation practice CD Series 3 (Kabat-Zinn, 2005). Each session lasted for 20 minutes. The first session began with the cultivation of mindfulness of breathing, whereas the second session emphasized the mindfulness of body sensations. Finally, the third session was a combination of mindful breathing and body sensations with more silence and less guidance.

Participants randomly assigned to the comparison group listened to the beginning of J. K. Rowling’s *Harry Potter and the Sorcerer’s Stone* (1999) (Appendix E). This listening activity is modeled after Ditto et al. (2006). As the experimental group involved listening to an audiotape of a person speaking in a soothing, pleasing voice, Ditto et al. argued that the control condition should involve similarly valenced stimuli. Therefore, participants in the comparison group listened to a narrator speaking in a pleasing baritone, and the content of this portion of the novel was not particularly sympathetically arousing.
Immediately following the listening activity, all participants completed the brief state mindfulness questionnaire (Appendix F). After that, all participants received instructions to “write about a highly stressful or traumatic event” and to “let go and explore your deepest emotions and thoughts related to this event” (Pennebaker, 1989). In addition, participants were reminded to write in the state they just experienced in the listening activity. Participants received the writing instructions in an envelope and wrote by hand for 20 minutes (Appendix G). After 20 minutes, participants turned in the writing piece in a sealed envelope.

After the first session, all participants scheduled sessions two and three at their convenience, with the requirement that the second and third sessions could not be on the same day and both had to be completed within two weeks from the first session. For these second and third sessions, participants in the experimental group continued to listen to the mindfulness meditation recording for 20 minutes each session, mindfulness of body sensations in session two and a combination of mindfulness breathing and body sensation in session three as described above (Appendix D), whereas participants in the comparison group listened to subsequent portions of *Harry Potter and the Sorcerer’s Stone* for 20 minutes each session (Appendix E).

Following the listening activity in session two and three, participants completed a brief state mindfulness questionnaire (Appendix F) again. After that, all participants again received instructions in an envelope to explore their deepest emotions and thoughts about the same stressful or traumatic event (Appendix H & I). They again wrote by hand for 20 minutes and turned in the writing pieces in a sealed envelope. At the end of session three, participants scheduled the fourth session to return four weeks later for
follow-up assessment. During this fourth session, all participants completed the 1-month follow-up questionnaire, which included the same measures as the baseline questionnaire (Appendix B). Other expressive writing studies have also employed a 1-month follow-up period and reported benefits (Baikie, 2008; Cameron & Nicholls, 1998; Danoff-Burg et al., 2010). In addition, Fratteroli (2006) found that expressive writing studies had a greater effect size when the timing of the follow-up was less than one month compared to at least one month. Upon completion of the 1-month follow-up questionnaire, participants were debriefed about the full nature of the experiment (Appendix J).

**Measures**

Two measures of trait mindfulness and several measures of physical and psychological well-being were administered at baseline and repeated at follow-up. The two measures of trait mindfulness were selected for different reasons: Five Facet Mindfulness Questionnaire for its conceptual comprehensiveness and Freiburg Mindfulness Inventory for its ability to detect changes in mindfulness. The selection of outcome measures assessing different aspects of psychological and physical health was based on previous expressive writing studies. In addition, a state mindfulness measure was administered after the listening activity in order to assess change in mindfulness. Toronto Mindfulness Scale was chosen as the measure of state mindfulness since it was the only validated measure of state mindfulness available.

*Demographic information.* Demographic information was collected in order to describe the sample and analyze any potential effects of these characteristics. Participants were asked to report their age, gender, level of education, and race/ethnicity.

*Five Facet Mindfulness Questionnaire.* (FFMQ; Baer, Smith, Hopkins,
Kriememeyer, & Toney, 2006). The FFMQ assesses five elements of mindfulness: observing, describing with words, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. An example of each element is as follows: “I notice the smells and aromas of things” (observe); “I’m good at finding the words to describe my feelings” (describe); “I am easily distracted” (acting with awareness); “I criticize myself for having irrational or inappropriate emotions” (non-judging of inner experience); “I perceive my feelings and emotions without having to react to them (non-reactivity to inner experience). Thirty-nine items are rated on a 5-point scale ranging from (1) never or very rarely true to (5) very often or always true. All 5 factors have shown good internal consistency and suggested a multifaceted construct for mindfulness (Baer et al., 2006). In recent years, the FFMQ has become a commonly used measure by mindfulness researchers (Baer et al., 2008; Fernandez, Wood, Stein & Rossi, 2010; Thompson & Waltz, 2007). It has been tested on students, community samples, and meditators (Baer et al., 2008). When developing the FFMQ, Baer et al. (2006) primarily used a student sample. The measure showed good internal consistency, and a confirmatory factor analysis was run to reveal the five-factor hierarchical model, with each facet also demonstrating good internal consistency. Using the data from the same sample, the authors also examined relations between mindfulness facets and other constructs in order to demonstrate convergent and discriminant validity. A strength of this particular measure is its derivation from other mindfulness measures, which enabled the authors to combine the factors that each measure tapped into, resulting in a five factor model that is currently the most comprehensive measure of mindfulness. In the present study, the internal consistency reliability was .77 at baseline and .91 at follow-up.
Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2001). The FMI assesses four elements of mindfulness: present moment disidentifying attention, nonjudgment towards self and others, openness to negative mind states, and process-oriented insightful understanding. The 30-item instrument has a 4-point scale, where a score of ‘1’ indicates a response of rarely and a score of ‘4’ represents almost always. Sample items are “I let my thoughts run away with me” (reverse-scored) and “I accept unpleasant experiences,” with higher scores indicating higher awareness of mindfulness. The authors conceptualize mindfulness as a state, which can be developed and acquired over time, and the FMI was developed as a measure for self-evaluation of mindfulness to be used in research assessing changes in mindfulness pre- and post-meditation. Psychometric analysis by the authors indicated that the FMI is internally consistent and reliable and was able to detect a significant mean change in mindfulness from pre-training to post-training. Using a student sample, Leigh, Bowen and Marlatt (2005) reported high internal consistency and conducted factor analysis on the FMI to reveal three reliable factors of mindfulness. The authors reported internal consistencies of .93 and .94 pre-meditation and post-meditation, respectively. Cronbach’s alpha in the present study was .77 at baseline and .91 at follow-up.

Toronto Mindfulness Scale (TMS; Lau et al., 2006). The TMS was created to measure mindfulness after meditation as a state-like construct and consists of 13 items. The directions instruct responders to consider their experience ‘just now’ and rate how much each of the statements describes their experience on a 5-point scale from 0 ‘not at all’ to 4 ‘very much.’ The authors intended to capture mindfulness defined as a two-part construct: decentering and curiosity. Curiosity
captures an individual’s stance of wanting to learn more about one’s experience, and decentering relates to not personally identifying with thoughts or feelings rather than being overly absorbed in one’s internal experiences (Lau et al., 2006). Sample items include ‘I was curious about my reaction to things’ (Curiosity) and ‘I experienced myself as separate from my changing thoughts and feelings’ (Decentering). Internal consistency reliability for the scales was sound, and construct validity was demonstrated by showing higher TMS factor scores following mindfulness training (Lau et al., 2006). In the present study, internal consistency reliability for the first, second, and third days of writing were .93, .90, .95 respectively.

_Pennebaker Inventory of Limbic Languidness_ (PILL; Pennebaker, 1982). The PILL is a 54-item checklist that is administered to assess for physical health complaints. PILL taps frequency of occurrence of a group of common physical symptoms and sensations. Participants rate the prevalence of each health complaint on a 5-point scale ranging from 0 “have never or almost never experience the symptom” to 4 “more than once every week.” Sample items include “headaches,”, “congested nose,”, and “coughing.” The PILL can be scored by summing up the 54 items, and the mean score for college students is 112.7. The measure has good internal consistency and test-retest reliability and was validated by Pennebaker (1982) when it was developed. In addition, it is a frequently used physical health measure in expressive writing studies (Chung & Pennebaker, 2008; Packankis & Goldfried, 2010; Sloan, Marx, Epstein, & Lexington, 2007). In this study, the internal consistency was .90 at baseline and .95 at follow-up.
Pittsburg Sleep Quality Index (PSQI; Buysse, Reynolds III, Monk, Berman, & Kupfer, 1989). Sleep is an important health issue for college students. There are studies that link sleep-related disturbances to lower academic performance, negative moods, and increased alcohol and tobacco use among college students (e.g., Jean-Louis, von Gizycki, Zizi & Nunes, 1998; Trocket, Barnes, & Egget, 2000). Regarding the potential benefits of expressive writing on sleep, the intervention may lead to a decrease in intrusive thoughts from post-writing to follow-up. Fewer intrusive thoughts may be related to decreases in anxiety that contribute to autonomic arousal; a decline in autonomic arousal may in turn be associated with sleep-related benefits. Several studies have examined the impact of expressive writing on sleep. A few studies have found expressive writing to be related to sleep benefits (Arigo & Smyth, 2012; Broderick et al., 2005; de Moor et al., 2002; Gillis et al., 2006; Harvey & Farrell, 2003; Mosher & Danoff-Burg, 2006; Mooney et al., 2009; Poon & Danoff-Burg, 2011), whereas two other studies did not (Spera et al., 1994; Stone et al., 2000). There is also research suggesting a connection between mindfulness and sleep quality (Anderson, et al., 2013; Carlson & Garland, 2005; Lengacher, et al., 2011; Roberts & Danoff-Burg, 2010). In light of this evidence, the PSQI was selected for inclusion in the current study. The PSQI evaluates sleep quality and disturbances for the past 30 days. Nineteen items are grouped into seven scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each component score combines into a global score that has been shown to be valid and consistent in a number of populations, including college students (Carpenter & Andrykowski, 1998; Grandner, Kripke, Yoon, & Youngsted, 2006). Participants report the time they went to bed and got up, and respond
to a variety of questions such as “Do you wake up in the middle of the night or early morning?” with response options ranging from “Not during the past month” to “Three or more times a week.” Higher scores indicate poorer sleep quality. In the current study, the internal consistency was .73 at baseline and .78 at follow-up.

