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Running Head: ANXIETY SENSITIVITY, EMOTIONAL AVOIDANCE, AND PTSD
Further Investigation of the Association between Anxiety Sensitivity and Posttraumatic Stress

Disorder: Examining the Influence of Emotional Avoidance

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Abstract

Anxiety sensitivity (AS) and the tendency to avoid emotions have both been identified as vulnerability factors for the development and maintenance of posttraumatic stress disorder (PTSD). Furthermore, both cross-sectional and prospective research have provided evidence that emotional avoidance and AS interact to predict anxiety symptoms, such that AS may only be associated with anxiety-related pathology among those who exhibit a tendency to avoid their emotions. The purpose of the present study was to determine if this moderator model extends to PTSD within a sample of substance dependent patients. Specifically, this study examined if AS

is associated with PTSD only among individuals with high (vs. low) levels of negative emotional avoidance. As predicted, results of a logistic regression analysis revealed a significant interaction between negative emotional avoidance and AS in predicting PTSD status. Follow-up analyses revealed a significant positive association between AS and PTSD status for participants high in negative emotional avoidance; however, AS was not associated with PTSD for those low in negative emotional avoidance. This finding remained even when relevant covariates were included in the model. Results confirm hypotheses and are consistent with the extant anxiety-risk literature.

Keywords: anxiety sensitivity; emotional avoidance; experiential avoidance; moderation; trauma
Further Investigation of the Association between Anxiety Sensitivity and Posttraumatic Stress Disorder: Examining the Influence of Emotional Avoidance

Despite the high lifetime prevalence of traumatic exposure, only a small fraction of those exposed to a traumatic event eventually develop posttraumatic stress disorder (PTSD; Breslau & Kessler, 2001). However, given the severe psychological distress and functional impairment associated with PTSD (Amaya-Jackson et al., 1999; Brady, Killeen, Brewerton, & Lucerini, 2000), researchers have expended considerable effort toward identifying risk and resiliency factors for the development and maintenance of PTSD symptoms. Although much of the research in this area to date focuses on specific risk and resiliency factors in isolation (Agaibi & Wilson, 2005), theoretical literature highlights the importance of examining the interplay among cognitive, physiological, behavioral, and emotional processes in order to improve our understanding of the pathogenesis of PTSD (e.g., Ehlers & Clark, 2000; Foa & Kozak, 1986;

Frewen & Lanius, 2006). More specifically, research is needed to examine the conditions under which established PTSD risk factors are more or less likely to relate to a PTSD diagnosis.

One well-established risk factor for PTSD is anxiety sensitivity (AS; for a review, see Naragon-Gainey, 2010). AS is conceptualized as a fear of anxiety-related sensations due to beliefs that such sensations will have adverse psychological, social, and physical outcomes (Reiss & McNally, 1985). Although related to the construct of trait anxiety, AS is considered a distinct construct. Specifically, whereas AS indicates a tendency to respond with fear to symptoms of anxiety, trait anxiety is characterized by fearful responding to stressors more generally (McNally, 2002). Empirical literature supports the differentiation of these constructs (Ehlers, 1995; Schmidt, Lerew, & Jackson, 1997).

Cross-sectional research has consistently shown a positive association between AS and PTSD symptoms (McDermott, Tull, Gratz, Daughters, & Lejuez, 2009; Naifeh, Tull, & Gratz, 2012; for a review, see Elwood, Hahn, Olatunji, & Williams, 2009), and, with the exception of panic disorder, PTSD is associated with higher levels of AS than all other anxiety disorders (Taylor, Koch, & McNally, 1992). Moreover, AS has been found to prospectively predict PTSD symptoms: (a) 6- and 12-months post-physical injury (Marshall, Miles, & Stewart, 2010); (b) 1-month after entry into treatment for alcohol use disorders (Simpson, Jakupcak, & Luterek, 2006); and (c) 12- and 24-months post-baseline assessment in a nonclinical sample, even after controlling for baseline PTSD symptoms and trait anxiety (Feldner, Zvolensky, Schmidt, & Smith, 2008). Together, this research suggests that AS is a robust risk factor for the development and maintenance of PTSD symptoms.

