Effects of Mindfulness Meditation and Distraction on Mood and Attention in Veterans with PTSD

Megumi Omonishi
Alan Stewart
Kenneth B. Matheny
Jeffrey S. Ashby
Georgia State University

Abstract

The purpose of this study was to investigate the effect of a brief (20-minute) mindfulness meditation treatment on mood and attention in a sample (N = 63) of veterans with PTSD when compared with a period of distraction and a control condition. Pre- and posttests of the State-Trait Anxiety Inventory and the Positive and Negative Affect Schedule were used to assess changes in anxiety and mood, while the Stroop task was employed as a measure of selective attention. To control for the effects of comorbid physiological and psychological conditions, sub-analyses were conducted for participants with and without depression, sleep disturbance, chronic pain, and traumatic brain injury. Analysis of results indicated that meditators who were not reporting sleep problems demonstrated higher levels of selective attention. A decrease in negative mood was found in all participants regardless of their group assignment. Implications for research and practice are discussed.

Keywords: mindfulness, meditation, distraction, mood, attention, veterans, PTSD, anxiety

Effects of Mindfulness Meditation and Distraction on Mood and Attention in Veterans with PTSD

Over two thousand years ago, the Buddha pointed out that human suffering is due to the tendency to cling to thoughts, feelings, biased perceptions of reality, and habitual ways of acting (Hayes, Strosahl, & Wilson, 1999). Unable or unwilling to remain in contact with negative private experiences in a direct, open, and unguarded manner, we react with habitual emotional and cognitive avoidance routines, e.g. rumination or distraction (Hayes, Strosahl, & Wilson, 1999).

More recently Lazarus and Folkman (1984) suggested that one could cope with stressful events by either working directly on a problem—problem-focused coping—or attempting to lessen emotional distress through cognitive efforts—emotion-focused coping. The most effective coping strategy is determined by the type of stressor: problem-focused coping is more appropriate when the situation is amenable to change, and emotion-focused coping when it is not (Penley, Tomaka, & Wiebe, 2002). Emotion-focused coping strategies may take a variety of forms, ranging from more to less adaptive. Acceptance, for example, is one of the more adaptive

emotion-focused coping strategies, while mental disengagement strategies such as cognitive distraction are less adaptive (Carver, Scheier, & Weintraub, 1989).

Distraction is generally understood as the conscious or unconscious effort to divert attention from unpleasant experiences. Persistent distraction, particularly in the form of avoidance of thoughts, feelings or stimuli associated with a trauma, is one of the characteristic symptoms of PTSD according to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013). Greater avoidance has been associated with the development of PTSD symptoms in several traumatized populations, including rape victims (Ulman, Filipas, Townsend, & Starzynski, 2000), persons suffering severe motor vehicle accidents (Dorfel, Rabe, & Karl, 2008), and veterans of Operation Desert Storm (Sutker, Davis, Uddo, & Ditta, 1995).

Although distraction may be effective in reducing anxiety and arousal in the short-term, Linehan (1993) argues that it is likely to be ineffective in the long run as it diverts attention from the development of more effective coping strategies. For example, Vietnam veterans using approach- rather than avoidance-oriented coping had fewer PTSD symptoms despite significant combat exposure (Wolfe, Keane, Kaoloupek, Mora, & Wine, 1993). Approach-oriented strategies, including mindfulness meditation, may be more beneficial for people experiencing psychological distress (Segal, Williams, & Teasdale, 2002; Teasdale, Segal & Williams, 1995).

Mindfulness involves "bringing one's complete attention to the present experience on a moment-to-moment basis" (Marlatt & Kristeller, 1999, p. 68). Operationalized as "a family of techniques which have in common a conscious attempt to focus attention in a non-analytical way and attempt not to dwell on discursive, ruminating thought" (Shapiro, 1982, p. 268), mindfulness meditation assists people in countering avoidance and remaining in contact with events in the present moment in a nonjudgmental manner, thus increasing cognitive flexibilities that lead to a reduction in habitual responding (Hayes & Wilson, 2003).

Numerous researchers have suggested that meditation is concerned with alterations to and/or training of attention (Brown, 1993; Goleman, 1977; Rao, 1989; Sethi, 1989; Valentine & Sweet, 1999). According to Deikman's (1963, 1966) deautomatization hypothesis, meditation practice minimizes biasing or habitual reactions through a process that reinvests one's attention in present actions and experiences. If engaging in meditation leads to deautomatization, those who meditate should generally show reduced habitual reacting and improved attention to the present. Wenk-Sormaz (2005) points out, however, that while the key factor of mindfulness meditation practice seems to be a cognitive attempt to control attention, there has not been extensive empirical research about its effectiveness in improving attention. Many mindfulness meditation and attention research studies have utilized introspection or self-report data as dependent measures rather than more formal measures of attention (Jha, Krompinger, & Baime, 2007).

Disturbances in attention are common complaints among individuals diagnosed with PTSD. Indeed, avoidance is one of the essential diagnostic criteria for PTSD (American Psychiatric Association, 2013), while difficulty concentrating and hypervigilance are included under a second major criterion. Attentional impairments among individuals with PTSD have been found on several measures of attention, e.g. the Digit Span and Digit Symbol subtests of the

Wechsler Adult Intelligence Scale – Revised, and the Visual Memory Span subtest of the Wechsler Memory Scale – Revised (Jenkins, Langlais, Delis, & Cohen, 2000; Koso & Hansen, 2006; Uddo, Vasterling, Brailey, & Sutker, 1993; Vasterling et al., 2002).

