Tables: 2

Figures: 3

Short-Term Pain for Long-Term Gain: The Role of Experiential Avoidance in the Relation between Anxiety Sensitivity and Emotional Distress

Joseph R. Bardeen

Department of Psychology, Auburn University, Auburn, AL

Author Note

Correspondence concerning this article should be addressed to Joseph R. Bardeen, Department of Psychology, Auburn University, 226 Thach, Auburn, AL 36849-5214. Phone: (334) 844-6647. E-mail: jbardeen@auburn.edu.

Abstract

Research has provided evidence of an interactive effect between anxiety sensitivity (AS) and experiential avoidance (EA) in predicting both anxiety and posttraumatic stress (PTS) symptomatology. Additionally, theory suggests that EA alleviates distress in the short-term, but exacerbates it in the long-term. The present cross-sectional study was developed to replicate the noted findings and examine the interaction (EA x AS) in the context of an emotionally evocative task. It was predicted that, among high AS participants, high EA would (a) reduce the likelihood of experiencing short-term increases in negative affect following the task, and (b) increase the likelihood of anxiety and PTS symptomatology. Undergraduate participants (N = 199) completed a battery of self-report questionnaires and an emotionally evocative task. As predicted, positive associations were observed between AS and both anxiety and PTS symptoms, but only among high EA participants. Additionally, AS only predicted increases in negative affect following the emotionally evocative task for those with lower levels of EA, thus providing empirical evidence of the affect regulatory function of EA among those who fear anxiety-related bodily sensations. These findings help to elucidate the motives for the use of avoidance among those high in AS. Conceptual and clinical implications are discussed.

Keywords: anxiety sensitivity; experiential avoidance, anxiety, posttraumatic stress; negative affect

1. Introduction

Anxiety Sensitivity (AS)—a fear of anxiety-related bodily sensations due to beliefs that such sensations will have adverse social, psychological, and physical outcomes (Reiss & McNally, 1985)—has been implicated in a wide array of negative outcomes and appears to be especially important for understanding the pathogenesis of anxiety pathology. Cross-sectional research has consistently shown positive associations between anxiety sensitivity and panic, generalized anxiety disorder, posttraumatic stress disorder (PTSD), social phobia, obsessive compulsive disorder, as well as a host of other maladaptive outcomes (for a review see Naragon-Gainey, 2010). Interestingly, among anxiety pathology, posttraumatic stress (PTS) symptomatology appears to be associated with the highest levels of AS (Taylor, Koch, & McNally, 1992). In fact, AS has been shown to be an even stronger predictor of PTSD than trauma-related beliefs (Federoff, Taylor, Asmundson, & Koch, 2000). Thus, AS may be a particularly important individual difference factor for understanding the pathogenesis of PTS symptomatology.

Although evidence from a plethora of cross-sectional studies, as well as a number of prospective studies (e.g., Ginsburg & Drake, 2002; Hayward, Killen, Kraemer, & Taylor, 2000; Schmidt, Lerew, & Jackson, 1997), has consistently shown a positive association between AS and anxiety-related symptomatology, recent research suggests the possibility that AS may only be a vulnerability factor for the development of anxiety and PTS symptomatology among those who are unwilling to experience emotional distress (Bardeen, Fergus, & Orcutt, 2013, 2014; Bardeen, Tull, Stevens, & Gratz, 2014; Kashdan, Zvolensky, & McLeish, 2008). For example, nonacceptance of one's inner experience has been shown to moderate the relation between AS and anxiety, such that the positive linear association between AS and anxiety symptoms is