Importantly, however, recent research suggests that the relation of AS to negative outcomes may depend on the extent with which an individual engages in efforts to avoid,

eliminate, or alter the frequency or intensity of unwanted internal experiences (i.e., experiential avoidance; Hayes, Strosahl, & Wilson, 1999; Hayes, Wilson, Gifford, Follette, & Strosahl, 1997), such as negative emotions. As noted by Kashdan, Zvolensky, and McLeish (2008), "...there is a growing recognition that how individuals regulate emotional experiences, particularly whether they accept or avoid emotional experiences, is critical in understanding how anxious and fearful responding is maintained and exacerbated" (p. 430). Consistent with this premise, Bardeen, Fergus, and Orcutt (2013) found that the positive association between AS and anxiety became stronger as experiential avoidance increased – a relation that has also been observed prospectively. Specifically, Bardeen, Fergus, and Orcutt (2014) found that AS at baseline predicted anxiety symptoms approximately one month later, but only among participants who had relatively higher levels of experiential avoidance at baseline. Notably, although the studies by Bardeen and colleagues (2013, 2014) assessed experiential avoidance in general, rather than the avoidance of emotions in particular, their findings have relevance to the understanding of the role of emotional avoidance in the relation between AS and anxiety. Specifically, it has been suggested that experiential avoidance most commonly applies to the avoidance of emotional experiences (Hayes et al., 1999). Moreover, consistent with this suggestion, the measure used to assess experiential avoidance in these studies (the Acceptance and Action Questionnaire-II; Bond et al., 2011) overlaps considerably with measures of emotional avoidance (Karekla & Panayiotou, 2011). Thus, these findings collectively demonstrate the need to build upon existing research focused on the relation between AS and PTSD by examining the moderating role of emotional avoidance.

Although PTSD symptoms have been found to be positively associated with experiential avoidance in general (Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011; Marx & Sloan, 2005;

Pickett, Bardeen, & Orcutt, 2011; Plumb, Orsillo, & Luterek, 2004), the avoidance of negative emotions in particular is considered especially relevant to PTSD. The avoidance of emotions has been described as a central factor in the development and maintenance of PTSD symptoms following traumatic exposure (see Salters-Pedneault, Tull, & Roemer, 2004), and both negative emotionality and the avoidance of emotions are emphasized in the current diagnostic criteria for PTSD (American Psychiatric Association [APA], 2013). Research also indicates that emotional avoidance in general (vs. trauma-specific emotional distress in particular) is associated with PTSD (e.g., Roemer, Litz, Orsillo, & Wagner, 2001). Moreover, studies demonstrate a positive association between the avoidance of emotions and PTSD symptoms (Naifeh et al., 2012; Tull, Hahn, Evans, Salters-Pedneault, & Gratz, 2011; see also Salters-Pedneault et al., 2004).

As noted above, research suggests that AS and a tendency to avoid unpleasant internal experiences interact to predict anxiety, such that the association between AS and anxiety becomes stronger as the tendency to avoid internal experiences increases (Bardeen et al., 2013; 2014). Given the overlap between anxiety pathology and PTSD, as well as the noted associations among PTSD, AS, and emotional avoidance, it is likely that emotional avoidance moderates the relation between AS and PTSD. Specifically, AS has been found to be associated with increased fear responding to emotionally-salient stimuli (Stein, Simmons, Feinstein, & Paulus, 2007). Consequently, following exposure to a traumatic event, a pre-existing tendency to believe that anxiety symptoms will have negative consequences may contribute to the development of a conditioned fear response to anxious arousal stemming from that exposure. When this conditioned fear response is combined with a tendency to avoid negative emotions, functional exposure to anxiety and cues for this anxiety would be prevented, contributing to a greater likelihood of PTSD. As such, the proposed relation between AS, emotional avoidance, and

PTSD is consistent with Mowrer's (1960) two-factor theory of fear acquisition and maintenance.