Review of a substantial body of research (e.g. Broderick, 2005; Kabat-Zinn, 1991; Kabat-Zinn, Massion, & Kristeller, 1992; Wenk-Sormaz, 2005) suggests that reductions in anxiety, hyperarousal and hypervigilance, as well as improved attention, could be achieved by engaging in meditation. Although meditation studies for individuals diagnosed with PTSD have been available for decades (e.g. Brooks & Scarano, 1985; Krippner & Colodzin, 1989), only recently has substantial research attention been paid to this topic (e.g. Rosenthal, Grosswald, Ross, & Rosenthal, 2011). One recent review of the topic noted that "meditation-based approaches are being widely implemented, but there is minimal research rigorously assessing their effectiveness" (Lang et al., 2012, p. 759). The reviewers go on to argue that "empirical evidence of the efficacy of meditation for PTSD is very limited but holds some promise. Additional evaluation of meditation-based treatment appears to be warranted" (p. 759).

To help ameliorate this lack of empirical evidence, the current study examined the effect of meditation on mood and attention in veterans with PTSD. Because engaging in meditation leads to a reduction in habitual patterns of responses (Salmon, Sephton, & Weissbecker, 2004), we predicted that participants who meditate would show less cognitive interference in processing information on the Stroop task than participants experiencing distraction conditions. More specifically, we hypothesized that participants experiencing meditation would have shorter reaction times and less interference in completion of the Stroop task than those experiencing distraction and control conditions. A secondary hypothesis was that distraction would be less effective than meditation in improving mood.

We used a between-subjects design to compare three randomly assigned experimental conditions—a brief mindfulness meditation experience, a period of distraction, and a control condition. Two self-report measures were used to assess change in mood, while alterations in attention were evaluated using the Stroop task. The Stroop task is an especially appropriate instrument for this study not only because it has been widely used to assess attention in general and selective attention in particular (MacLeod, 1991), but because it assesses one's ability to inhibit habitual responding, word reading, and to attend instead to an atypical aspect of reading, noting typeface color. Analogously, meditation is believed to assist people in reducing habitual responding by focusing attention on an atypical aspect of daily life, i.e. the physical sensations accompanying breathing (Deikman 1963, 1966; Hayes & Wilson, 2003).

Because psychological and psychophysiological problems can affect mood and attention, and because 80% of those with PTSD report at least one other comorbid psychological disorder (Foa, Keane, Friedman, & Cohen, 2008), we took steps to account for the potential confounding effects of such conditions. Participant medical records were examined post-treatment and sub-group analyses were conducted of those with depression (Asmundson, Stein, & McCreary, 2002; Schnurr, Spiro, & Paris, 2000), sleep disturbance (Norman, Stein, & Davidson, 2007), chronic pain (Beck, Freeman, Shipherd, Hamblen, & Lackner, 2001; Sharp, 2004) and traumatic brain injury (TBI; Dolan et al., 2012).

Materials and Methods

Participants

The study was conducted at a Veterans Affairs Medical Center (VAMC) located in a large city in the southeastern US, and was approved by the institutional review boards of the VAMC and a local university. Participants were recruited from VAMC PTSD therapy groups, referrals from clinicians in the VAMC mental health and PTSD clinics, and through advertisement posters displayed at those clinics' waiting areas and other designated areas in the VAMC. Potential participants were instructed to contact the researcher or to give a study participation form to the mental health clinic receptionist. A researcher telephoned potential participants, and only veterans who met study criteria were invited to the study. Veterans who were colorblind or who practiced meditation regularly were excluded from the study. Those who were experiencing psychotic symptoms (e.g. hallucinations or delusions), a manic state, or who had active drug and/or alcohol problems were also excluded, as these conditions could have compromised their ability to focus on the Stroop task. Participation in the study was voluntary, and no incentives were provided for participation. Participants were notified through the informed consent document that participation did not mean they would receive treatment.

Of the 80 veterans selected to participate, eleven dropped out before starting, three were excluded for not passing the intervention check (see below), three did not complete the experiment, and one was excluded for severe colorblindness, which invalidated the Stroop test. The remaining participants (N = 63) were randomly assigned to a control group (n = 19), a distraction group (n = 22) or a mindfulness meditation group (n = 22). They had a mean age of 56 years (SD = 11.28, range = 25 to 80 years), and 92% were male. Of the participants, 62% identified as African American, 30% as Caucasian, 3% as Latino, 2% as Asian American, and 2% as Native American. A majority of the participants were married (57%), while 29% were divorced, 11% were single, and 3% were widowed. In terms of educational background, 95% reported graduating from high school; of those, 10% graduated from vocational school, 10% from college, and 7% from graduate school. Sixty percent were veterans of the Vietnam War, 27% of the Persian Gulf War, 6% of the Operation Enduring Freedom/Operation Iraqi Freedom, 5% of post-Vietnam, and 2% of the Korean war. The vast majority, 89%, had experienced combat, and 35% reported having sustained at least one TBI. Mean PTSD treatment length was six years (SD = 7.64; range = 1.5 to 35 years).

Post-treatment review of medical records revealed high comorbidity within this sample. In addition to a diagnosis of PTSD, 64% had a history of major depressive disorder, 59% pain problems, and 46% sleep disturbance, while 25% were in remission for drug and alcohol abuse. Participants were expected to be experiencing PTSD symptoms at either clinical or sub-clinical level, depending on their mental health treatment progress at the VAMC.