Brief Symptom Inventory (BSI; Derogatis, 1993). The BSI consists of 53 items covering nine symptom dimensions: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The items in the instrument (e.g., “pains in heart or chest,” “feeling blue”) are rated on a 5-point scale from (0) not at all to (4) extremely, with higher scores indicating higher psychological distress during the past seven days. The Global Severity Index, which is the total of the 53 items, was used in the study. The BSI was included in this study because of its strong psychometric properties, including adequate internal consistency, test-rest reliability, and solid evidence of convergent and construct validity, as well as ability to assess several areas of psychological functioning (Derogatis, 1993). Internal consistency in this study was .95 at baseline and .97 at follow-up.

Results

Preliminary Analysis

To test for possible pretest differences between the two groups, a series of Chi-Square tests were performed for categorical demographic variables (age group, gender, level of education and ethnicity). There were no significant group differences for age group $\chi^2(3, 120) = 4.34, p = .23$, gender $\chi^2(1, 120) = 0.03, p = .86$, level of education $\chi^2(3, 120) = 5.87, p = .12$, or ethnicity $\chi^2(4, 120) = 6.97, p = .14$. Similarly, each dependent variable and trait mindfulness was examined for pretreatment differences
between the two groups with a series of univariate ANOVAs. Participants were randomly assigned to each group, therefore no significant group differences at baseline were anticipated, FFMQ \( F(1, 118) = 0.01, p = .95 \), FMI \( F(1, 118) = 1.57, p = .21 \), PSQI \( F(1, 118) = 0.58, p = .45 \), PILL \( F(1, 118) = 1.70, p = .19 \), BSI \( F(1, 118) = 0.04, p = .84 \).

Descriptive statistics of the dependent variables and mindfulness at baseline and follow-up are shown in Table 1. The baseline level of mindfulness in FFMQ \( (M = 118.49) \) was within the range of each of the three non-mediating populations \( (M = 116.9, 124.34, 137.32) \) reported by Baer (2008). Moreover, baseline level of mindfulness in FMI \( (M = 78.62) \) was also consistent with those in a mixed sample of retreats, general population, and clinical sample \( (M = 75.06; \) Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006). Physical symptoms measured at baseline \( (M = 68.47) \) was within the range reported by the authors regarding college students \( (M = 59.24; \) Pennebaker, 1982), although a recent study of college students reported much higher scores \( (M = 121.1; \) Edwards, Hershberger, Russell & Markert, 2001). The mean of the BSI at baseline in the present sample \( (M = 62.50) \) was higher than those reported for college sample \( (M = 40.46; \) Cochran & Hale, 1985). The baseline value of the PSQI \( (M = 6.31) \) was higher than 5.0, a cutoff point indicating poor sleep quality (Buysse et al., 1989). In comparison with a large-scale study of college students in which only 34% students reported scores below 5 and 66% students had scores of 6 or above (Lund, Reider, Whiting & Prichard, 2010), our score of 6.31 appeared to be representative of a college student population.

Zero order correlations were calculated between each of the trait and state mindfulness measures as well as the dependent variables at baseline and follow-up. These correlations are shown in Table 2 and 3. As expected, the two trait measures of
mindfulness are highly positively correlated at baseline and follow-up. In addition, the three outcome measures are also highly positively correlated at baseline and follow-up. Both trait measures of mindfulness are negatively correlated with all three outcomes at baseline as well as follow-up. The state mindfulness is not correlated with either trait mindfulness at baseline but is positively correlated with FMI at follow-up at each measurement.

Primary Analysis

Effect of mindfulness meditation at 1-month follow-up

It was expected that the experimental manipulation would result in a significant decrease in terms of the physical and psychological measures from baseline to follow-up. Therefore a main effect for listening condition was predicted. In order to test hypothesis one, a one-way ANCOVA was conducted for each outcome measure, with listening condition as the independent variable, follow-up scores of outcome measures as the dependent variables, and baseline scores on these measures as covariates. To test the assumption of homogeneity of variance, Levene’s test of equality of error variance was utilized. The statistic was nonsignificant for each of the dependent variables in this analysis, indicating that the assumption of homogeneity of variance was met, PSQI $F(1, 118) = 0.02, p = .90$, PILL $F(1, 118) = 2.20, p = .14$, BSI $F(1, 118) = 1.83, p = .18$.

Significant condition effects were found for all outcome measures. More specifically, participants in the experimental condition reported fewer physical symptoms than participants in the comparison condition from baseline to follow-up, PILL $F(1, 118) = 18.20, p < .01$. A significant group effect was also found for PSQI; participants in the experimental condition had better sleep quality than participants in the comparison
condition from baseline to follow-up, $F(1, 118) = 4.05, p < .05$. In addition, participants’ psychological symptoms in the experimental condition also decreased from baseline to follow-up, compared to those reported by participants in the comparison condition, BSI: $F(1, 118) = 8.07, p < .01$. Adjusted means of the dependent variables are presented in Table 2.

*Change in state mindfulness across writing sessions*

It was expected that the delivery of mindfulness meditation would increase participants’ state mindfulness in the experimental group across the writing sessions. Similar to hypothesis one, a main effect for listening condition was predicted. In addition, we also examined if there were significant differences between listening condition with regard to the writing sessions. In order to test hypothesis two, examining whether there was an increase in state mindfulness, a 2 (listening condition) x 3 (writing sessions) repeated measures ANOVA was conducted with the state mindfulness measure as the within-subject variable and the listening condition as the between-subject variable. Follow-up analysis of significant interaction effects was proposed, including a series of planned contrasts of mean change of state mindfulness across each writing session. Prior to conducting this analysis, various tests were utilized to ensure that the assumptions of this mixed design were fulfilled. The results of Mauchly’s W test showed that the assumption of sphericity was not met (Mauchly’s $W = 0.82$, chi square $df_{w2} = 23.76, p < .01$). Thus, a corrected statistic of Pillai’s Trace is reported for the main effect and interaction effect when sphericity is not assumed. On the other hand, the results of Levene’s test of quality of variances ($1^{st}$ TMS $F(1, 118) = 2.52, p = .12$; $2^{nd}$ TMS $F(1, 118) = 7.17, p = .01$; $3^{rd}$ TMS $F(1, 118) = 3.05, p = .08$) and Box’s M test ($F = 2.82, p = .
.01) show that the assumptions of both homogeneity of variances and homogeneity of covariance matrices, respectively, were fulfilled.

There was a significant main effect for listening condition on state mindfulness. Individuals in the experimental condition had significantly higher scores of state mindfulness ($M = 29.08 \ SD = 1.31$) than individuals in the comparison condition ($M = 24.06 \ SD = 1.31$) on average across all three writing sessions, Pillai’s trace = 0.22 $F(2, 117) = 16.45, p < .01$. There was also a significant interaction regarding listening condition and writing session on state mindfulness, such that participants in the experimental condition reported a greater increase in state mindfulness over time compared with those in the comparison condition, Pillai’s trace = 0.08 $F(2, 117) = 4.71, p < .05$. Planned contrasts revealed a significant increase in state mindfulness between 1st day of writing and 2nd day of writing ($p < .01$) in the experimental condition, while 2nd day of writing to 3rd day of writing was not significant ($p = .09$). Estimate marginal means of the TMS by condition are presented in Table 3 and Figure 1.

