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# **The Body Scan and Mindful Breathing Among Veterans with PTSD: Type of Intervention Moderates the Relationship Between Changes in Mindfulness and Post-treatment Depression**

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Abstract:

Mindfulness-based stress reduction (MBSR) is a promising intervention for veterans with post-traumatic stress disorder (PTSD) and depression; however, a more detailed examination of the different elements of MBSR and various facets of mindfulness to determine what works best for whom is warranted. One hundred and two veterans with PTSD were randomly assigned to one of four arms: (a) body scan (BS;  $n=27$ ), (b) mindful breathing (MB;  $n=25$ ), (c) slow breathing (SB;  $n=25$ ), or (d) sitting quietly (SQ;  $n=25$ ). The purpose of this study was to (a) examine two separate components of MBSR (i.e., body scan and mindful breathing) among veterans with PTSD when compared to a non-mindfulness intervention (SB) and a control group (SQ), (b) assess if changes in specific mindfulness facets were predictive of post-treatment PTSD and depression for individuals who participated in a mindfulness intervention (BS vs. MB), and (c) investigate if type of mindfulness intervention received would moderate the relationship between pre- to post-treatment changes in mindfulness facets and post-treatment outcomes in PTSD and depression. Participants in the mindfulness groups experienced significant decreases in PTSD and depression symptom severity and increases in mindfulness, whereas the non-mindfulness groups did not. Among veterans who participated in a mindfulness group, change in the five facets of mindfulness accounted for 23% of unique variance in the prediction of post-treatment depression scores. Simple slope analyses revealed that type of mindfulness intervention moderated the relationship among changes in facets of mindfulness and post-treatment depression.

Discussion

Understanding the clinical effects of specific components of a mindfulness intervention has the potential to optimize clinical outcomes for veterans with PTSD. Our first hypothesis, in which we predicted that the BS and MB interventions would significantly improve depression and PTSD symptoms, was supported. Furthermore, participants in the BS group intervention evidenced statistically significant increases in total mindfulness scores and acting with awareness mindfulness facet, whereas participants in the MB group also evidenced marginally significant increases in nonjudgmental acceptance. In the SB group, there were no significant pre- to post-treatment changes in mindfulness, depression, or PTSD symptoms. Surprisingly, the SQ group evidenced a significant reduction in PTSD symptoms, suggesting that sitting quietly for 20 min a day may provide benefits for veterans with PTSD. We also predicted that at post-intervention, the BS and MB interventions would significantly increase mindfulness and improve depression and PTSD symptoms when compared to the SB and SQ groups. This hypothesis was partially supported by the results. Mindful breathing had a greater effect on mindfulness when compared to slow breathing or sitting quietly and a greater effect on PTSD symptoms when compared to slow breathing, though not statistically significant ( $p=0.06$ ). Practicing the body scan had a greater effect on

depression when compared to slow breathing. While there were no significant differences noted between the two mindfulness interventions, results did suggest that the mechanism of action in mindful breathing may be different from the reduction of respiration rate (Conrad et al. 2006). Our second hypothesis, which predicted that change in mindfulness facets would predict depression and PTSD outcomes for veterans who received the BS or MB interventions, was also partially supported by the results. Preliminary zero order correlation analyses revealed that in the BS group, change in depression and change in acting with awareness were significantly inversely correlated, congruent with Boden et al. (2012). In the MB group, also congruent with Boden et al., change in depression and change in describing were significantly inversely correlated, as were change in depression and change in non-reactivity. Finally, change in PTSD and change in nonreactivity were inversely correlated. Consistent with predictions and previous literature, collective pre- to post-treatment change in the five facets of mindfulness accounted for 23 % of unique variance in the prediction of post-treatment depression scores, after controlling for pre-treatment scores (Boden et al. 2012; Owens et al. 2012). When examined individually, change in acting with awareness and nonreactivity predicted post-treatment depression. The simple slope analyses revealed that for participants in the BS group, increased observing skills led to decreased depression whereas change in nonreactivity was unrelated to depression. Alternatively, for participants in the MB group, increased nonreactivity skills led to decreased depression whereas change in observing was unrelated to depression. Inconsistent with our predictions and previous findings (Boden et al. 2012), change in nonjudgmental acceptance positively predicted higher post-treatment depression scores and collective pre- to post-treatment changes in the five facets of mindfulness did not significantly explain post-treatment PTSD symptom severity. Inconsistencies between the current findings and previous outcome studies may be partly explained by differences in the interventions. Specifically, participants in studies of Boden et al. (2012) and Owens et al. (2012) received intensive, multifaceted interventions within residential treatment facilities. Conversely, this study employed a brief and narrowly focused intervention—a single component of a mindfulness practice taught for six, 1-h sessions. This study contributes to the scientific literature regarding effective treatment for veterans with PTSD. First, brief, individual components of a mindfulness intervention had significant effects on mindfulness, depression, and PTSD symptoms among veterans when compared to a slow breathing intervention or a sitting quietly control group. While there were no significant differences noted between the two mindfulness interventions, results did suggest that the mechanism of action in mindful breathing may be different from the reduction of respiration rate. Furthermore, the separate components of the mindfulness intervention evidenced medium effect sizes. On contrary, effect sizes found in previous studies evaluating mindfulness-based interventions in their entirety have typically been medium to large (see Carmody and Baer 2008; Carmody et al. 2009). Current findings are consistent with those of Sauer-Zavala et al. (2013) who investigated three different meditation practices commonly used in mindfulness-based interventions. Results may further support the notion that the large effects of MBIs may not be due to any one component of these interventions, but instead the synergetic power of the combined practices. Second, these findings are congruent with the past literature and provide additional support to suggest that acting with awareness and nonreactivity—two commonly recognized core components of mindfulness (Baer et al. 2006; Bishop et al. 2004)—are consistent and strong negative predictors of depression among individuals with PTSD (Bernstein et al. 2011; Boden et al. 2012). The increased ability to focus and pay attention to one activity at a time and to create a non-reactive awareness toward internal and