Instruments

Respondents were asked to provide information about their age, sex, race/ethnicity, education, marital status, history of TBI, and duration of PTSD treatment. Participants in all three groups were informed that they had permission to have their eyes open or closed; if closed, they were to try not to fall asleep. In all conditions, the experimenter was present in the room with the participants.

Distraction response tasks. The Nolen-Hoeksema (1990) protocol was used to generate distraction conditions. Some items from the protocol were eliminated as culturally inappropriate, and replacement items were created and added to the list. Participants in the distraction group were instructed to read, individually and silently, sentences from a booklet, and to use their imagination and concentration to focus on the ideas in the sentence. The sentences focused on external events, e.g., "Think about the shape of a large black umbrella," or "Think about clouds forming in the sky."

Mindfulness meditation. Those in the meditation condition participated in a guided open-meditation practice which involved self-acceptance, focusing on breathing, and awareness of surroundings. Kabat-Zinn's (2002) 20-minute meditation exercise audio recording was used. The audiotape includes a brief introduction to meditation, guidance in focusing attention on breathing and in developing greater awareness of the way the mind works. During the intervention itself, participants were occasionally reminded to return the focus of their attention to their breathing when their mind had wandered to other thoughts.

Control group. Those in the control group were instructed to sit, rest, and let their minds wander for 20 minutes. Magazines from which war or PTSD related articles and pictures had been removed were provided. Participants were told that they might skim a magazine if it helped them let their minds wander.

Intervention check. Participants assigned to the meditation and distraction conditions were asked to explain briefly the content of the recording or to state three sentences from the distraction booklet in order to ensure their levels of engagement in intervention tasks. Those who could not provide correct responses were excluded from the data analysis. Respondents were also asked to answer two questions. 1) On a Likert scale of 1 (*never*) to 5 (*great deal*), did they fall asleep during the intervention, and 2) on a Likert scale of 1 (*not at all*) to 9 (*extremely*), how much effort did they put into following the intervention directions. Participants who answered above 3 on the first question or below 4 on the second question were excluded from the data analysis. These cut-scores were determined by calculating two standard deviations below the mean. Three participants were excluded from the analysis in this way.

Positive and Negative Affect Schedule (PANAS). Participants were asked to complete a pre-and post-test of the PANAS (Watson, Clark, & Tellegen, 1988). This measurement assesses two broad mood states, using ten items to reflect positive affect (PA; e.g., strong, enthusiastic, active, pride) and ten to reflect negative affect (NA; e.g., scared, upset, distressed, hostility). The authors of the PANAS reported acceptably high internal consistency, with Cronbach's alphas of .86 to .90 for the PA scale and .84 to .87 for the NA scale. They also found a low level of correlation between the PA and NA scales (ranging from -.12 to -.23), indicating significant discriminant values. (In the present study, correlation coefficients were -.19 between the PA-pretest and NA-pretest (p = .14), and -.31 between the PA-posttest and NA-posttest (p = .01).) The authors also reported reasonably high test-retest correlations for both scales, ranging from .47 to .68 for the PA scale and from .39 to .71 for the NA scale. Convergent validity between the PANAS NA scale and the Hopkins Symptom Checklist was reported to range from .65 to .74 (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974).

State-Trait Anxiety Inventory – State Anxiety Scale (STAI-S). Participants were also asked to complete the STAI-S Form Y (Spielberger, 1983) to assess their level of anxiety. The twenty items on this scale evaluate respondents' current feelings of apprehension, nervousness, tension, and worry. The reported psychometric properties of the scale (Knight, Waal-Manning, & Spears, 1983; are adequate, including good to excellent internal consistency, with Cronbach's alphas ranging from .86 to .95 (Spielberger, 1983; Ramanaiah, Franzen, & Schill, 1983). Reported correlations with the Minnesota Multiphasic Personality Inventory clinical scales for depression, psychasthenia, and schizophrenia were .57, .79, and .71 respectively (Spielberger, 1983).

Stroop task. To assess their selective attention, participants were asked to complete the Stroop Color and Word Test, a standardized three-page paper Stroop test (Golden, 1978). The paper-and-pencil version of the Stroop test was administered rather than a computerized version because of concerns regarding the level of computer familiarity among older participants. The mean interference score is 0.00 (SD = 10.00), with higher scores indicating greater resistance to interference and thus better selective attention. A positive interference score means the individual performed better than predicted based on age, while a negative interference score means the individual performed less well than predicted.

Procedure

The experiment was conducted with one or two participants from a single experimental group at a time. Participants first completed a demographic questionnaire and the STAI-S and PANAS pretests, after which they participated in their assigned intervention. Participants then completed the STAI-S and PANAS posttests, followed by the Stroop task and the intervention check questionnaire. At the completion of the experiment, participants were debriefed. The procedures took place in a small assessment room, and total participation time was approximately 60 minutes. After the experiment, participants' medical records were reviewed to collect medical and psychiatric information, including sleep disorders (insomnia and hypersomnia), TBI, pain problems, mood disorders, and drug and alcohol problems. This medical information was utilized for sub-sample analyses.

Analysis

Stroop task. A one-way between-groups analysis of variance (ANOVA) was conducted to explore the impact of the assigned intervention on the interference score and the response time of the Stroop task. Post hoc analysis using the Student-Newman-Keuls test (SNK) was conducted as needed. Data from all participants (main group analysis) was analyzed first, followed by analyses controlling for participants with pain problems, sleep problems, depression, and TBI (sub-sample group analyses). Comorbid conditions such as drug and alcohol problems and other mood disorders were not controlled for in the sub-sample group analyses because of their small rate of occurrence in the sample.