Baseline trait mindfulness as a moderator

It was expected that baseline trait mindfulness would moderate the physical and psychological effects of expressive writing, specifically at high levels of baseline trait mindfulness. Given that both trait mindfulness measures and outcome measures were continuous variables, each of the variables was centered to reduce collinearity of the main effect and interaction term. A separate set of analysis was conducted for each of the two trait mindfulness measures. In order to test hypothesis three, we used a hierarchical regression model with the baseline scores of outcome measures entered in the first step as covariates, then the main effect of
listening condition and baseline trait mindfulness entered in the second step as predictors, followed by the interaction term (product of listening condition and mindfulness) in the third step. Criterion variables were the follow-up scores for outcome measures. A significant interaction term indicated moderation by baseline mindfulness and was followed with simple slope analyses. The above hierarchical regression model has been employed by others (Kraft, Lumley, D’souza, & Dooley, 2008; Norman, Lumley, Dooley, & Diamond, 2004). The full model predicting outcome measures from baseline mindfulness and change in R-square when the interaction term entered the model is presented below.

**FFMQ.** Baseline trait mindfulness assessed by the FFMQ moderated condition effects on changes in sleep quality, PSQI: \( F(1, 115) = 8.19, p < .01, \Delta R^2 = .04 \), physical symptoms, PILL: \( F(1, 115) = 4.67, p < .05, \Delta R^2 = .03 \), and psychological symptoms, BSI \( F(1, 115) = 4.78, p < .05, \Delta R^2 = .02 \).

**FMI.** Baseline trait mindfulness assessed by the FMI moderated condition effects on changes in psychological symptoms, BSI: \( F(1, 115) = 5.69, p < .05, \Delta R^2 = .02 \). However, sleep quality, PSQI: \( F(1, 115) = 0.84, p = .36, \Delta R^2 = .01 \) and physical symptoms, PILL: \( F(1, 115) = 3.43, p = .07, \Delta R^2 = .02 \), were not moderated by the FMI.

In order to further explore the significance of the interaction, simple slope analyses were conducted after a significant interaction term. Regression analyses were conducted predicting the follow-up score of outcome measures for each condition at high and low scores of baseline trait mindfulness, which is one standard deviation above and below the mean, respectively, with baseline outcome
measures entered as covariates. Simple slope analysis showed that PSQI was significant at low levels of FFMQ ($p < .01$), PILL was significant at high levels of FFMQ ($p < .01$), and BSI was significant at high levels of FFMQ ($p < .01$) and FMI ($p < .01$). Predicted follow-up scores of outcome measures regressed on FFMQ and FMI are shown in Table 4 and Figures 2, 3, and 4.

**Examination of Word Content in Written Narratives**

It was predicted that the experimental group’s written narratives would show a significant increase in use of present tense, cognitive processing words, and positive and negative emotion words across writing sessions compared to the comparison group. Similar to hypothesis two, a main effect for listening condition was predicted. In addition, we also examined if there were significant differences between listening condition with regard to the writing sessions. In order to test hypothesis four, examining change in word content between groups, a 2 (listening condition) x 3 (writing sessions) repeated measures ANOVA was conducted with various word content as the within-subject variable and the listening condition as the between-subject variable. A separate analysis was conducted for each type of word content analyzed. Follow-up analysis of significant interaction effects was proposed, including a series of planned contrasts of mean change of word content across each writing session. Prior to conducting this analysis, various tests were utilized to ensure that the assumptions of this mixed design were fulfilled. The results of Mauchly’s W test showed that the assumption of sphericity was met for Emotion words but not for Present Tense nor Cognitive Processing words (Emotion: Mauchly’s $W = 0.99$, chi square $df_{e2} = 1.73$, $p = .42$; Tense: Mauchly’s $W = 0.90$, chi square $df_{e2} = 11.95$, $p < .01$; Cognitive: Mauchly’s $W = 0.91$, chi square $df_{e2} = 11.29$, $p < .01$).
Thus, a corrected statistic of Pillai’s Trace is reported for main effects and interaction effects in Present Tense and Cognitive Processing words when sphericity is not assumed. On the other hand, the results of Levene’s test of quality of variances (1st Emotion $F(1, 118) = 0.29, p = .59$; 2nd Emotion $F(1, 118) = 0.01, p = .96$; 3rd Emotion $F(1, 118) = 0.27, p = .60$; 1st Tense $F(1, 118) = 0.10, p = .75$; 2nd Tense $F(1, 118) = 0.58, p = .45$; 3rd Tense $F(1, 118) = 0.09, p = .76$; 1st Cognitive $F(1, 118) = 0.59, p = .44$; 2nd Cognitive $F(1, 118) = 1.61, p = .21$; 3rd Cognitive $F(1, 118) = 0.32, p = .58$) and Box’s M test (Emotion $F = 0.07, p = .99$; Tense $F = 0.51, p = .80$; Cognitive $F = 0.47, p = .83$) show that the assumptions of both homogeneity of variances and homogeneity of covariance matrices, respectively, were fulfilled.

Contrary to expectation, there was no significant main effect for listening condition for any of the word categories, Emotion $F(2, 236) = 0.72, p = .49$; Tense Pillai’s trace = 0.01 $F(2, 117) = 0.67, p = .52$; Cognitive Pillai’s trace = 0.03 $F(2, 117) = 1.65, p = .20$. Moreover, there was also no significant interaction regarding listening condition and writing session, Emotion $F(2, 236) = 0.03, p = .97$; Tense Pillai’s trace = 0.00 $F(2, 117) = 0.03, p = .97$; Cognitive Pillai’s trace = 0.04 $F(2, 117) = 2.20, p = .12$.

*Post-hoc analysis*

We predicted in hypothesis three that participants in the mindfulness meditation group would show a significant increase in state mindfulness across writing sessions, and our analysis supported that hypothesis. We further reran state mindfulness in the experimental group as a variable in a hierarchical regression model with the baseline scores of outcome measures and trait mindfulness entered in the first step as covariates, and then entered each successive score of state...
mindfulness as predictors in each stage. Criterion variables were the follow-up scores for outcome measures. A separate set of analyses was conducted for each of the two trait mindfulness measures. Results indicated that the best predictor for the outcome measures was the second measurement of state mindfulness, PSQI at 2\textsuperscript{nd} TMS with baseline FFMQ: $F(1, 55) = 4.73, p < .05$; PILL at 2\textsuperscript{nd} TMS with baseline FFMQ: $F(1, 55) = 5.97, p < .05$; PSQI at 2\textsuperscript{nd} TMS with baseline FMI: $F(1, 55) = 5.85, p < .05$; PILL at 2\textsuperscript{nd} TMS with baseline FMI: $F(1, 55) = 6.53, p < .05$. The full model predicting outcome measures from the state mindfulness scores across each session and change in R-square when each state mindfulness score was entered the model is presented in Table 5.

Discussion

Overview of the Present Study

The study of mindfulness – paying attention nonjudgmentally to one’s moment-by-moment internal and external experience – has achieved a substantial presence in Western psychology over the past several decades. Substantive research has documented the efficacy of mindfulness-based therapy for a variety of psychological problems. The conceptual basis for focusing on nonjudgmental awareness of one’s thoughts, feelings, and behavior is particularly salient and somewhat similar to express writing, an intervention that requires participants to engage in writing about stressful/traumatic events, and an open and accepting awareness is beneficial to producing a coherent narrative.

Relatively little research has investigated the process of mindfulness in expressive writing, other than a conceptual article by Brody and Park (2004) that
hypothesized expressive writing is itself a ‘mindful’ process because it allows for focused attention to a specific emotional stimulus, and experimental studies by Moore et al. (2009) and Poon & Danoff-Burg (2011), which both examined mindfulness as a personality attribute instead of as an experimental manipulation. The current study examined two experimental processes, the practice of a brief mindfulness meditation exercise and engagement in expressive writing. In the present study we sought to examine whether the delivery of brief mindfulness mediation training would result in an increase in state mindfulness and whether such an increase would enhance the effects of the subsequent expressive writing exercise. Moreover, we also intended to replicate the previous finding of baseline trait mindfulness as a moderator of the expressive writing effects.

Primary Findings

The overall predicted effect of the combined experimental condition in the study was supported. That is, individuals who were introduced to a brief mindfulness meditation exercise and subsequently wrote about a stressful/traumatic topic on three occasions demonstrated greater increases in measures of well-being and state mindfulness compared to individuals assigned to another group in which they listened to Harry Potter and engaged in expressive writing afterwards.