Past research on the relation between AS, emotional avoidance, and anxiety has primarily focused on nonclinical populations (e.g., Bardeen et al., 2013; 2014). Consequently, we chose to conduct a preliminary test of this model within a clinical population – substance dependent patients. Substance dependent patients are a particularly relevant population in which to test this model, given both their elevated rates of PTSD (Brady, Back, & Coffey, 2004) and their high levels of AS (Buckner, Proctor, Reynolds, Kopetz, & Lejuez, 2011; McDermott et al., 2009) and emotional avoidance (Naifeh et al., 2012). Consistent with previous research, we hypothesized that patients with versus without PTSD would report significantly higher levels of both AS and negative emotional avoidance. Furthermore, we predicted that negative emotional avoidance would moderate the association between AS and PTSD, such that AS would be associated with the presence of a current PTSD diagnosis only among those with relatively higher levels of negative emotional avoidance.

Method

Participants

Participants for the current study included 198 patients (97 women) from a substance use disorder inpatient treatment facility who reported exposure to at least one potentially traumatic event. Participants ranged in age from 18 to 59 years ($M = 34.3$, $SD = 10.0$) and were ethnically diverse (59.6% White; 37.4% African American; 1.5% Latina; 1.0% Native American, and 0.5% Asian/Southeast Asian). With regard to educational attainment, 70.2% of participants had received their high school diploma or GED, with 37.4% continuing on to complete at least some higher education. The majority of participants were unemployed (65.7%) and single (62%), with a household income of less than \$20,000 (66.2%).¹

Measures

AS was assessed via the Anxiety Sensitivity Index-3 (ASI-3; Taylor et al., 2007). The ASI-3 is an 18-item self-report measure that assesses the fear of anxiety-related sensations due to physical, cognitive, and social concerns. Respondents are asked to rate each item on a 5-point scale (0 = *very little* to 4 = *very much*) based on the degree to which they agree with each statement. Higher scores are indicative of higher levels of AS. The ASI-3 has been found to demonstrate adequate reliability and discriminant, convergent, and criterion-related validity (Taylor et al., 2007). Within the present sample, the ASI-3 ($M = 22.00$, $SD = 16.44$, $range = 0$ to 72) had good internal consistency ($\alpha = .93$).

Avoidance of negative emotions was assessed using the Avoidance of Negative Emotions subscale of the Emotional Avoidance Questionnaire (EAQ-Negative; Taylor, Laposa, & Alden, 2004). The subscale is comprised of 5 items assessing the tendency to avoid or escape negative emotions. Items are rated on a 5-point Likert-type scale (1 = *not true of me* to 5 = *very true of me*). The EAQ has been found to have adequate psychometric properties in both clinical and nonclinical samples (Taylor et al., 2004). Internal consistency of the EAQ-Negative subscale ($M = 15.00$, $SD = 5.65$, $range = 5$ to 25) in the present sample was adequate ($\alpha = .79$).

In order to establish current PTSD diagnoses, all participants completed the Life Events Checklist (LEC; Blake et al., 1990) and the Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990). The LEC provides a list of 17 potentially traumatic events (PTEs) and instructs participants to indicate whether: (a) the PTE happened to them, (b) the PTE was witnessed, or (c) they learned about the PTE. The list of PTEs includes natural disasters, unexpected death of a loved one, assault with a weapon, sexual assault, and physical assault, among others. Upon completion of the LEC, participants were asked to indicate which event was the most stressful or

distressing for them. This event was then used to determine the presence of PTSD on the CAPS. We also calculated the number of lifetime PTEs reported by participants and used this variable as a covariate in analyses.

The CAPS is a structured PTSD diagnostic interview and the most widely used measure of PTSD (Elhai, Gray, Kashdan, & Franklin, 2005). It assesses the frequency and intensity of the 17 DSM-IV PTSD symptoms (plus eight associated symptoms). Frequency items are rated from 0 (never or none/not at all) to 4 (daily or almost every day or more than 80%). Intensity items are rated from 0 (none) to 4 (extreme). The Item Severity ≥ 4 (ISEV4) rule, which requires that at least one reexperiencing, three avoidance/emotional numbing, and two hyperarousal symptoms have a severity rating (frequency + intensity) of ≥ 4 , was used to establish PTSD diagnoses. Frequency and intensity ratings were also summed to create an overall PTSD symptom severity score (Weathers, Ruscio, & Keane, 1999). The CAPS has adequate interrater reliability (.92-.99) and convergent validity with the Structured Clinical Interview for DSM-IV Axis I disorders (SCID-IV; First, Spitzer, Gibbon, & Williams, 1996) and other established measures of PTSD (Weathers, Keane, & Davidson, 2001). In addition, the robust psychometric properties of the CAPS have been supported in a variety of combat and civilian samples, including substance dependent patients (e.g., Blake et al., 1990; Brown, Stout, & Mueller, 1996; Shalev, Freedman, Peri, Brandes, & Sahar, 1997; Weathers et al., 2001). All interviews were conducted by bachelors- or masters-level clinical assessors trained by a senior investigator (MTT). All interviews were reviewed by this investigator, with diagnoses confirmed in consensus meetings.

The Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995a) is a self-report questionnaire designed to differentiate between the core symptoms of depression, anxiety, and stress. The DASS has demonstrated adequate test-retest reliability (Brown, Chorpita,

Korotitsch, & Barlow, 1997), and there is extensive evidence for its construct and discriminant validity (Antony, Bieling, Cox, Enns, & Swinson, 1998; Lovibond & Lovibond, 1995a; Lovibond & Lovibond, 1995b). There are two versions of the DASS: a 21-item version and a 42-item version. These versions have been found to be consistent (Clara, Cox, & Enns, 2001) and comparable in their ability to distinguish between different diagnostic groups (Antony et al., 1998). The DASS-21 was used in this study. Specifically, we summed all subscales to obtain an overall score reflecting general psychiatric distress. This variable was used as a covariate in analyses. Internal consistency in this sample was good ($\alpha = .95$).

Procedure

All procedures were reviewed and approved by the relevant Institutional Review Boards. Data were collected as part of a larger study examining risky behaviors among substance dependent patients. To be eligible for inclusion in the larger study, participants were required to: 1) be dependent on cocaine and/or alcohol; 2) have a Mini-Mental Status Exam (Folstein, Folstein, & McHugh, 1975) score of ≥ 24 ; and 3) have no current psychotic disorder (as determined by the psychosis screener from the SCID-IV; First et al., 1996). Eligible participants were recruited for this study no sooner than 72 hours after entry into the facility (to limit the possible interference of withdrawal symptoms on study engagement). Those who met inclusion criteria were provided with information about study procedures and associated risks, following which written informed consent was obtained. Participants were reimbursed \$25 for the assessment session.

Results

Missing data were minimal (with less than 1% missing data points); mean imputation was used in these cases. Of the study sample, 27.3% ($n = 54$) met criteria for current PTSD. As would

be expected, this rate of PTSD is higher than current (past year) prevalence rates of PTSD in the general population (3.6%; Kessler, Chiu, Demler, Merikangas, & Walters, 2005) and consistent with rates of current PTSD documented in other inpatient substance dependent populations (e.g., 28%; Coffey, Schumacher, Brady, & Cotton, 2007). See Table 1 for descriptive statistics and correlations between primary variables of interest. Independent t-tests were conducted to test the hypothesis that patients with (vs. without) PTSD would report significantly higher levels of both AS and negative emotional avoidance. As predicted, participants with (vs. without) current PTSD reported a greater tendency to avoid negative emotions, $t(196) = -3.41, p = .001$ (*Means* = 17.18 ± 5.98 and 14.18 ± 5.32 , respectively), and AS, $t(196) = -2.69, p = .008$ (*Means* = 27.04 ± 17.39 and 20.10 ± 15.71 , respectively).

Next, logistic regression analyses were used to test the hypothesis that the avoidance of negative emotions would moderate the relationship between AS and PTSD status. Evaluation of the assumptions for logistic regressions indicated that all were met. For all logistic regression analyses, the Nagelkerke pseudo R^2 is reported. AS and negative emotional avoidance were entered in the first step of the model, and the interaction of AS and negative emotional avoidance was entered in the second step. All variables, including the interaction term, were mean centered. Current PTSD diagnostic status (presence vs. absence) served as the dependent variable. The first step of the model was significant, $\chi^2(2) = 13.74, p = .001$, accounting for 10% of the variance in PTSD status. Negative emotional avoidance, but not AS, emerged as a significant predictor of PTSD status (see Table 2). The inclusion of the interaction term significantly improved the model, accounting for an additional 4% of the variance in PTSD status, $\chi^2(1) = 7.06, p < .01$ (overall model, $\chi^2[3] = 20.80, p < .001$). The interaction χ^2 term was a significant predictor of PTSD status (see Table 2). The interaction effect was probed using simple slopes