STAI-S and PANAS PA and NA. The analysis employed a 3 x 2 (meditation, distraction or control group x pretest or posttest) split-plot ANOVA with repeated measures to explore the impact of intervention by comparing scores on the STAI-S and PANAS at pretest and posttest. The between-subjects factor was the intervention group while the within-subject factor was the pretest and posttest scores. As mentioned above, given the high level of

comorbidity in the sample, further analyses were conducted controlling for data from participants with pain problems, sleep problems, TBI, or depression.

Post hoc analysis. Where the interaction effect for a split-plot ANOVA was statistically significant, simple effects tests were conducted to further explore the interaction effect. To compare levels of the within-group variable (pretest and posttest scores) for each level of the between-groups variable (type of intervention group), cases were selected by the between-groups variable. Paired-samples t-tests with a Bonferroni adjusted alpha level (i.e., 0.05/3 = 0.016) for multiple testing were conducted. To compare levels of the between-groups variable (type of intervention group) for each level of the within-group variable (pretest and posttest scores), a one-way ANOVA was conducted with post hoc analysis using SNK as needed. When the between-groups effect for a split-plot ANOVA was significant, post hoc analysis using SNK was conducted.

Results

Analysis using one-way ANOVAs and, for categorical variables, chi-square tests of homogeneity (Franke, Ho, & Christie, 2012) found no significant differences among groups with regard to age, education, PTSD treatment length, history of TBI, pain problems, sleep problems, depression or drug/alcohol use. Due to violation of minimum expected cell frequency, a chi-square test was not possible on race/ethnicity, gender, marital status or combat experience.

In comparing the Stroop task interference scores, the main-group analyses indicated no significant effect of intervention, $F(2, 59) = 1.15$, $p = .32$, $\eta^2 = .04$, power = .24. In the sub-sample group analyses, however, when participants with sleep issues were excluded, a significant effect was found, $F(2, 31) = 7.14$, $p = .003$, $\eta^2 = .32$, power = .91. The actual group difference in mean scores was quite large. Post-hoc comparisons employing the SNK test with a harmonic mean sample size of 10.97 indicated that the mean interference score for the meditation group ($M = 7.18$, $SD = 7.21$) was significantly different from the distraction ($M = -2.82$, $SD = 5.88$) and control groups ($M = -4.45$, $SD = 9.05$), as illustrated in Figure 1, while the distraction and control groups did not differ significantly from each other. Interestingly, the meditation group's interference score was the only positive score, indicating better performance than predicted; scores for the other two groups were negative, indicating worse performance than predicted. There were no significant results in Stroop task response time for either the main-group or the sub-sample group analyses.

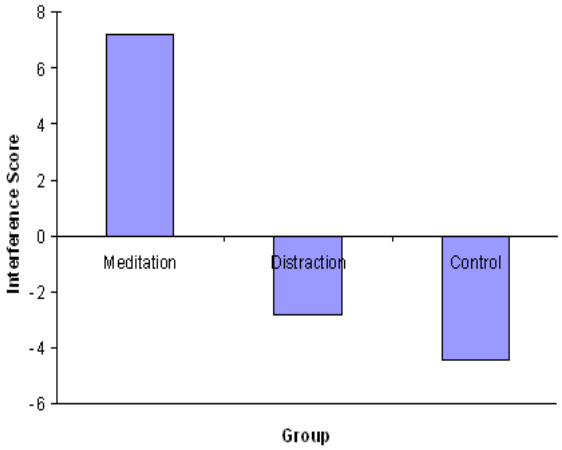

Figure 1. Mean interference scores for meditation, distraction and control groups.

For the main-group analysis of the STAI-S scores, a 3 x 2 split-plot ANOVA revealed a statistically significant within-group main effect, $F(1, 60) = 15.97$, $p < .00018$, Cohen's $d = .36$,

power = .98. Means comparisons revealed that the STAI-S posttest score (M = 47.02, SD = 13.02) was significantly lower than its pretest score (M = 51.70, SD = 12.71), indicating a reduction of state anxiety in all three intervention groups. Within-group interaction effects were found to be non-significant.

Similarly, significant within-group main effects were found for most of the sub-sample groups. The only exception occurred when participants with pain problems were excluded from the analysis. In the sub-sample group without pain problems, the within-group main effect was not significant, $F(1, 23) = 3.09$, $p < .09$, $d = .29$, power = .39, while results for its counter cohort, the sub-sample group with pain, were found to be significant, $F(1, 34) = 13.58$, $p = .001$, $d = .43$, power = .95. The non-significant within-group main effect on this particular sub-sample group appears to be due to lower pretest scores as compared to other sub-sample groups. On the pretest, the without-pain mean score (M = 46.65, SD = 43.27) was significantly lower than the with-pain mean score (M = 55.24, SD = 12.72), $t(61) = 2.78$, $p = .007$. Thus participants without pain probably could not reduce their state anxiety levels as greatly as participants with pain because their pretest scores were already low. No significant within-group interaction or between-groups effects were found on any of the sub-sample group analyses.

For the main-group analysis of PANAS-NA scores, a 3 x 2 split-plot ANOVA produced results similar to those from STAI-S: a statistically significant within-group main effect, $F(1, 60) = 14.35$, $p < .00035$, $d = .36$, power = .96, and a means comparison showing PANAS-NA posttest scores (M = 22.16, SD = 9.8) significantly lower than pretest score (M = 25.79, SD = 10.53), indicating a reduction of negative affect in all intervention groups. A within-group interaction effect and a between-groups effect were found to be non-significant.