significantly stronger for those with a greater unwillingness to experience emotional distress (Kashdan, Zvolensky, & McLeish, 2008) and those with greater experiential avoidance (EA; i.e., an unwillingness to stay in contact with unwanted inner experiences [Hayes, Wilson, Gifford, Follette, & Strosahl, 1996]; Bardeen et al., 2013). Similarly, Bardeen, Tull, et al. (2014) found that emotional avoidance moderated the relation between AS and PTSD, such that higher AS was predictive of a PTSD diagnosis, but only among those who were unwilling to experience emotional distress. That is, for those with higher levels of AS and lower levels emotional avoidance, AS was not associated with a PTSD diagnosis. Importantly, the described moderation effect has been observed prospectively in relation to anxiety. Specifically, AS, measured at an initial assessment session, was shown to predict anxiety symptoms at a one month follow-up session, but only among those with relatively higher levels of EA (Bardeen, Fergus, et al., 2014). Taken together, results suggest that the described interaction effect may be transdiagnostic in nature, at least in relation to anxiety symptomatology. Additionally, they highlight the importance of accounting for EA when examining AS in relation to maladaptive outcomes.

Given that EA makes it more likely that one with relatively higher levels of AS will experience anxiety and PTS symptomatology, one has to wonder, why exactly the cognitive and behavioral repertoire associated with EA would be maintained among those higher in AS. In other words, how is it reinforcing, or what purpose does it serve? A behavioral conceptualization of this phenomena would suggest that the avoidance of unwanted inner experiences alleviates distress in the short-term, but paradoxically exacerbates distress in the long-term (Hayes et al., 1996). Indeed, it seems intuitive that one would seek immediate relief, through both cognitive and behavioral avoidance, from experiencing bodily sensations to which one is highly averse. In contrast, it may be far more difficult for individuals experiencing highly aversive bodily

sensations to see the value in approaching, or allowing oneself to experience, such sensations. Abundant research supports the proposition that the inflexible use of EA may lead to a wide variety of maladaptive outcomes (Chawla & Ostafin, 2007). For example, high levels of EA measured prior to a traumatic event predicts increased PTS symptoms in the acute aftermath of the event and eight months later (Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011). In the short-term, attempts to avoid aversive bodily sensations associated with a traumatic event may initially decrease the frequency and severity of trauma-related distress, thus serving to reinforce the likelihood that one will engage in experientially avoidant behavior. In the long-term, the chronic use of avoidance likely interferes with one's ability to disconfirm faulty appraisals of threat, which would serve to extinguish maladaptive fear responses (Foa & Kozak, 1986). Moreover, as described by Dymond, Dunsmoor, Vervliet, Roche, and Hermans (in press), experientially avoidant behavior in response to fear reactions likely increases fear generalization (e.g., fear responses established by a sensory stimuli are elicited by other sensory stimuli that are perceptually similar), thus increasing one's level of distress and functional impairment. For example, triggering of the fight-or-flight response, initially elicited by the sound of gun fire during a traumatic event, may eventually be elicited by a host of loud noises (e.g., a door slamming, fireworks). In this manner, EA not only maintains anxiety-related distress, but may exacerbate it.

Based on this conceptualization, as well as the research described above, one might predict that, among individuals with relatively higher AS, those with higher EA would experience less short-term increases in distress in the face of an emotionally evocative situation, but relatively worse long-term psychological outcomes in comparison to those with lower EA. Following this rationale, the purpose of the present study was two-fold. First, the present study

was designed to replicate the noted interaction effects showing strong positive associations between AS and both anxiety and PTS symptoms, but only among participants with relatively higher EA. In combination with the noted temporal evidence of these effects, findings that support our hypothesis will further strengthen the assertion that individuals with relatively higher AS and higher EA are at greater risk for long-term anxiety-related symptomatology in comparison to those with higher AS and relatively lower EA. Second, the noted interaction effect was examined in the context of an emotionally evocative task. It was hypothesized that there would be a significant positive association between AS and post-task negative affect when accounting for pre-task negative affect, but only among those with relatively lower levels of EA. That is, high EA was expected to (a) protect individuals with high AS from experiencing short-term increases in negative affect following the emotionally evocative task, and (b) paradoxically increase the likelihood of long-term anxiety and PTS symptomatology.