analysis (i.e., at high and low [$\pm 1.5 SD$ from the mean] values of negative emotional avoidance). As demonstrated in Figure 1, results revealed a significant positive association between AS and PTSD status for participants high in negative emotional avoidance (OR = 1.05, 95% CI [1.02, 1.09], $p = .005$). AS was not associated with PTSD among participants low in negative emotional avoidance (OR = 0.96, 95% CI [0.91, 1.01], $p = .204$).²

To ensure that the observed relations could not be accounted for by other relevant factors, we reran the logistic regression analysis controlling for relevant covariates: number of substance use disorders, number of lifetime PTEs, and general psychiatric distress. Consistent with the results of the primary analysis, negative emotional avoidance ($B = 3.79$, $SE = .04$, Wald = 3.79, OR = 1.07, 95% CI [1.00, 1.15], $p = .05$), but not AS ($B = .01$, $SE = .01$, Wald = 0.19, OR = 1.01, 95% CI [.98, 1.03], $p = .66$), emerged as a significant predictor of PTSD status with the covariates included in the model. Further, the inclusion of the interaction term significantly improved the model, accounting for an additional 5% of the variance in PTSD status, $\chi^2 (1) = 7.46$, $p = .006$ (overall model, $\chi^2 [6] = 28.84$, $p < .001$) and emerging as a significant predictor of PTSD status ($B = .01$, $SE = .002$, Wald = 6.61, OR = 1.01, 95% CI [1.001, 1.01], $p = .01$). The interaction effect was probed using simple slopes analysis (i.e., at high and low [$\pm 1.5 SD$ from the mean] values of negative emotional avoidance). As before, results revealed a significant positive association between AS and PTSD status for participants high in negative emotional avoidance (OR = 1.04, 95% CI [1.002, 1.08], $p = .039$). However, among participants low in negative emotional avoidance, AS was significantly negatively associated with PTSD status (OR = 0.95, 95% CI [0.89, 0.999], $p = .046$).

Given suggestions that PTSD may be best represented dimensionally (Forbes, Haslam, Williams, & Creamer, 2005), we conducted a hierarchical regression analysis to examine

whether a similar interaction pattern occurs when utilizing a continuous PTSD symptom severity variable. The covariates (i.e., number of substance use disorders, number of PTEs, and general psychiatric distress) were entered in the first step of the model, followed by AS and negative emotional avoidance in the second step. Finally, the AS and negative emotional avoidance interaction term was entered in the third step of the model. All variables, including the interaction term, were mean centered. The continuous PTSD symptom severity score served as the dependent variable. Unlike our previous models, neither negative emotional avoidance nor AS predicted PTSD symptom severity above and beyond the covariates (see Table 3). However, the interaction term did emerge as a significant predictor of PTSD symptom severity, accounting for an additional 4% ($p = .002$) of the variance in PTSD symptom severity and significantly improving the model. The interaction effect was probed using simple slopes analysis (i.e., at high and low [$\pm 1.5 SD$ from the mean] values of negative emotional avoidance). Results revealed a significant positive association between AS and PTSD symptom severity for participants high in negative emotional avoidance ($B = 0.64$, $SE = 0.23$, $\beta = .33$, $p = .005$). Among participants low in negative emotional avoidance, AS was not significantly associated with PTSD symptom severity ($B = -0.52$, $SE = 0.27$, $\beta = -.27$, $p = .056$).