The first hypothesis was designed to examine differences in measures of well-being. It was expected that participants who listened to mindfulness meditation compared to those in the comparison group would demonstrate a significant improvement in sleep quality and reduction in physical and psychological symptoms. This hypothesis was supported in our sample. At 1-month
follow-up, participants in the experimental condition had better sleep quality and a
decrease in physical and psychological symptoms. Notice that participants in the
comparison condition also engaged in expressive writing, unlike other expressive
writing studies in which participants in control conditions wrote about trivial
topics. In our sample, participants in the comparison condition also demonstrated
an improvement in sleep quality as well as reduction in physical and psychological
symptoms, but, as expected, the magnitude of that improvement was not as large as
those reported in the experimental condition.

The next set of analyses examined change in a state measure of
mindfulness. For hypothesis two, it was anticipated that individuals who were in
the experimental group would show significantly higher state mindfulness than the
comparison group. This was confirmed, and, more importantly, the writing sessions
influenced the extent of change in state mindfulness. Specifically, for participants
in the experimental condition, there was an increase in state mindfulness between
the first and second day of the experiment, whereas participants’ state mindfulness
remained stable throughout the sessions for the comparison group. While
participants’ state mindfulness continued to rise in the experimental condition on
the third session, the increase was not significantly different from the second
session. This finding sheds light on the timeframe of how soon an increase in state
mindfulness takes place but also raises question on the durability of the increase in
state mindfulness. In general, hypothesis two is supported in our current sample
and no prior investigations of expressive writing have examined state mindfulness
as a variable.
To put our current findings regarding the increase of state mindfulness into context, other studies have also employed Toronto Mindfulness Scale (TMS) to measure state mindfulness, but they did not measure it session by session. The authors of TMS reported the means of TMS for participants with less than a year of meditation experience and more than a year of meditation experience to be 40.36 and 44.95 respectively when they were developing the questionnaire (Lau et al., 2006). In addition, they also reported an increase from 38.61 to 47.48 from pre-MBSR to post-MBSR. Carmody et al. (2008) also assessed pre-post MBSR using TMS and reported an increase from 18.62 to 28.14. In our study, participants in the mindfulness meditation group reported an increase from 24.53 to 32.47, which is comparable to the findings of those two studies.

One of the primary purposes of the current study was to replicate the findings of trait mindfulness as a potential moderator of the benefits of expressive writing, which was first reported by Poon and Danoff-Burg (2011). In hypothesis three, we expected that participants high in baseline trait mindfulness would experience more positive benefits from expressive writing. More specifically, baseline trait mindfulness in our sample influenced the extent of benefits in expressive writing in the experimental group but not the comparison group. Two measures of trait mindfulness were tested, and both yielded a somewhat similar pattern of results. Specifically, a higher FFMQ and FMI score predicted greater decrease over time in physical and psychological symptoms. On the other hand, a lower FFMQ score predicted better sleep quality. This finding of higher baseline trait mindfulness predicting greater benefits is consistent with the previous study
that examined mindfulness as a moderator in expressive writing (Poon & Danoff-Burg, 2011). However, the lower FFMQ score finding was contrary to findings in the previous study, in which a higher FFMQ and FMI score predicted better sleep quality. It could be said that hypothesis three is partially supported in our sample and warrants future investigation.

Several predictions were made regarding the content of the writing samples, namely present tense, cognitive processing and positive and negative emotion words. In hypothesis four, it was predicted that the narrative of those participants who listened to mindfulness meditation prior to expressive writing would reflect aspects of mindfulness. Moore and Brody (2009) found that an increase in cognitive processing words from the first to third narrative predicted an increase in mindfulness. It was hypothesized that participants in the experimental condition would use more cognitive processing words. The same result was not demonstrated in the present study, and both groups’ usage of cognitive processing words was consistent throughout the writing sessions and did not differ from each other. In the same study by Moore and Brody (2009), they also found that an increase in use of present tense words predicted an increase in mindfulness. In addition, Tausczik and Pennebaker (2010) suggested that verb tense can indicate temporal focus of attention and psychological distance and that usage of present tense can show immediate attention and a decrease in psychological distance. It was expected in the present study that participants who were exposed to mindfulness meditation would write more in the present tense. Our finding revealed no effect of having practiced mindfulness on the use of present tense and is consistent with the findings
of Low et al. (2008). Finally, Pennebaker, Mehl, and Niederhoffer (2003) found that participants who used a higher number of positive emotion words and a moderate number of negative emotions words were more likely to benefit from expressive writing, and we posited that mindfulness meditation would help participants accept their emotional experiences. In addition, based on past findings that brief practice of mindfulness was related to increased positive affect (Arch & Craske, 2006; Erisman & Roemer 2010), it was expected that individuals who were in the experimental condition would use more positive and negative emotion words in their narratives. This effect was also not replicated in the current sample. Overall, hypothesis four was not supported in our current sample.

Lastly, the post-hoc analysis we conducted was largely an extension of hypothesis two in relating the change in state mindfulness to our outcome measures of sleep quality, physical symptoms, and psychological symptoms. An interesting finding from this analysis was that the best predictor to account for the benefits in sleep quality and physical symptoms occurred at the second session, but not the first and third session. No session was able to account for the effects of state mindfulness on psychological symptoms, which is consistent with the finding that expressive writing tends to have a larger effect size in physical compared to psychological functioning (Fratteroli, 2006).

**Discussion of Primary Findings**

The purpose of this study was to provide a novel approach to understanding the effects of combining two somewhat similar interventions, mindfulness meditation and expressive writing. The results indicated that engaging in mindfulness meditation prior to
expressive writing enhances the effects of expressive writing in terms of sleep quality, physical symptoms, and psychological symptoms. These findings are encouraging, considering how brief the intervention were – a 20-minute session of mindfulness meditation and a 20-minute writing exercise disclosing a stressful/traumatic event for a total of 120 minutes over three sessions – and how the combination produced significant benefits.

In the current study, brief mindfulness meditation demonstrated its effectiveness in increasing state mindfulness. This present study is the first of its kind to look at brief mindfulness meditation using a state measurement of mindfulness to examine change in mindfulness. Our results indicated that participants reported being more mindful as early as the conclusion of the second meditation session. The Toronto Mindfulness Scale (TMS) is the only instrument assessing mindfulness as a state that can vary across a short period of time. The authors pointed out that an individual may be in a particularly mindful state during meditation, but this state of mindfulness may diminish soon after the meditation ends (Lau et al., 2006). Thus, it could be that even though participants in the experimental condition reported being more mindful, the increase was only transient. It could be argued that this temporary increase that occurred with a brief intervention is captured better with a state measure of mindfulness than a trait mindfulness measure. Besides, many of the previous studies that reported an increase in mindfulness (Carmody & Baer, 2008; Carmody et al., 2008; Klatt, Buckworth & Malarkey, 2009; Shapiro, Brown, Thoresen, & Plante, 2011) required a longer commitment that included intensive meditation and mindfulness practice, and they measured mindfulness at a trait level as opposed to a state. It seems that more time/sessions may be crucial when one is looking
to improve trait mindfulness. In addition, many of the mindfulness interventions are conducted in a group format. The support, modeling, and processing that occurs in the group modality may be important to the improvement of mindfulness skills. Finally, research has shown that there is little to no relationship between mindfulness during meditation and everyday mindfulness (Thompson & Waltz, 2007), and therefore it is possible that increases in state mindfulness that occur during meditation do not necessarily translate into mindfulness in everyday life.

The current study also replicated findings of Poon and Danoff-Burg (2011) that baseline trait mindfulness influenced the effects of expressive writing, although our result was less consistent. In Poon and Danoff-Burg’s study, the moderating effect occurred only at high levels of trait mindfulness, whereas in our current sample, low levels of trait mindfulness predicted better sleep quality. However, the moderating effects of physical and psychological symptoms at high levels of trait mindfulness were consistent with the previous study’s findings. Although the focus of this hypothesis is on moderation of expressive writing effects, it is important to note that even though participants with higher levels of baseline trait mindfulness fared better than those with lower levels of baseline trait mindfulness, as a whole, participants receiving expressive writing reported improvement on all of the outcomes measures. In other words, high baseline trait mindfulness was not a necessary condition for expressive writing benefit, but it did predict magnitude of benefit across the outcomes assessed.