In the PANAS-NA sub-sample group analyses, significant within-group main effects were found in all sub-sample groups with one exception. Like the STAI-S results, that exception occurred in the without-pain sub-sample group, $F(1, 23) = 2.12$, $p < .16$, $d = .244$, power = .29, where the non-significant result appears to be due to lower pretest scores as compared to other sub-sample groups. No significant within-group interactions or between-groups effects were found on any sub-sample groups.

The PANAS-PA main-groups analyses showed no significant results, but a within-group interaction effect, $F(2, 60) = 1.49$, $p = .23$, power = .31, a within-group main effect, $F(1, 60) = 2.66$, $p < .11$, $d = .16$, power = .36, and a between-groups effect, $F(2, 60) = 1.65$, $p = .20$, partial $\eta^2 = .05$, power = .34, were noted. In terms of sub-sample groups, when participants with pain were excluded, a significant within-group interaction effect was found, $F(2, 23) = 5.63$, $p < .01$, power = .81. Simple effects tests using paired-sample t-tests with a Bonferroni adjusted alpha level (.05 / 3 = .016) were conducted to compare pre- and posttest scores for each of the three conditions, with the following results: for the meditation group, $t(8) = -1.61$, $p < .15$, $d = .41$; for the distraction group, $t(9) = 2.55$, $p < .03$, $d = .55$; and for the control group, $t(6) = 2.40$, $p < .05$, $d = .52$. Only the meditation group's posttest scores increased, while the distraction and control groups' scores decreased. All p values exceeded the Bonferroni adjusted alpha level (.016) however, so no statistically significant results were found. Further simple effects tests using a one-way ANOVA to compare levels of the between-groups variable (effect of intervention) for each level of the within-group variable (pre-posttest) found that there were no significant differences in scores for pretests, $F(2, 23) = 0.90$, $p < .42$, or posttests, $F(2, 23) = 1.69$, $p < .21$.

Discussion

Because characteristic PTSD symptoms can lead to or exacerbate personal, social, and vocational issues, regulating basic mental functions such as mood and attention in everyday life is important in improving the quality of life for veterans with PTSD. The current study examined the effect of a brief experience of meditation on the attention and mood of a sample drawn from this population. Analysis of results showed significant effects from the brief meditation exercise as compared with the distraction and control condition. That is, engaging in a brief meditation led to a reduction in habitual responding and an increase of selective attention among participants without sleep issues.

A significantly higher level of selective attention (the ability to selectively attend to atypical aspect of reading, noting the typeface color) was seen in meditators, as compared to participants in the control and distraction groups when participants with sleep problems were excluded from the analysis. This result replicates Wenk-Sormaz's (2005) study, conducted with 120 undergraduate students, and extends the applicability of brief meditation from a nonclinical to a clinical population. It offers support for the possibility of brief meditation interventions with other clinical populations, support which is bolstered by the high comorbidity rate of psychiatric and medical diagnoses in the current sample.

Further, the present study offers direction for future brief meditation studies to investigate the dosage effect of meditation with a variety of clinical populations. Mental health providers who use mindfulness based therapies such as Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999), Dialectical Behavior Therapy (Linehan, 1993), or Morita Therapy (Morita, Kondō, & LeVine, 1998) encourage patients to practice meditation regularly for maximal gain. However, the threshold of meditation dosage (frequency, duration, etc.) for patients to start feeling its benefits is unknown. In this study, a very brief meditation experience led to a reduction in Stroop interference among those without sleep problems. The effects of a twenty-minute meditation were, however, different for each sub-sample group, even though all participants had been diagnosed with PTSD. This suggests a more complex dosage picture than can be addressed by the current study.

On both the STAI-S and the PANAS-NA, all participant groups reported significantly decreased levels of state anxiety and negative mood at the posttest. Interestingly, a significant sub-group result was not found in participants without pain problems, perhaps because they could not reduce their already-low negative mood and state anxiety levels any further. It should be noted that, while their state anxiety (M = 40.22) and negative mood (M = 19.33) levels at the posttest were the lowest among all sub-sample groups, they were still much higher than the norm group scores for nonclinical populations, M = 35.72, SD = 10.40 (Spielberger, 1983) and M = 14.80, SD = 5.40 (Watson, Clark, & Tellegen, 1988).

Further, the current study did not replicate the results from Broderick's study (2005), which was conducted with a group of undergraduate students (n = 177). In her study, all participants received an intervention that induced a dysphoric mood, and then engaged in interventions similar to those in the current study. Meditators in Broderick's study demonstrated significantly lower levels of negative mood than those in rumination or distraction conditions. In

the current study, no mood differences were found between meditation and distraction conditions, possibly due to chronic and comorbid psychiatric and physical conditions among the current participants. Thus brief meditation experiences appear to be more effective in reducing negative mood than distraction for a non-clinical population experiencing transitional negative moods, but not for PTSD populations with chronic conditions.

An unforeseen outcome of this study is the significant across-the-board improvement in mood, regardless of intervention type. It is possible that this was due to subject expectancy effects; i.e. the effect of the participants' expectations of improvement may have obscured the intervention group differences, especially given participants' high levels of state anxiety and negative mood. It may also be explained as a reaction to experimental arrangements (Kazdin, 1998), a condition wherein the results of an experiment are influenced by the participants' awareness that a certain outcome is being examined. Bootzin (as cited in Kazdin) suggested that when control participants were led to expect improvement, they often made improvement even though the treatment was non-veridical.