Discussion

The goal of this study was to examine the moderating role of negative emotional avoidance in the relation between AS and PTSD. As expected, participants with versus without a current PTSD diagnosis reported significantly higher levels of both AS and negative emotional avoidance. Moreover, consistent with past research (Bardeen et al., 2013, 2014; Kashdan et al., 2008), negative emotional avoidance moderated the relation between AS and PTSD, such that AS was positively related to a PTSD diagnosis among individuals with high, but not low, levels

of negative emotional avoidance. Our finding that negative emotional avoidance moderated the relation between AS and PTSD was robust, remaining significant even when including relevant covariates (i.e., number of lifetime PTEs, number of substance use diagnoses, and general psychiatric distress) in the model. These findings suggest that AS may increase the risk for PTSD only in the context of negative emotional avoidance. Thus, when considering the extent to which AS increases the risk for PTSD, it may be particularly important to take into account an individual's willingness to experience emotional distress. Specifically, among individuals who fear anxiety-related bodily sensations, those who do not try to avoid or escape emotions may be less likely to develop PTSD following traumatic exposure. Such a finding is consistent with Mowrer's (1960) two-factor theory which states that the maintenance of an acquired fear requires the negative reinforcement properties of avoidance.

Results of the present study are consistent with past findings from both cross-sectional (Bardeen et al., 2013) and prospective (Bardeen et al., 2014) research indicating that the interaction of AS and experiential avoidance predicts anxiety symptoms. Notably, however, and inconsistent with the results of past studies (Bardeen et al., 2013, 2014; Kashdan et al., 2008), we did not find that AS predicts PTSD when taking into account the variance associated with negative emotional avoidance. This finding is consistent with research by McDermott et al. (2009), which found that AS did not remain a significant predictor of PTSD among substance dependent patients when emotion regulation difficulties were taken into account. Together, these findings suggest that, at least among substance dependent patients, maladaptive ways of responding to negative emotions (including negative emotional avoidance and emotion regulation difficulties in general) may be more relevant to the presence of PTSD than AS. Specifically, our findings suggest that AS may be relevant to PTSD only among individuals with

the tendency to avoid negative emotional experiences. Together with evidence that both AS and negative emotional avoidance underlie numerous forms of anxiety-related pathology (Cox, Borger, & Enns, 1999; Salters-Pedneault et al., 2004), our results suggest that the combination of negative emotional avoidance and AS may have utility as a transdiagnostic model of risk for anxiety-related pathology. These results also provide additional support for the potential utility of interventions that target shared factors underlying anxiety-related pathology, such as the Unified Protocol (Barlow et al., 2010; Ellard, Fairholme, Boisseau, Farchione, & Barlow, 2010).

Although the present study advances our understanding of the relations among AS, negative emotional avoidance, and PTSD, limitations must be acknowledged. First, our cross-sectional design precludes conclusions regarding temporal relations among the constructs of interest, and we are unable to determine whether elevated levels of AS and negative emotional avoidance actually increase the risk for the development of PTSD. However, it is important to note that empirical research has shown that both AS (Feldner et al., 2008; Marshall et al., 2010; Simpson et al., 2006) and emotional avoidance (Kumpula et al., 2011) prospectively predict the development of PTSD symptoms. Moreover, the interaction of AS and experiential avoidance has been found to prospectively predict anxiety symptom severity (Bardeen et al., 2014). Nonetheless, future research using a longitudinal design is needed to determine whether the noted interaction effect prospectively predicts PTSD. Further research is also needed to examine the various ways in which emotional avoidance and AS may contribute to the development of psychopathology. For example, research has found that AS mediates the relation between negative emotionality and experiential avoidance (Pickett, Lodi, Parkhill, & Orcutt, 2012). These findings suggest that the fear of internal sensations may prompt efforts to avoid such sensations, which, in turn, may increase risk for psychopathology. However, other researchers

have suggested that experiential avoidance may contribute to the development of anxiety-related pathology through AS (see Berman, Wheaton, McGrath, & Abramowitz, 2010), with experiential avoidance increasing the risk for AS. Longitudinal studies are needed to clarify the specific pathways through which AS and negative emotional avoidance may contribute to the development and maintenance of PTSD.