As described, AS has been conceptualized as the fear of anxiety-related bodily sensations due to beliefs that such sensations will have adverse social, psychological, and physical outcomes, and some evidence supports this three factor model (i.e., social [fear that anxiety reactions will lead to social rejection], cognitive [fear of mental incapacitation due to cognitive symptoms of anxiety], physical [fear of physical incapacitation due to physical symptoms of anxiety]; Taylor et al., 2007). Consistent with this three factor model, a post-hoc analysis will be conducted for each of the hypothesized interactive effects that reaches statistical significance to examine the degree to which each of these lower-order AS dimensions accounts for the observed interactive effects. Given the exploratory nature of these analyses, no a-priori hypotheses were made.

2. Method

2.1. Participants and Procedure

For this Institutional Review Board approved study, the sample consisted of 199 (106 males; 93 females) undergraduate students recruited from an introductory psychology mass testing pool at a mid-sized U.S. University. Students were required to be at least 18 years of age and fluent in English to participate. The present study was part of a larger study examining threat-related attentional biases. During one experimental session, participants completed informed consent and then spent the remainder of the session completing measures and an emotionally evocative task in the following order: (1) a battery of self-report questionnaires, including measures of anxiety, AS, EA, PTS symptoms, and trauma history, (2) a pre-task self-report measure of negative affect (T1 NA), (3) an emotionally evocative task (i.e., modified dot-probe task), and (4) a post-task self-report measure of negative affect (T2 NA). Only those participants who reported experiencing a potentially traumatic event (i.e., Criterion A1; DSM-IV-TR: APA 2000) completed a measure of PTS symptoms (n = 176: 92 males; 84 females). Therefore, any reference hereafter to the PTSD Checklist-Stressor Specific Version (PCL-S; Weathers, Huska, & Keane, 1991) or PTS symptoms is specific to this subsample. Upon study completion, participants were debriefed and given credit for their introductory psychology course.

The full sample (N = 199) had an average age of 20.5 years (SD = 3.8) and 55% self-identified as White, 23% as Black, 11% as Asian, 1% as American Indian or Alaska Native, 9% endorsed “other”, while 1% preferred not to respond. Additionally, 11% of the sample reported being of Hispanic ethnicity. The subsample (n = 176) of participants who completed the PCL-S (Weathers et al., 1991) had an almost identical demographic profile (M age = 20.5 years [SD =

3.8]; 55% White, 25% Black, 10% Asian, 1% American Indian or Alaska Native, 8% “other”, 1% preferred not to respond, and 11% Hispanic).

2.2. Equipment

Self-report measures and an emotionally evocative task were presented on a Dell Dimension 8300 desktop computer with a 19-inch monitor. Participants were seated approximately 50 cm from the computer monitor for the emotionally evocative task. Self-report measures were presented using SSI Web software (Orme, 2005), and DirectRT software (version 2004.1; Jarvis, 2004) was used to present the emotionally evocative task.

2.3. Emotionally Evocative Task

In the present study, a modified dot-probe task served as the emotionally evocative task. During the task, two images appeared side by side on a computer monitor (i.e., neutral-neutral or negative-neutral) for one of four presentation durations (i.e., from 15 to 500 ms). The participant was instructed to use the computer keyboard to indicate the relative position of a dot that replaced one of the images on the computer screen. Participants completed 10 practice trials followed by one block of 120 trials, with the entire task taking approximately 15 minutes to complete. Forty negative (e.g., man with gun, bloody hand, plane crash) and 80 neutral (e.g., ceiling fan, chair, mushroom caps) images, taken from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1999), were presented twice during the course of the task. Negative images were identified based on ratings of valence and arousal (negative valence and high arousal: M = 2.17 and 6.52, respectively). Neutral images were neither negatively nor positively valenced and had low arousal ratings (M = 5.12 and 2.96, respectively; Lang et al., 1999). IAPS images, such as those used in the present study, have been used to induce negative affective states in several studies (e.g., Erk et al., 2003; Pretz, Totz, & Kaufman, 2010).