It is surprising that none of the predictions regarding the content of the writing samples were supported, considering what previous studies have found (Moore & Brody, 2009; Pennebaker, Mehl & Niederhoffer, 2003; Tausczik & Pennebaker, 2010).
However, previous studies typically compared an expressive writing group to another group that did not engage in expressive writing but rather wrote about neutral topics. In the current study, there was no specific effort made to manipulate the writing instructions or to emphasize the use of mindfulness in the writing itself. Instead, participants were only reminded to write in the state of mind they experienced in the previous activity. Perhaps if we had used different variations of writing instructions it would have encouraged participants more directly to be mindful while engaging in expressive writing and resulted in a more prominent effect of several different indicators of mindfulness, including using more present tense, cognitive processing words, and describing positive and negative emotions. Similarly, there were no instructions for participants to write about the same topic across the three writing sessions. This was a choice intended to allow individuals to select the stressful event most salient to them at that time. However, the lack of consistency could have affected the assessment of change in word content over time. Although the results of our word content analysis were not significant, one of the categories, present tense, showed an increase in usage of present tense between second and third day of writing across both groups. In contrast, North, Meyerson, Brown, and Holahan (2012) analyzed present tense usage but found no significant difference across three writing conditions (acceptance + positive reappraisal, emotional disclosure, and positive reappraisal). However, these authors averaged the first half of writing (day 1 and 2) and second half of writing (day 3 and 4) to compare between two time points. In the current study, it is interesting to note that word content, as analyzed by the LIWC program, did not relate to the majority of findings. This suggests that it may be some
processes other than repeated writing or the specific word content that affects outcomes, with the important caveat that both groups focused on stressful experiences.

**Strengths, Limitations, and Future Directions**

There are several strengths of the current study. First, this experiment employed a randomized, controlled design, which is the most rigorous design examining therapeutic interventions. This experimental strategy allowed for inferences to be made without confounding factors becoming a major issue. Moreover, the sample size for this study was ample and enabled each group to have an adequate number of participants, allowing for sufficient statistical power. Finally, this study was able to largely replicate the findings of a previous study, which adds further support to the moderating effect of baseline trait mindfulness in expressive writing. However, there were specific limitations that should be addressed in future research. First, our study was based on a relatively homogeneous college student sample that was interested in receiving course credit, and therefore the generalizability of the results may be limited. It might be helpful to utilize a treatment-seeking sample to see whether there are different effects of mindfulness and expressive writing in individuals who are motivated to reduce distress. Second, although we were able to replicate the moderating effect of a previous study, the two measures of mindfulness were not entirely consistent between the two studies. The discrepant results between measures could possibly be due to a difference in how the scales’ developers conceptualized mindfulness or due to the inclusion of items that represent different aspects of mindfulness (Baer, 2011; Grossman, 2008; Grossman & Van Dam, 2011). In fact, Bergomi, Tschacher,
and Kupper (2013) argued that none of the currently available and validated mindfulness scales provide a comprehensive assessment of all aspects of mindfulness in samples from the general population. These authors also questioned the validity of self-report measures of mindfulness such as possible bias due to social desirability and personal values. However, this critique generally applies to self-report assessment and may not be specifically relevant for mindfulness, but this is also another limitation of our study – reliance on self-reported outcomes.

Future research could benefit by including more objective (e.g., behavioral) measures of mindfulness, mental health, and well-being, as well as a measure of participant expectancy. In addition, future studies should also test whether writing instructions can be better modified to instruct individuals how to engage in mindfulness during writing, which could potentially clarify the relationship between mindfulness and expressive using different variations of writing instructions. Moreover, a more elaborate design of our study featuring a control group that did not engage in expressive writing might measure the effects of mindfulness meditation alone. Finally, studies should explore further whether the ability to invoke a mindful state as measured by the TMS generalizes to the degree of mindfulness in everyday life (Thompson & Waltz, 2007). There is much evidence to suggest that mindfulness is a skill that improves over time, and thus the possibility of finding long-lasting effects could have increased had participants been given more of an opportunity to practice mindfulness.

Despite these limitations, the results of the current study support the importance of considering the combination of brief mindfulness meditation and expressive writing. The findings suggest that mindfulness offers the potential to
enhance the benefits of expressive writing and to predict which individuals will benefit most from expressive writing. However, this line of research is new, and larger-scale studies are needed to replicate and extend the present findings to other populations. Also needed is research to explore why/how mindfulness interacts or otherwise combines with express writing to predict better treatment outcomes. As one of the few preliminary examinations of its kind, this study highlights the need to understand questions and anticipate problems that emerge from the assimilation of two areas of study.
### Table 1

**Means for Baseline and Follow-up of Outcome Measures by Condition**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Listening Activity</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mindfulness Meditation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
<td>Follow-up</td>
<td>Baseline</td>
<td>Follow-up</td>
</tr>
<tr>
<td>PSQI</td>
<td>6.42 (2.13)</td>
<td>4.97 (2.23)</td>
<td>6.73 (2.42)</td>
<td>5.85 (2.36)</td>
</tr>
<tr>
<td></td>
<td>(9)</td>
<td>(9)</td>
<td>(11)</td>
<td>(7)</td>
</tr>
<tr>
<td>PILL</td>
<td>70.80 (17.57)</td>
<td>43.8 (23.30)</td>
<td>66.13 (21.40)</td>
<td>57.73 (26.54)</td>
</tr>
<tr>
<td></td>
<td>(69)</td>
<td>(86)</td>
<td>(110)</td>
<td>(95)</td>
</tr>
<tr>
<td>BSI</td>
<td>58.88 (23.60)</td>
<td>36.90 (24.74)</td>
<td>66.13 (21.40)</td>
<td>46.98 (26.03)</td>
</tr>
<tr>
<td></td>
<td>(86)</td>
<td>(88)</td>
<td>(106)</td>
<td>(84)</td>
</tr>
<tr>
<td>FFMQ</td>
<td>118.42 (13.07)</td>
<td>119.11 (11.03)</td>
<td>118.55 (12.14)</td>
<td>118.00 (11.47)</td>
</tr>
<tr>
<td></td>
<td>(44)</td>
<td>(50)</td>
<td>(51)</td>
<td>(43)</td>
</tr>
<tr>
<td>FMI</td>
<td>79.52 (7.76)</td>
<td>76.97 (10.34)</td>
<td>77.72 (7.97)</td>
<td>76.92 (11.09)</td>
</tr>
<tr>
<td></td>
<td>(26)</td>
<td>(50)</td>
<td>(40)</td>
<td>(40)</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are presented in parentheses under means. Ranges are presented in parentheses under standard deviations. PSQI = Pittsburg Sleep Quality Index; PILL = Pennebaker Inventory of Limbic Languidness; BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire; FMI = Freiburg Mindfulness Inventory.
Table 2

Zero-order Correlations Between Mindfulness and Outcome Measures at Baseline

<table>
<thead>
<tr>
<th></th>
<th>1st TMS</th>
<th>2nd TMS</th>
<th>3rd TMS</th>
<th>FFMQ</th>
<th>FMI</th>
<th>PILL</th>
<th>PSQI</th>
<th>BSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st TMS</td>
<td>_</td>
<td>0.66**</td>
<td>0.65**</td>
<td>-0.09</td>
<td>0.06</td>
<td>0.20*</td>
<td>-0.07</td>
<td>0.28**</td>
</tr>
<tr>
<td>2nd TMS</td>
<td>0.66**</td>
<td>_</td>
<td>0.85**</td>
<td>0.10</td>
<td>0.17</td>
<td>0.27**</td>
<td>0.00</td>
<td>0.30**</td>
</tr>
<tr>
<td>3rd TMS</td>
<td>0.65**</td>
<td>0.85**</td>
<td>_</td>
<td>0.12</td>
<td>0.21*</td>
<td>0.25**</td>
<td>-0.10</td>
<td>0.31**</td>
</tr>
<tr>
<td>FFMQ</td>
<td>-0.09</td>
<td>0.10</td>
<td>0.12</td>
<td>_</td>
<td>0.66**</td>
<td>-0.36**</td>
<td>-0.18*</td>
<td>-0.40**</td>
</tr>
<tr>
<td>FMI</td>
<td>0.06</td>
<td>0.17</td>
<td>0.21*</td>
<td>0.66**</td>
<td>_</td>
<td>-0.25**</td>
<td>-0.19*</td>
<td>-0.36**</td>
</tr>
<tr>
<td>PILL</td>
<td>0.20*</td>
<td>0.27**</td>
<td>0.25**</td>
<td>-0.36**</td>
<td>-0.25**</td>
<td>_</td>
<td>0.11</td>
<td>0.48**</td>
</tr>
<tr>
<td>PSQI</td>
<td>-0.07</td>
<td>0.00</td>
<td>-0.10</td>
<td>-0.18*</td>
<td>-0.19*</td>
<td>0.11</td>
<td>_</td>
<td>0.19*</td>
</tr>
<tr>
<td>BSI</td>
<td>0.27**</td>
<td>0.30**</td>
<td>0.31**</td>
<td>-0.40**</td>
<td>-0.36**</td>
<td>0.48**</td>
<td>0.19*</td>
<td>_</td>
</tr>
</tbody>
</table>

Note. PSQI = Pittsburg Sleep Quality Index; PILL = Pennebaker Inventory of Limbic Languidness; BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire; FMI = Freiburg Mindfulness Inventory. TMS = Toronto Mindfulness Scale.

