

# Mindfulness Predicts Decreased Psychophysiological Responding Following Exposure for Participants with PTSS



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## Introduction

Exposure has been shown to be effective for reducing post-traumatic stress symptoms (PTSS; e.g., Foa et al., 2008). However, drop-out rates are high (Kehle-Forbes et al., 2016) and relapse is common (Ursano et al., 2004). There are several factors that may affect exposure outcomes, including state and trait dissociation and mindfulness.

Dissociation during exposure has been demonstrated to decrease memory activation and impede recovery (Jaycox & Foa, 1996). Mindfulness is empirically and conceptually opposed to dissociation (Michal et al., 2007), suggesting that mindful and dissociative states cannot co-occur within an individual. It would therefore be expected that individuals high in state mindfulness would also be low in state dissociation.

Considering that dissociation may impair learning during exposure, mindfulness may result in improved exposure outcomes. If so, targeting state mindfulness in traditional exposure using current mindfulness techniques may be an important adjunct to exposure.

The current study explored the relationships of mindfulness and dissociation with exposure outcomes. State mindfulness and dissociation were assessed to examine the relationships between outcomes and these states of awareness as they occurred during exposure. Trait mindfulness and dissociation were included as exploratory variables to examine the relationship of overall disposition to engage in each state of awareness with exposure outcomes.

This study hypothesized that:

- 1) State mindfulness during exposure would predict decreased PTSS and psychophysiological responding following exposure, and
- 2) State dissociation during exposure would predict less change in PTSS and psychophysiological responding following exposure.

## Participants and Procedures

This study was conducted in the context of a larger study examining the effects of an exposure-based memory reconsolidation interference intervention compared to traditional written exposure (see Darnell, 2018). No significant differences were found between the two conditions, so all participants were collapsed into a single exposure condition for the current study. Participants ( $N = 40$ ) were introductory psychology students at a large Midwestern U.S. university (52.5% female; 62.5% White;  $M_{age} = 19.4$ ,  $SD = 1.8$ ) who reported at least one traumatic event and scores of 20 or greater on the PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013). At time 1 (T1), participants completed the PCL-5, the Five Factor Mindfulness Questionnaire (FFMQ; Baer et al., 2006), and the Dissociative Experiences Scale (DES; Carlson & Putnam, 1993), then completed 50 minutes of a written exposure task. The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) and the State Scale of Dissociation (SSD; Krüger & Mace, 2002) were administered immediately post-exposure. One week later (T2), participants completed the PCL-5 and a baseline physiological assessment, then were exposed to audio recordings of their written narratives with assessment of heart-rate (HR) and skin conductance (SC) reactivity (i.e., initial increase at the start of the audio exposure) and habituation.

## Results

### HR Measures

- State mindfulness at T1 negatively predicted HR reactivity at T2 and positively predicted HR habituation at T2 (see Figure 1).
- Trait mindfulness at T1 negatively predicted HR reactivity at T2 and positively predicted HR habituation at T2 (see Figure 1).

### SC Measures

- State mindfulness at T1 did not predict SC reactivity at T2 or SC habituation at T2.
- Trait mindfulness at T1 did not predict SC reactivity at T2 or SC habituation at T2.

### Change in PTSS

- State mindfulness at T1 did not predict change in PCL-5 scores from T1 to T2.
- Trait mindfulness at T1 did not predict change in PCL-5 scores from T1 to T2, SC reactivity at T2, or SC habituation at T2.

- Neither state nor trait dissociation predicted any dependent variable.

Scale	Mean (SD)	1	2	3	4	5	6	7	8	9
1 T1 Trait Mindfulness	116.1(15.2)									
2 T1 Trait Dissociation	104.3(41.2)	-.416**								
3 T1 State Mindfulness	4.9(1.4)	.559**	-.416**							
4 T1 State Dissociation	79.1(52.3)	-.411**	.525**	-.578**						
5 HR Reactivity	-5.7(8.1)	-.352*	-.004	-.346*	.037					
6 HR Habituation	-4.9(8.0)	.299	-.042	.348*	.025	-.888**				
7 SC Reactivity	5.7(4.4)	-.105	.224	-.159	.052	-.029	.129			
8 SC Habituation	-2.6(2.7)	.085	-.146	.251	-.156	-.048	.041	-.755**		
9 PCL Change	-3.5(11.5)	-.214	.006	-.191	.212	.074	.038	-.038	.224	

Table 1. Descriptive statistics and bivariate correlations among study variables.  $N = 40$ . \*two-tailed  $p < .05$ , \*\*two-tailed  $p < .01$

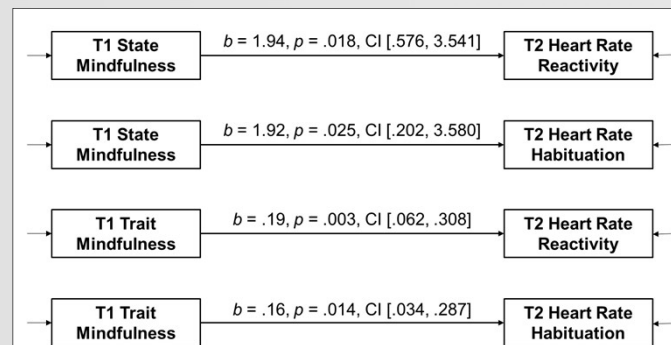


Figure 1. Bootstrapped regression coefficients with confidence intervals (CI) based on 1000 bootstrap samples. Time 1 state and trait mindfulness were entered in four separate regression models as independent predictors of time 2 heart rate reactivity and habituation.

## Discussion

- These results suggest that state mindfulness during exposure is related to increased efficacy of written exposure, as evidenced by lower physiological reactivity and greater physiological habituation one week later, as measured by HR. The ability to exercise mindfulness during exposure may promote emotional engagement, thus allowing for corrective learning to occur.
- Trait mindfulness prior to exposure was found to be related to lower HR reactivity and greater HR habituation one week post-exposure. It is possible that trait mindfulness also promotes emotional engagement during exposure, potentially via mechanisms such as increased state mindfulness during exposure.
- Neither state nor trait mindfulness prior to

exposure predicted change in PTSS. It is possible that the HR measures were more sensitive than the PTSS self-report measure regarding small changes in arousal that might occur due to a single session of exposure. A higher dose of exposure may be necessary to see any relationship of mindfulness with change in PTSS.

- Neither state nor trait mindfulness prior to exposure predicted either SC measure. Many of the correlations of study variables (i.e., mindfulness, dissociation, HR, and PTSS measures) were in the unexpected direction (see Table 1). It is possible that measurement error regarding the SC measures interfered with study results. More research is needed to understand the relationship between mindfulness, PTSS, and measures of SC.
- Although dissociation prior to exposure did not predict any exposure outcome in the current study, it is possible that the effects of dissociation on exposure efficacy may be more apparent with a larger dose of exposure. It is important to note that the correlation of trait dissociation with HR reactivity was in the unexpected direction, so it is possible that measurement error affected the results regarding trait dissociation.
- Mindfulness may be an important factor that influences exposure for PTSS in as few as one session of written exposure. Future research should explore how mindfulness and dissociation relate to exposure outcomes after multiple exposure sessions. Studies should also examine how change in mindfulness may effect exposure outcome and what methods may be most effective at creating that change.