Other explanations for this outcome include the brief interaction with the experimenter, and the small amount of individual attention it provided, which may have contributed to the participants' mood improvement. Within the VAMC, study participants are called "patients", and are recipients of various medical treatments or targets of interventions. During this study, however, they may have seen themselves as "contributors" to a scientific research study. All participants were told at the beginning of the experiment, and also read in the study consent form, that a possible benefit of participation would be the opportunity to contribute to the development of PTSD treatment.

Alternatively, perhaps spending 20-minutes sitting in a quiet environment without focusing on trauma was just what this highly stressed population needed to feel less anxious and less negative. Working with inpatient PTSD veterans, Johnson, Lubin, James, and Hale (1997) found that within a single session, treatments that involved an external focus (e.g., physical action, little trauma content) produced greater improvement than those with an internal focus and high trauma content.

On the PANAS-PA, a significant interaction effect was found in the without-pain sub-sample groups, and the interaction plot illustrated changes in the outcome in a direction that partially supports the secondary hypothesis: an increase of positive mood among meditators (see

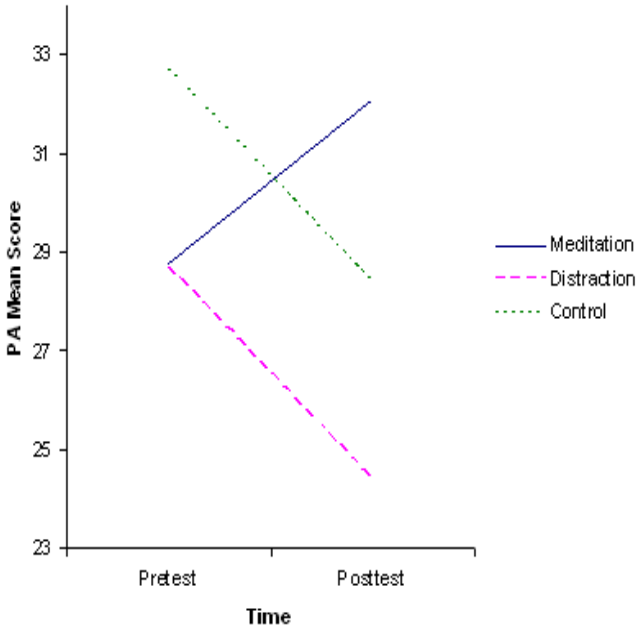

Figure 2. Interaction plot of PANAS-PA mean scores for without-pain sub-sample groups.

Figure 2). However, further analysis revealed that none of the simple effect tests were statistically significant. This is attributable to the low power resulting from the small sample sizes. It is important to note, however, that effect sizes were all moderate (Cohen's *d* ranges from .41 to .55), and thus the results of simple effect tests are inconclusive. Had a similar effect size been found in a larger sub-sample, the difference would have been significant, so further research with larger sub-sample size is warranted.

Previous research studies of long-term meditation support its effectiveness in reducing pain (Kabat-Zinn, 1982, 1991; Kabat-Zinn, Lipworth, & Burney, 1985). In the present study, however, increased positive mood was not found in participants with pain issues. Perhaps pain made it difficult for them to experience the benefits of brief meditation; or perhaps being required to sit for 20 minutes without freely changing postures increased their pain levels. The lack of significant PA results among those with pain issues might suggest that these patients need a form of meditation that calls for standing, walking, and/or lying down.

Limitations

Caution should be used when generalizing from the findings of this study because of several limitations. Participants in this study differed significantly from participants in previous studies using brief meditation: 92% were men, most were 50 or older, and all were veterans with PTSD. Whereas previous study participants were relatively high functioning college students assumed to be free of mental health issues (Wenk-Sormaz, 2005; Broderick, 2005), many participants in this study had multiple diagnoses in addition to PTSD; some were currently in remission from drug and alcohol problems; and others were experiencing mood disorders, pain problems and/or sleep problems.

Other limitations of this study include the small number of participants in each sub-sample, and the lack of a mechanism for collecting qualitative information regarding the experiences of participants. While participants often shared their thoughts and reactions to the experiment during the debriefing, no qualitative data were formally collected.

In addition to the above, instructions for the three intervention groups differed in how they were presented. Participants in the distraction group engaged in a self-paced, structured exercise; those in the control group engaged in a self-paced, unstructured exercise; while those in the meditation group engaged in a guided, structured exercise, using an audiotape. It is unknown if listening to an audiotape has more or less effect in inducing mood than reading materials; and there may be differences between structured and non-structured instructions, or between self-paced and guided exercises.

Finally, the experimenter's Asian racial background may have had an effect, given that 60% of participants were Vietnam-era veterans. In a study of the clinical experience of Asian female psychiatrists (n = 10), Fujii, Fukushima, and Chang (1989) found that all female Asian psychiatrists reported experiencing racial biases and stereotyping effects from Vietnam veteran patients with PTSD. Some participants in the current study may have experienced negative transference effects toward the experimenter that would have influenced their mood scores.

Conclusions

Research Implications

In spite of these limitations, the results largely replicate the results from a previous study using a brief form of meditation (Wenk-Sormaz, 2005). The results of the current study contribute to a greater understanding of the effects of brief meditation experiences with PTSD patients, and support the likelihood that its use with a variety of other clinical populations may prove therapeutic. It would seem advisable for future research to involve larger samples to insure the robustness of results, and to investigate both the dosage and duration of the effects of brief meditation for different types of psychiatric or medical conditions. Finally, the use of qualitative methods should be considered as an additional means of collecting data regarding individuals' experiences of brief meditation.