* p < 0.05; ** p < 0.01.
Table 3

Zero-order Correlations Between Mindfulness and Outcome Measures at Follow-up

<table>
<thead>
<tr>
<th></th>
<th>1st TMS</th>
<th>2nd TMS</th>
<th>3rd TMS</th>
<th>FFMQ</th>
<th>FMI</th>
<th>PILL</th>
<th>PSQI</th>
<th>BSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st TMS</td>
<td>_</td>
<td>0.66**</td>
<td>0.65**</td>
<td>0.29</td>
<td>0.18*</td>
<td>0.22*</td>
<td>0.02</td>
<td>0.18</td>
</tr>
<tr>
<td>2nd TMS</td>
<td>0.66**</td>
<td>_</td>
<td>0.85**</td>
<td>0.05</td>
<td>0.25**</td>
<td>0.22*</td>
<td>0.08</td>
<td>0.10</td>
</tr>
<tr>
<td>3rd TMS</td>
<td>0.65**</td>
<td>0.85**</td>
<td>_</td>
<td>0.17</td>
<td>0.35**</td>
<td>0.18</td>
<td>-0.04</td>
<td>0.07</td>
</tr>
<tr>
<td>FFMQ</td>
<td>0.03</td>
<td>0.05</td>
<td>0.17</td>
<td>_</td>
<td>0.79**</td>
<td>-0.22*</td>
<td>-0.43**</td>
<td>-0.36**</td>
</tr>
<tr>
<td>FMI</td>
<td>0.18*</td>
<td>0.25**</td>
<td>0.35**</td>
<td>0.79**</td>
<td>_</td>
<td>-0.14</td>
<td>-0.36**</td>
<td>-0.28**</td>
</tr>
<tr>
<td>PILL</td>
<td>0.22*</td>
<td>0.22*</td>
<td>0.18</td>
<td>-0.22*</td>
<td>-0.14</td>
<td>_</td>
<td>0.43**</td>
<td>0.52**</td>
</tr>
<tr>
<td>PSQI</td>
<td>0.02</td>
<td>0.08</td>
<td>-0.04</td>
<td>-0.43**</td>
<td>-0.36**</td>
<td>0.43**</td>
<td>_</td>
<td>0.31**</td>
</tr>
<tr>
<td>BSI</td>
<td>0.18</td>
<td>0.10</td>
<td>0.07</td>
<td>-0.36**</td>
<td>-0.28**</td>
<td>0.52**</td>
<td>0.31**</td>
<td>_</td>
</tr>
</tbody>
</table>

Note. PSQI = Pittsburg Sleep Quality Index; PILL = Pennebaker Inventory of Limbic Languidness; BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire; FMI = Freiburg Mindfulness Inventory. TMS = Toronto Mindfulness Scale.

* p < 0.05; ** p < 0.01.
Table 4

*Estimated Marginal Means of Follow-up Scores of Outcome Measures by Condition*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Listening Activity</th>
<th>Mindfulness Meditation</th>
<th>Harry Potter</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSQI</td>
<td>5.06 (0.25)</td>
<td>5.76 (0.25)</td>
<td></td>
</tr>
<tr>
<td>PILL</td>
<td>42.29 (2.80)</td>
<td>59.24 (2.80)</td>
<td></td>
</tr>
<tr>
<td>BSI</td>
<td>37.23 (2.35)</td>
<td>46.66 (2.35)</td>
<td></td>
</tr>
<tr>
<td>FFMQ</td>
<td>119.15 (1.18)</td>
<td>118.98 (1.18)</td>
<td></td>
</tr>
<tr>
<td>FMI</td>
<td>76.60 (1.33)</td>
<td>77.28 (1.33)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are presented in parentheses under means. PSQI = Pittsburg Sleep Quality Index; PILL = Pennebaker Inventory of Limbic Languidness; BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire; FMI = Freiburg Mindfulness Inventory.
Table 5

*Estimated Marginal Means of State Mindfulness by Condition*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Listening Activity</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mindfulness</td>
<td>Meditation</td>
<td>Harry Potter</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; TMS</td>
<td>24.53</td>
<td>(12.15)</td>
<td>22.42</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; TMS</td>
<td>30.25</td>
<td>(8.55)</td>
<td>24.97</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; TMS</td>
<td>32.47</td>
<td>(11.19)</td>
<td>24.78</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are presented in parentheses under means. TMS = Toronto Mindfulness Scale.
Table 6

*Predicted Scores of Outcome Measures by Levels of Mindfulness*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Level of Trait Mindfulness</th>
<th>Listening Activity</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mindfulness Meditation</td>
<td>Harry Potter</td>
</tr>
<tr>
<td>PSQI</td>
<td>Low FFMQ</td>
<td>5.23</td>
<td>6.96</td>
</tr>
<tr>
<td></td>
<td>High FFMQ</td>
<td>4.84</td>
<td>4.61</td>
</tr>
<tr>
<td>PILL</td>
<td>Low FFMQ</td>
<td>52.37</td>
<td>60.70</td>
</tr>
<tr>
<td></td>
<td>High FFMQ</td>
<td>32.43</td>
<td>57.47</td>
</tr>
<tr>
<td>BSI</td>
<td>Low FFMQ</td>
<td>48.57</td>
<td>51.68</td>
</tr>
<tr>
<td></td>
<td>High FFMQ</td>
<td>25.64</td>
<td>41.81</td>
</tr>
<tr>
<td></td>
<td>Low FMI</td>
<td>48.80</td>
<td>49.37</td>
</tr>
<tr>
<td></td>
<td>High FMI</td>
<td>27.94</td>
<td>43.34</td>
</tr>
</tbody>
</table>

*Note.* No Significant Interactions for FMI on PSQI and PILL.  PSQI = Pittsburg Sleep Quality Index; PILL = Pennebaker Inventory of Limbic Languidness; BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire; FMI = Freiburg Mindfulness Inventory.
Table 7

Change in $\Delta R$ and $F$ Value for Each State Mindfulness Measure in Regression Model

<table>
<thead>
<tr>
<th>Measure</th>
<th>FFMQ</th>
<th></th>
<th></th>
<th>FMI</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\Delta R^2$</td>
<td>$F$</td>
<td>$p$</td>
<td>$\Delta R^2$</td>
<td>$F$</td>
<td>$p$</td>
</tr>
<tr>
<td>PSQI x 1&lt;sup&gt;st&lt;/sup&gt; TMS</td>
<td>0.01</td>
<td>0.23</td>
<td>.63</td>
<td>0.01</td>
<td>0.45</td>
<td>.50</td>
</tr>
<tr>
<td>PSQI x 2&lt;sup&gt;nd&lt;/sup&gt; TMS</td>
<td>0.06</td>
<td>4.73</td>
<td>&lt;.05</td>
<td>0.07</td>
<td>5.85</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>PSQI x 3&lt;sup&gt;rd&lt;/sup&gt; TMS</td>
<td>0.01</td>
<td>0.15</td>
<td>.70</td>
<td>0.01</td>
<td>0.56</td>
<td>.46</td>
</tr>
<tr>
<td>PILL x 1&lt;sup&gt;st&lt;/sup&gt; TMS</td>
<td>0.01</td>
<td>0.43</td>
<td>.52</td>
<td>0.02</td>
<td>2.04</td>
<td>.16</td>
</tr>
<tr>
<td>PILL x 2&lt;sup&gt;nd&lt;/sup&gt; TMS</td>
<td>0.05</td>
<td>5.97</td>
<td>&lt;.05</td>
<td>0.05</td>
<td>6.53</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>BSI x 1&lt;sup&gt;st&lt;/sup&gt; TMS</td>
<td>0.01</td>
<td>0.16</td>
<td>.70</td>
<td>0.01</td>
<td>1.11</td>
<td>.30</td>
</tr>
<tr>
<td>BSI x 2&lt;sup&gt;nd&lt;/sup&gt; TMS</td>
<td>0.01</td>
<td>0.01</td>
<td>.97</td>
<td>0.01</td>
<td>0.01</td>
<td>.93</td>
</tr>
<tr>
<td>BSI x 3&lt;sup&gt;rd&lt;/sup&gt; TMS</td>
<td>0.01</td>
<td>0.04</td>
<td>.85</td>
<td>0.01</td>
<td>1.36</td>
<td>.25</td>
</tr>
</tbody>
</table>

Note. PSQI = Pittsburg Sleep Quality Index; PILL = Pennebaker Inventory of Limbic Languidness; BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire; FMI = Freiburg Mindfulness Inventory. TMS = Toronto Mindfulness Scale.
Figure 1. Change in TMS across sessions by condition. TMS = Toronto Mindfulness Scale.
Figure 2. Moderating Effect of Baseline FFMQ for PSQI. PSQI = Pittsburg Sleep Quality Index; FFMQ = Five Facet Mindfulness Questionnaire.
Figure 3. Moderating Effect of Baseline FFMQ for PILL. PILL = Pennebaker Inventory of Limbic Languidness; FFMQ = Five Facet Mindfulness Questionnaire.
Figure 4. Moderating Effect of Baseline FFMQ for BSI. BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire.
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Appendix A

PERSONAL CODE FORM

To protect your anonymity as a participant in this study, your responses will be identified only by a personal code that you will create. Because your participation in this study is anonymous, your personal code is the only way for us to identify you and match up your responses. Please use the space below to create your unique personal code, which you will use on each day that you participate in this study.