In addition, given evidence that the interaction of AS and emotional avoidance is associated with both PTSD and anxiety symptom severity, it will be important for future research to determine if this model applies to other psychiatric disorders that have also been found to be associated with elevated levels of AS, such as depression and borderline personality disorder (Gratz, Tull, & Gunderson, 2008; Taylor, Koch, Woody, & McLean, 1996). Moreover, the exclusive reliance on self-report measures of AS and negative emotional avoidance may be considered a limitation, as responses to such measures may be influenced by an individual's willingness and ability to accurately report on emotional experiences (Tull, Bornovalova, Patterson, Hopko, & Lejuez, 2008). Thus, behavioral measures of the unwillingness to experience negative emotions should be incorporated into future studies in this line of research (e.g., Gratz, Bornovalova, Delany-Brumsey, Nick, & Lejuez, 2007). In interpreting our findings, it is also important to consider that we utilized a diagnostic interview designed to assess the DSM-IV diagnostic criteria for PTSD. The symptoms associated with PTSD and the criteria for determining a PTSD diagnosis were modified in the DSM-5 (see APA, 2013). Consequently, it is possible that our findings may be less relevant for individuals meeting DSM-5 diagnostic criteria for PTSD. Future studies should attempt to replicate our findings among individuals meeting criteria for PTSD in the DSM-5. Finally, we tested our model within a specific clinical population of substance dependent patients in residential treatment. This population is

characterized by a high level of psychiatric comorbidity (Chen et al., 2011), traumatic exposure (Brown, Stout, & Mueller, 1999), and functional impairment (Hasin, Stinson, Ogburn, & Grant, 2007). Consequently, it is possible that findings may not generalize to other clinical populations (e.g., psychiatric outpatient populations) or nonclinical populations. Future studies are needed to examine whether the tested model applies to clinical populations other than substance dependent patients or nonclinical populations with subthreshold PTSD symptoms.

Despite these limitations, the present study contributes to our understanding of the conditions under which AS is associated with PTSD. To our knowledge, the present study is the first to provide evidence that AS may relate to PTSD only among individuals with high levels of negative emotional avoidance. These findings have clinical implications, highlighting the potential benefits of interventions aimed at reducing experiential avoidance among individuals with high levels of AS. Preventive interventions that assist individuals high in AS in altering the ways in which they relate and respond to their internal states may have particular utility (e.g., Acceptance and Commitment Therapy [Hayes, et al., 1999]; Mindfulness-Based Stress Reduction [Kabat-Zinn, 1990]), and could be used with vulnerable individuals following traumatic exposure to prevent the development of PTSD.

Footnote

¹The sample of the present paper does not overlap with that presented in Bordieri, Tull, McDermott, and Gratz (2015).

²There is evidence that AS may consist of three factors: (1) social concerns; (2) physical concerns; and (3) mental concerns (Taylor et al., 2007). Given this, post-hoc analyses were conducted to examine the degree to which each of these lower-order AS dimensions accounts for the observed interaction effect. This analysis mirrored the primary regression model, except that the ASI-3 total score was replaced by the three ASI-3 subscale scores in the first step of the model, and three interaction terms (calculated as the product of each of the ASI-3 subscale scores by negative emotional avoidance) were entered in the second step of the model. None of the interaction terms reached statistical significance in the second step of the model (p values from .28 to .88).

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Table 1. *Descriptive data for and correlations between primary variables of interest.*

	1	2	3	4
1. Anxiety sensitivity	---			
2. Negative emotional avoidance	.39**	---		
3. PTSD status	.19*	.24**	---	
4. PTSD symptom severity	.24*	.25**	.87**	---
Mean	22.00	15.00	---	25.13
SD	16.44	5.65	---	31.95

* $p < .01$. ** $p < .001$.

Table 2. *Logistic regression analysis examining the moderating role of negative emotional avoidance in the relation between anxiety sensitivity and PTSD status.*

	<i>B (SE)</i>	Wald	OR	95% CI
<i>Step 1</i>				
Anxiety sensitivity (AS)	0.02 (0.01)	2.24	1.02	1.00-1.04
Negative emotional avoidance	0.09 (0.03)	6.53*	1.09	1.02-1.16
<i>Step 2</i>				
Anxiety sensitivity (AS)	0.01 (0.01)	0.19	1.01	0.98-1.03
Negative emotional avoidance	0.10 (0.04)	7.77**	1.11	1.03-1.19
AS × negative emotional avoidance	0.01 (0.002)	6.37*	1.01	1.00-1.01

Note. OR = Odds Ratio; CI = Confidence Interval.