Clinical Implications

The findings of this study have implications for the treatment of veterans with PTSD, supporting the proposition that brief meditation may help such individuals feel less negative and improve their selective attention. Brief meditation prior to psychotherapy, for example, could help maximize the effects of therapeutic interventions. Creating a meditation room where veterans can have some quiet time before attending their therapy sessions might also be beneficial. The results of the current study support the notion that giving veterans' with PTSD quiet moments may reduce their negative mood and state anxiety and, depending on their physical condition, improve selective attention. However, implementing a meditation room should be done with caution, as some may experience flashbacks in such an environment.

Additionally, providing guided meditation recordings might encourage veterans to practice at home and work. A variety of durations and types of guided meditations should be included, with special consideration being given to those with sleep and pain problems. For example, Kabat-Zinn's (2002) guided sitting meditation CD, which was used for the meditation intervention in this study, also contains different durations (10, 20, and 30 minutes) and types of meditation (sitting, walking, and lying). Similar recordings might also be helpful for veterans on a waiting list for PTSD treatment, as well as for those who do not meet diagnostic criteria for PTSD but are experiencing sub-clinical symptoms.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

Asmundson, G. J. G., Stein, M. B., & McCreary, D. R. (2002). Posttraumatic stress disorder symptoms influence health status of deployed peacekeepers and nondeployed military personnel. *Journal of Nervous and Mental Disease, 190,* 807– 815.

Beck, J. G., Freeman, J. B., Shipherd, J. C., Hamblen, J. L., & Lackner, J. M. (2001). Specificity of Stroop interference in patients with pain and PTSD. *Journal of Abnormal Psychology, 110*(4), 536.

Broderick, P. C. (2005). Mindfulness and coping with dysphoric mood: Contrasts with rumination and distraction. *Cognitive Therapy and Research, 29,* 501-510.

Brooks, J. S., & Scarano, T. (1985). Transcendental meditation in the treatment of post-Vietnam adjustment. *Journal of Counseling & Development, 64*, 212–225.

Brown, D. (1993). The path of meditation: Affective development and psychological well-being. In S. L. Ablon, D. Brown, E. J. Khantzian, & J. E. Mack (Eds.), *Human feelings: Explorations in affect development and meaning* (pp. 373-402). Hillsdale, NJ: Analytic Press.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56,* 269-283.

Deikman, A. J. (1963). Experimental meditation. *Journal of Nervous and Mental Disease, 136,* 329-373.

Deikman, A. J. (1966). Deautomatization and the mystic experience. *Psychiatry, 29,* 324-338.

Derogatis, L. R., Lipman, R. S., Rickels, K., Uhlenhuth, E. H., & Covi, L. (1974). The Hopkins Symptom Checklist (HSCL): A self-report symptom Inventory. *Behavioral Science, 19,* 1-15.

Dolan, S., Martindale, S., Robinson, J., Kimbrel, N. A., Meyer, E. C., Kruse, M. I., ...Gulliver, S. B. (2012). Neuropsychological sequelae of PTSD and TBI following war deployment among OEF/OIF veterans. *Neuropsychology Review, 22*(1), 21-34.

Dorfel, D., Rabe, S., & Karl, A. (2008). Coping strategies in daily life as protective and risk factors for post-traumatic stress in motor vehicle accident survivors. *Journal of Loss & Trauma, 13,* 422-440.

Foa, E. B., Keane, T. M., Friedman, M. J., & Cohen, J. A. (Eds.). (2008). *Effective treatments for PTSD: practice guidelines from the International Society for Traumatic Stress Studies.* New York, NY: Guilford Press.

Franke, T. M., Ho, T., & Christie, C. A. (2012). The chi-square test: Often used and more often misinterpreted. *American Journal of Evaluation, 33*(3), 448-458.

Fujii, J. S., Fukushima, S. N., & Chang, C. Y. (1989). Asian woman psychiatrist. *Psychiatric Annals, 19,* 633-638.

Golden, C. (1978). *Stroop color and word test.* Chicago, IL: Stoelting Company.

Goleman, D. (1977). *The varieties of meditative experience.* New York, NY: Irvington.

Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change.* New York, NY: Guilford Press.

Hayes, S. C., & Wilson, K. G. (2003). Mindfulness: Method and process. *Journal of Consulting and Clinical Psychology, 64,* 1152- 1168.

Jenkins, M. A., Langlais, P. J., Delis, D., & Cohen, R. A. (2000). Attentional dysfunction associated with posttraumatic stress disorder among rape survivors. *The Clinical Neuropsychologist, 14,* 7-12.

Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, & Behavioral Neuroscience, 7,* 109-119.

Johnson, D. R., Lubin, H., James, M., & Hale, K. (1997). Single session effects of treatment components within a specialized inpatient posttraumatic stress disorder program. *Journal of Traumatic Stress, 10*, 377-390.

Kabat-Zinn, J. (1982). An outpatient program in behavioral medicine for chronic pain patients based on the practice of mindfulness meditation. *General Hospital Psychiatry, 4,* 33-47.

Kabat-Zinn, J. (1991). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York, NY: Delta Book.

Kabat-Zinn, J. (2002). Sitting meditations: 20 minutes. On *Guided mindfulness meditation: Series 2* [CD.]. Lexington, MA: Stress Reduction CDs and Tapes.

Kabat-Zinn, J., Lipworth, L., & Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine, 8*, 163-190.

Kabat-Zinn, J., Massion, A. O., & Kristeller, J. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry, 149*, 936-943.

Kazdin, A. E. (1998). *Research design in clinical psychology* (3rd ed.). New York, NY: Allyn and Bacon.