**PERSONAL CODE:**

<table>
<thead>
<tr>
<th>Last 2 letters</th>
<th>Your day of birth</th>
<th>Last 2 letters</th>
<th>Number on the writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>of your first name</td>
<td>of your birth city</td>
<td></td>
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</tbody>
</table>

**FOR EXAMPLE:**

If your first name is Juanita, your day of birth is 08, and you were born in Queens, NY, and the number on your writing instruction form is 1, then your personal code would be: **TA08NS1**

**Juanita**

**Queens**

**08**
Appendix B

Demographic Information

1. Age (choose one)
   - 18-19
   - 20-21
   - 22-24
   - 25 and above

2. Gender
   - Male
   - Female

3. Year in School
   - Freshman
   - Sophomore
   - Junior
   - Senior

4. Race or Ethnicity
   Do you consider yourself (check as many as apply)
   - American Indian/Alaskan Native
   - Asian/Asian-American
   - Black/African/African American
   - Native Hawaiian/Other Pacific Islander
   - Spanish/Hispanic/Latino
   - White/Caucasian
   - Other
Appendix C

A. Five Facet Mindfulness Questionnaire

The following section contains statements that describe your daily experience. Please use the last 30 days as the time frame to consider each item. Provide an answer for every statement as best as you can. Please answer as honestly and spontaneously as possible. There are neither right nor wrong answers, what is important to us is your own personal experience.

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<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>never or very rarely true</td>
<td>rarely true</td>
<td>sometimes true</td>
<td>often true</td>
<td>very often or always true</td>
</tr>
</tbody>
</table>

1. When I’m walking, I deliberately notice the sensations of my body moving.
2. I’m good at finding words to describe my feelings.
3. I criticize myself for having irrational or inappropriate emotions.
4. I perceive my feelings and emotions without having to react to them.
5. When I do things, my mind wanders off and I’m easily distracted.
6. When I take a shower or bath, I stay alert to the sensations of water on my body.
7. I can easily put my beliefs, opinions, and expectations into words.
8. I don’t pay attention to what I’m doing because I’m daydreaming, worrying, or otherwise distracted.
9. I watch my feelings without getting lost in them.
10. I tell myself I shouldn’t be feeling the way I’m feeling.

11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

12. It’s hard for me to find the words to describe what I’m thinking.

13. I am easily distracted.

14. I believe some of my thoughts are abnormal or bad and I shouldn’t think that way.

15. I pay attention to sensations, such as the wind in my hair or sun on my face.

**Please select the level of agreement for each statement:**

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<tr>
<td>never or very rarely true</td>
<td>rarely true</td>
<td>sometimes true</td>
<td>often true</td>
<td>very often or always true</td>
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</tbody>
</table>

16. I have trouble thinking of the right words to express how I feel about things.

17. I make judgments about whether my thoughts are good or bad.

18. I find it difficult to stay focused on what’s happening in the present.

19. When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it.

20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

21. In difficult situations, I can pause without immediately reacting.

22. When I have a sensation in my body, it’s difficult for me to describe it because I can’t find the right words.

23. It seems I am “running on automatic” without much awareness of what I’m doing.

24. When I have distressing thoughts or images, I feel calm soon after.

25. I tell myself that I shouldn’t be thinking the way I’m thinking.

26. I notice the smells and aromas of things.

27. Even when I’m feeling terribly upset, I can find a way to put it into words.

28. I rush through activities without being really attentive to them.

29. When I have distressing thoughts or images I am able just to notice
them without reacting.

_____ 30. I think some of my emotions are bad or inappropriate and I shouldn’t feel them.

_____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

_____ 32. My natural tendency is to put my experiences into words.

_____ 33. When I have distressing thoughts or images, I just notice them and let them go.

_____ 34. I do jobs or tasks automatically without being aware of what I’m doing.

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<td>rarely true</td>
<td>sometimes true</td>
<td>often true</td>
<td>very often or always true</td>
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</tbody>
</table>

_____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

_____ 36. I pay attention to how my emotions affect my thoughts and behavior.

_____ 37. I can usually describe how I feel at the moment in considerable detail.

_____ 38. I find myself doing things without paying attention.

_____ 39. I disapprove of myself when I have irrational ideas.

B. Freiburg Mindfulness Inventory

The following section contains statements that describe your daily experience. Please use the last 30 days as the time-frame to consider each item. Provide an answer for every statement as best as you can. Please answer as honestly and spontaneously as possible. There are neither right nor wrong answers, what is important to us is your own personal experience.

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</table>
rarely | occasionally | fairly often | almost always |

_____ 1. I notice how my emotions express themselves through my body.

_____ 2. I feel connected to my experience in the here-and-now.

_____ 3. I know that I am not identical to my thoughts.
4. I am open to the experience of the present moment.
5. I observe how experiences arise and fade away.
6. I pay attention to what’s behind my actions.
7. I accept myself as I am.
8. I examine unpleasant, as well as pleasant, sensation and perceptions.
9. I avoid unpleasant feelings.
10. I sense my body, whether eating, cooking, cleaning, or talking.
11. I see my mistakes and difficulties without judging them.
12. I consider things from different perspectives.

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<tbody>
<tr>
<td>rarely</td>
<td>occasionally</td>
<td>fairly often</td>
<td>almost always</td>
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</table>

13. I am impatient with myself and with others.
15. When I notice an absence of mind, I gently return to the experience of the here and now.
16. I am able to smile when I notice how I sometimes make life difficult.
17. I let my thoughts run away with me.
18. I am aware how brief and fleeting my experience is.
19. I remain present with sensations and feelings even when they are unpleasant or painful.
20. I easily get lost in my thoughts and feelings.
21. I experience moments of inner peace and ease, even when things get hectic and stressful.
22. I accept unpleasant experiences.
23. I notice that I don’t need to react to whatever pops into my mind.
24. I watch my thoughts without identifying with them.
25. I see how I create my own suffering.
26. I am friendly to myself when things go wrong.
27. I am able to appreciate myself.
28. I perceive my feelings and emotions without having to react to them.
29. I watch my feelings without getting lost in them.
30. In difficult situations, I can pause without immediately reacting.

C. Brief Symptom Inventory

Listed below is a list of problems that people sometimes have. Please read each one carefully, and choose the number from the scale below that best describes how much that problem has distressed or bothered you during the past 7 days, including today.

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<tr>
<td></td>
<td>not at all</td>
<td>a little bit</td>
<td>moderately</td>
<td>quite a bit</td>
<td>extremely</td>
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</table>

1. ___ Nervousness or shakiness inside
2. ___ Faintness or dizziness
3. ___ The idea that someone else can control your thoughts
4. ___ Feeling others are to blame for most of your troubles
5. ___ Trouble remembering things
6. ___ Feeling easily annoyed or irritated
7. ___ Pains in heart or chest
8. ___ Feeling afraid in open places or on the street
9. ___ Thoughts of ending your life
10. ___ Feeling that most people cannot be trusted
11. ___ Poor appetite
12. ___ Suddenly scared for no reason
13. ___ Temper outbursts that you could not control
14. ___ Feeling lonely even when you are with people
15. ___ Feeling blocked in getting things done
16. ___ Feeling lonely
17. ___ Feeling blue
18. ___ Feeling no interest in things
19. ___ Feeling fearful
20. ___ Your feelings being easily hurt
21. ___ Feeling that people are unfriendly or dislike you
22. ___ Feeling inferior to others
23. ___ Nausea or upset stomach
24. ___ Feeling that you are watched or talked about by others
25. ___ Trouble falling asleep
26. ___ Having to check and double-check what you do
27. ___ Difficulty making decisions
28. ___ Feeling afraid to travel on buses, subways, or trains
29. ___ Trouble getting your breath
30. ___ Hot or cold spells
31. ___ Having to avoid certain things, places, or activities because they frighten you
32. ___ Your mind going blank
33. ___ Numbness or tingling in part of your body