emotions predicts post-treatment depression among veterans. When working with veterans with PTSD, it may be beneficial for therapists to teach and cultivate these important skills. Third, current findings provide some support for the hypothesis that treatment-specific training in the use of specific mindfulness skills may influence the functional relationship between mindfulness skills and treatment outcomes. For participants in the BS intervention, as observing skills increased, depression decreased. This relationship was not demonstrated in the MB intervention. While practicing the body scan, veterans were instructed to sustain focus on bodily sensations. Observing bodily sensations may increase the ability to recognize the transient nature of the physical, mental, and emotional sensations, which may, in turn, increase veterans' willingness to experience present moment sensation and decrease avoidant tendencies (Carmody and Baer 2008; Thompson and Waltz 2010). Furthermore, while attempting to pay attention to bodily sensations, one may become more aware of the mind's tendency to judge simple sensation (Sayadaw 1994). Having noticed the mind's frequent tendency to judge and evaluate, an individual can become increasingly aware of the mind as intermediary or secondary interpreter (Dreeben et al. 2013). Therefore, enhanced observation of present moment bodily sensation, as practiced in the body scan, may interrupt automatic engagement in unproductive styles of cognitive processing and, ultimately, break the cycle of automatic rumination and depression (Nolen-Hoeksema et al. 2008). As a result of a mindful breathing practice, increased skills in nonreactivity, but not observing, were correlated with decreased post-treatment depression. During the MB intervention, participants focused their attention on the sensations of breath and, when a thought or emotion arose, they were instructed to notice the passing thought or emotion without reacting to it and return the attention to the breath. Mindful breathing has been correlated with nonreactivity (Feldman et al. 2010) and decentering (Segalet al. 2002), and decentering has been associated with decreased depression (e.g., Derosiers et al. 2013), physiological arousal, stress reactivity, and emotional reactivity (Delizonna and William 2009). Creating an internal spaciousness to notice and allow the distressing thoughts and emotions to pass without reacting and then returning the attention back to the breath may serve to strengthen location of attention and enhance an individual's ability to recognize the transient nature of the distressing signals or experiences. Moreover, nonreactivity increases tolerance to aversive experiences and decreases rigid cognitive and behavioral patterns of avoidance (Delizonna et al. 2009; SullivanKalill et al. 2013; Thompson et al. 2011), ultimately interrupting the cycle of automatic rumination and depression. Finally, these findings are very important when considering that approximately half of the military personnel and veterans with a PTSD diagnosis do not seek or complete treatment (Shiner 2011; Tanielian 2008). Yet, in 2010, 39 % of veterans reported using CAM (Libby et al. 2014). Consistent with previous findings and recommendations (DOD and VA's practice guidelines, Management of Post-Traumatic Stress Working Group 2010; Boden et al. 2012; Vujanovic et al. 2011), these findings suggest that mindfulness interventions may assist veterans with PTSD to cultivate the skills necessary to prepare for the therapeutic process, thereby optimizing clinical outcomes.