Knight, R. G., Waal-Manning, H. J., & Spears, G. F. (1983). Some norms and reliability data for the State-Trait Anxiety Inventory and the Zung Self-Rating Depression scale. *British Journal of Clinical Psychology 22*, 245–249.

Koso, M., & Hansen, M. (2006). Executive function and memory in posttraumatic stress disorder: A study of Bosnian war veterans. *European Psychiatry, 21,* 167-173.

Krippner, S., & Colodzin, B. (1989). Multi-cultural methods of treating Vietnam veterans with post-traumatic stress disorder. *International Journal of Psychosomatics, 36,* 79-85.

Lang, A. J, Strauss, J. L, Bomyea, J., Bormann, J. E., Hickman, S. D., Good, R. C., & Essex, M. (2012). The theoretical and empirical basis for meditation as an intervention for PTSD. *Behavior Modification, 36*(6), 759-786.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer Publication.

Linehan, M. M. (1993). *Cognitive-behavioral treatment for borderline personality disorder.* New York, NY: Guilford Press.

MacLeod, C. M. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin, 109*, 163-203.

Marlatt, G. A., & Kristeller, J. L. (1999). Mindfulness and meditation. In W. R. Miller (Ed.), *Integrating spirituality into treatment* (pp. 67-84). Washington, DC: American Psychological Association.

Morita, M., Kondō, A., & LeVine, P. (1998). *Morita therapy and the true nature of anxiety-based disorders (Shinkeishitsu)*. Albany, NY: SUNY Press.

Nolen-Hoeksema, S. (1990). Effects of responses to depression on the remediation of depressive affect. *Journal of Personality and Social Psychology, 58,* 519-527.

Norman, S. B., Stein, M. B., & Davidson, J. R. (2007). Profiling posttraumatic functional impairment. *Journal of Nervous and Mental Disease, 195,* 48-53.

Penley, J. A., Tomaka, J., & Wiebe, J. S. (2002). The association of coping to physical and psychological health outcomes: A meta-analytic review. *Journal of Behavioral Medicine, 25,* 551-603.

Ramanaiah, N. V., Franzen, M., & Schill, T (1983). A psychometric study of the State-Trait Anxiety Inventory. *Journal of Personality Assessment, 47,* 531-535.

Rao, K. R. (1989). Meditation: Secular and sacred. A review and assessment of some recent research. *Journal of the Indian Academy of Applied Psychology, 15,* 51-74.

Rosenthal, J. Z., Grosswald, S., Ross, R., & Rosenthal, N. (2011). Effects of transcendental meditation in veterans of Operation Enduring Freedom and Operation Iraqi Freedom with posttraumatic stress disorder: a pilot study. *Military Medicine, 176*(6), 626-630.

Salmon P., Sephton S., & Weissbecker I. (2004). Mindfulness meditation in clinical practice. *Cognitive Behavior Practice, 11,* 434-446.

Schnurr, P. P., Spiro III, A., & Paris, A. H. (2000). Physician-diagnosed medical disorders in relation to PTSD symptoms in older male military veterans. *Health Psychology, 19,* 91–97.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness based cognitive therapy for depression: A new approach to preventing relapse*. New York, NY: Guildford Press.

Sethi, A. S. (1989). *Meditation as an intervention in stress reactivity*. New York, NY: AMS Press.

Shapiro, D. H. (1982). Overview: Clinical and physiological comparison of meditation with other self-control strategies. *American Journal of Psychiatry, 139,* 267-274.

Sharp, T. J. (2004). The prevalence of post-traumatic stress disorder in chronic pain patients. *Current Pain and Headache Reports, 8*(2), 111-115.

Spielberger, C. D. (1983). *STAI: Manual for the State-Trait Anxiety Inventory.* Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C. D. (1989). *State-Trait Anxiety Inventory: A comprehensive bibliography* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.

Sutker, P. B., Davis, J. M., Uddo, M., & Ditta, S. R. (1995). War zone stress, personal resources, and PTSD in Persian Gulf war returnees. *Journal of Abnormal Psychology, 104,* 444-452.

Teasdale, J. T., Segal, Z. V., & Williams, J. M. G. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help? *Behavior Research and Therapy, 33,* 25-39.

Uddo, M., Vasterling, J. J., Brailey, K., & Sutker, P. B. (1993). Memory and attention in combat-related post-traumatic stress disorder (PTSD). *Journal of Psychopathology and Behavioral Assessment, 15,* 43-52.

Ulman, S. E., Filipas, H. H., Townsend, S. M., & Starzynski, L. L. (2000). Psychosocial correlates of PTSD symptom severity in sexual assault survivors. *Journal of Traumatic Stress, 20,* 821-831.

Valentine, E. R., & Sweet, P. L. G. (1999). Meditation and attention: A comparison of the effects of concentrative and mindfulness meditation on sustained attention. *Mental Health, Religion & Culture, 2,* 59-70.

Vasterling, J. J., Duke, L. M., Brailey, K., Constans, I. J., Alain, A. N., & Sutker, P. B., (2002). Attention, learning, and memory performances and intellectual resources in Vietnam veterans: PTSD and no disorder comparisons. *Neuropsychology, 16,* 5-14.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063-1071.

Wenk-Sormaz, H. (2005). Meditation can reduce habitual responding. *Advances in Mind-Body Medicine, 21,* 33-49.

Wolfe, J., Keane, T. M., Kaloupek, D. G., Mora, C. A., & Wine, P. (1993). Patterns of positive stress adjustment in Vietnam combat veterans. *Journal of Traumatic Stress, 6,* 179-19