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<th>3</th>
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<td>not at all</td>
<td>a little bit</td>
<td>moderately</td>
<td>quite a bit</td>
<td>extremely</td>
</tr>
</tbody>
</table>

34. ___ The idea that you should be punished for your sins
35. ___ Feeling hopeless about the future
36. ___ Feeling weak in parts of your body
37. ___ Feeling tense or keyed up
38. ___ Thoughts of death or dying
39. ___ Having urges to beat, injure, or harm someone
40. ___ Having urges to break or smash things
41. ___ Feeling very self-conscious with others
42. ___ Feeling uneasy in crowds, such as shopping or at a movie
43. ___ Never feeling close to another person
44. ___ Spells of terror or panic
45. ___ Getting into frequent arguments
46. ___ Feeling nervous when you are left alone
47. ___ Others not giving you proper credit for your achievements
48. ___ Feeling so restless you couldn’t sit still
49. ___ Feelings of worthlessness
50. ___ Feeling that people will take advantage of you if you let them
51. ___ Feelings of guilt
52. ___ Trouble concentrating
53. ___ The idea that something is wrong with your mind.
D. Pennebaker Inventory of Limbic Languidness

Several common symptoms or bodily sensations are listed below. Most people have experienced most of them at one time or another. We are currently interested in finding out how prevalent each symptom is among various groups of people. On the page below, write how frequently you experience each symptom. For all items, use the following scale:

<table>
<thead>
<tr>
<th></th>
<th>Have never or almost never</th>
<th>Less than 3 or 4 times per year</th>
<th>Every month or so</th>
<th>Every week or so</th>
<th>More than once every week</th>
</tr>
</thead>
</table>

___1. Eyes water
___2. Itchy eyes or skin
___3. Ringing in ears
___4. Temporary deafness or hard of hearing
___5. Lump in throat
___6. Choking sensations
___7. Sneezing spells
___8. Running nose
___9. Congested nose
___10. Bleeding nose
___11. Asthma or wheezing
___12. Coughing
___13. Out of breath
___14. Swollen ankles
___15. Chest pains
___16. Racing heart
___17. Cold hands or feet even in hot weather
___18. Leg cramps
___19. Insomnia or difficulty sleeping
___20. Toothaches
___21. Upset stomach

___22. Swollen joints
___23. Stiff or sore muscles
___24. Back pains
___25. Sensitive or tender skin
___26. Face flushes
___27. Tightness in chest
___28. Skin breaks out in rash
___29. Acne or pimples on face
___30. Acne/pimples not face
___31. Boils
___32. Sweat in cold weather
___33. Headache
___34. Feeling pressure head
___35. Hot flashes
___36. Chills
___37. Dizziness
___38. Feel faint
___39. Twitching of eyelid
___40. Twitching other eyelid
___41. Hands tremble or shake
___42. Stiff joints

___43. ___44. ___45. ___46. ___47. ___48.
E. **Pittsburg Sleep Quality Index**

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, when have you usually gone to bed at night?
   Usual bed time ___________

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?
   Number of minutes ________

3. During the past month, when have you usually gotten up in the morning?
   Usual getting up time ________

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed.)
   Hours of sleep per night ________

5. During the past month, how often have you had trouble sleeping because you . . .
   a. Cannot get to sleep within 30 minutes?
      Not during the past month _____ 
      Less than once a week _____ 
      Once or twice a week _____ 
      Three or more times a week_____
   b. Wake up in the middle of the night or early morning?
      Not during the past month _____ 
      Less than once a week _____ 
      Once or twice a week _____ 
      Three or more times a week_____
   c. Have to get up to use the bathroom?
      Not during the past month _____ 
      Less than once a week _____ 
      Once or twice a week _____ 
      Three or more times a week_____

___22. Indigestion          ___49. Sore muscles
___23. Heartburn or gas     ___50. Sore throat
___25. Diarrhea             ___52. Nausea
___26. Constipation         ___53. Strong reaction to
___27. Hemorrhoids          ___54. Numbness or tingling
                             in part of body
d. Cannot breathe comfortably?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

e. Cough or snore loudly?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

f. Feel too cold?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

g. Feel too hot?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

h. Had bad dreams?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

i. Have pain?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

j. Other reason(s)?  Please describe:
_________________________

How often during the past month have you had trouble sleeping because of this?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

6. During the past month, how would you rate your sleep quality overall?
Very good _____
Fairly good _____
Fairly bad _____
Very bad _____

7. During the past month, how often have you taken medicine (prescribed or “over the counter”) to help you sleep?
Not during the past month _____    Less than once a week _____   Once or twice a week _____   Three or more times a week _____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?
Not during the past month _____    Less than once a week _____   Once or three or more times a week _____
past month _____ once a week _____ twice a week _____ times a week_____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?
No problem at all      _____
Only a very slight problem    _____
Somewhat of a problem       _____
A very big problem        _____

Appendix D

Instructions for Experimental Group (All 3 writing sessions)

For the next 20 minutes, please listen to and follow as closely as possible the directions in this recording. Make yourself comfortable and allow yourself a moment to relax. You may close your eyes if you feel comfortable.
Appendix E

Instructions for Comparison Group (All 3 writing sessions)

For the next 20 minutes, please sit quietly and listen to this audio book.
Appendix F

Toronto Mindfulness Scale

We are interested in what you just experienced. Below is a list of things that people sometimes experience. Please read each statement and indicate the extent to which you agree with each statement. In other words, how well does the statement describe what you just experienced, just now?

<table>
<thead>
<tr>
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<tbody>
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<td>moderately</td>
<td>quite a bit</td>
<td>very much</td>
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</table>

_____ 1. I experienced myself as separate from my changing thoughts and feelings
_____ 2. I was more concerned with being open to my experiences than controlling or changing them.
_____ 3. I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations.
_____ 4. I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things ‘really’ are.
_____ 5. I was curious to see what my mind was up to from moment to moment.
_____ 6. I was curious about each of the thoughts and feelings that I was having.
_____ 7. I was receptive to observing unpleasant thoughts and feelings without interfering with them.
8. I was more invested in just watching my experience as they arose, than in figuring out what they could mean.
9. I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.
10. I remained curious about the nature of each experience as it arose.
11. I was aware of my thoughts and feelings without overidentifying with them.
12. I was curious about my reactions to things.
13. I was curious about I might learn about myself by just taking notice of what my attention gets drawn to.

Appendix G

Day 1 Writing Instructions for the Experimental and Comparison Group

For the next three days, we’d like you to write about a highly stressful or traumatic event – either one that occurred recently, or at any another time in your life. I want you to write about an event that is very personally significant to you, and one that you experienced directly. Most importantly, try to let go and express your deepest emotions and thoughts relating to this event, allowing your words to flow freely onto the page. Also, please write in the state of mind that you just experienced during the listening activity. Throughout these three days, you may also tie your personal experiences to other parts of your life, such as your childhood, your parents, people you love. Again, in your writing, we’d like you to examine your deepest emotions and thoughts. Things like grammar and spelling aren’t important now – just focus on trying to keep writing for the next 20 minutes. Even if you run out of things to say, you can just repeat yourself until you think of more to write about.
Appendix H

Day 2 Writing Instructions for the Experimental and Comparison Group

Today please continue what you have been writing by examining your deepest emotions and thoughts of the stressful or traumatic event that you wrote about last time. Again, please write in the state of mind that you just experienced in the previous exercise.
Appendix I

Day 3 Writing Instructions for the Experimental and Comparison Group

Today is the last day of your writing sessions. We again want you to explore your deepest emotions and thoughts about the most stressful or traumatic event of your life. Again, please write in the state of mind that you just experienced in the previous exercise. Keep in my mind that this is the last writing session so you might want to conclude the writing experience.
Appendix J

Debriefing

This study asked participants to write about stressful or traumatic personal experiences, and therefore some people may experience emotional distress. Previous studies suggest that while some negative emotions may be experienced immediately after writing about stress or trauma, this is outweighed by the longer-term benefits of this type of writing. These longer-term benefits include improvement in psychological and physical well-being. In addition, many participants in research studies like this one have reported that they enjoyed the opportunity to write about their personal life experiences.

If you are experiencing any discomfort or distress as a result of this study, we urge you to contact one of the support resources below:

**University Counseling Center** ........................... 442-5800
400 Patroon Creek Boulevard, University at Albany, SUNY

**Psychological Services Center** ........................... 442-4900
299 Washington Avenue, University at Albany, SUNY

**Middle Earth, Crisis Intervention & Support Hotline**  .......... 442-5777
University at Albany, SUNY

**Capital District Psychiatric Center (CDPC)**  ................. 447-9611
75 New Scotland Avenue, Albany

Capital District Psychiatric Center (CDPC) 447-9650
24-Hour Crisis Hotline