* $p < .05$; ** $p < .01$.

Table 3. Hierarchical linear regression analysis examining the moderating role of negative emotional avoidance in the relation between anxiety sensitivity and PTSD symptom severity.

	<i>B</i> (SE)	β	R^2 (ΔR^2)	<i>F</i>
<i>Step 1</i>			.17 (.17****)	13.15****
General distress	0.18 (0.07)	.17*		
Number of substance use disorders	2.65 (1.45)	.12		
Lifetime potentially traumatic events	3.65 (0.76)	.32****		
<i>Step 2</i>			.19 (.02)	8.72****
General distress	0.12 (0.09)	.11		
Number of substance use disorders	2.56 (1.46)	.12		
Lifetime potentially traumatic events	3.32 (0.78)	.29****		
Anxiety sensitivity (AS)	0.15 (0.16)	.08		
Negative emotional avoidance	0.54 (0.41)	.10		
<i>Step 3</i>			.23 (.04**)	9.16****
General distress	0.14 (0.08)	.13		
Number of substance use disorders	2.58 (1.43)	.12		
Lifetime potentially traumatic events	3.23 (0.76)	.28****		
Anxiety sensitivity (AS)	0.06 (0.16)	.03		
Negative emotional avoidance	0.75 (0.41)	.14		
AS \times negative emotional avoidance	0.07 (0.02)	.20**		

* $p < .05$. ** $p < .01$. *** $p < .001$.

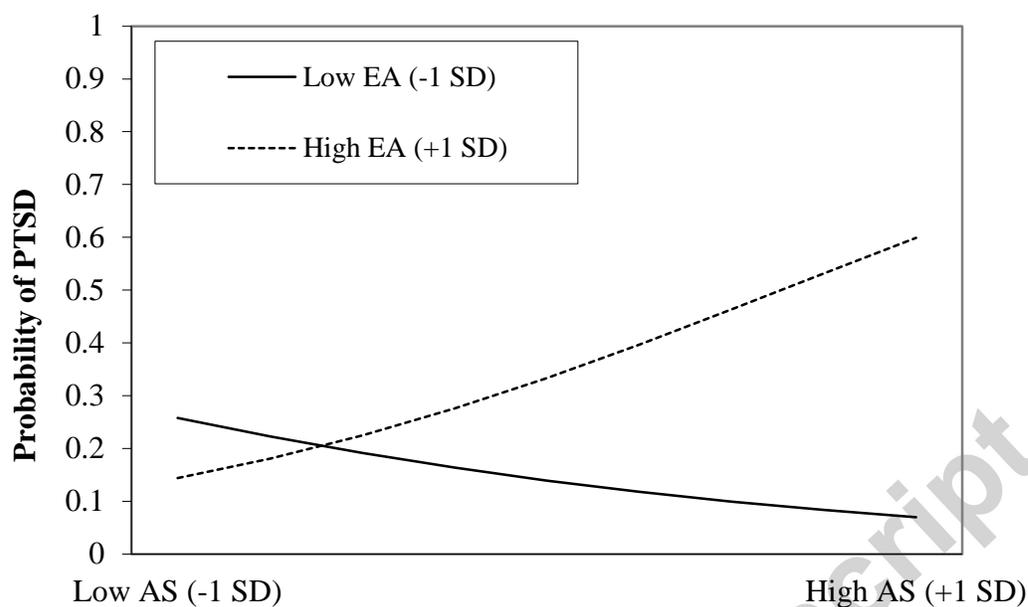


Figure 1. *Interaction effect of anxiety sensitivity (AS) and negative emotional avoidance (EA) predicting the probability of a PTSD diagnosis.*

Highlights

Studied emotional avoidance as moderator of anxiety sensitivity-PTSD relation.

Emotional avoidance moderated anxiety sensitivity-PTSD relation.

Anxiety sensitivity related to PTSD for those high in emotional avoidance.

Anxiety sensitivity not related to PTSD for those low in emotional avoidance.

Important to consider emotional avoidance when studying anxiety sensitivity.