2.4. Self-Report Measures

Anxiety Sensitivity Index–3 (ASI-3). The ASI-3 is an 18-item self-report measure that assesses the fear of arousal-related sensations due to physical (e.g., "It scares me when my heart beats rapidly"), cognitive (e.g., "It scares me when I am unable to keep my mind on a task"), and social concerns (“e.g., It is important for me not to appear nervous;" Taylor et al., 2007). ASI-3 items are rated on a 5-point scale (0 = *very little* to 4 = *very much*) based on the degree to which the participant agrees with each statement. The ASI-3 has demonstrated adequate psychometric properties, including discriminant and convergent validity, internal consistency, and criterion-related validity (Taylor et al., 2007). Internal consistency for the ASI-3 total scale score (*M* = 11.82, *SD* = 10.19, Range = 0-47) in the present sample was adequate (α = .88).

Acceptance and Action Questionnaire-II (AAQ-II). The 7-item AAQ-II (Bond et al., 2011) is a self –report measure which assesses EA. AAQ-II items are rated on a 7-point scale (1 = *never true* to 7 = *always true*) based on the degree to which the participant believes that each item pertains to them (e.g., ‘‘My painful memories prevent me from having a fulfilling life’’). The AAQ-II has demonstrated adequate psychometric properties, including internal consistency, discriminant and convergent validity, and predictive validity over a one year time period (Bond et al., 2011). Internal consistency for the AAQ total scale score (*M* = 16.45, *SD* = 7.69, Range = 7-48) in the present sample was adequate (α = .90).

Positive and Negative Affect Schedule (PANAS). The 20-item PANAS (Watson, Clark, & Tellegen, 1988) is a self–report measure which assesses both positive and negative affect over a given time period. Participants rate 20 emotions on a 5-point Likert scale (1 = *very slightly or not at all* to 5 = *extremely*) on the basis of the extent to which they are currently experiencing each emotion (i.e., state affect was assessed in the present study). The

negative affect scale of the PANAS (i.e., PANAS-NA)—the PANAS scale of interest in the present study—contains 10 items (e.g., afraid, distressed) and has shown adequate psychometric properties in prior studies, including internal consistency, convergent validity (Crawford & Henry, 2004; Watson et al., 1988), and measurement invariance across demographic subgroups (i.e., age, gender; Crawford & Henry, 2004). Internal consistency for the PANAS-NA Scale (pre-task [T1 NA]: M = 14.47, SD = 5.84, Range = 10-41; post-task [T2 NA]: M = 13.81, SD = 4.88, Range = 10-33) in the present sample was adequate for both administrations (T1 NA: α = .89, T2 NA: α = .86).

Depression, Anxiety, and Stress Scale-21-item Version (DASS-21 Anxiety). Anxiety was assessed via the DASS-21 Anxiety Scale (Lovibond & Lovibond, 1995a). The seven items of the DASS-21 Anxiety Scale are (e.g., ‘‘I felt I was close to panic’’) are rated on a 4-point scale (0 = *did not apply to me at all* to 3 = *applied to me very much, or most of the time*). Participants rate the degree to which each statement applies to them over the past week. Individuals who have been diagnosed with an anxiety disorder, as per the DSM-IV-TR (American Psychiatric Association 2000), score significantly higher than nonclinical control participants on the DASS-21 Anxiety Scale (Antony, Bieling, Cox, Enns, & Swinson, 1998). Additionally, convergent validity has been established between the DASS-21 Anxiety Scale and other measures of anxiety (e.g., Beck Anxiety Inventory; Beck & Steer, 1990; Lovibond & Lovibond, 1995b). Internal consistency for the DASS-21 Anxiety Scale (M = 2.15, SD = 2.93, Range = 0-17) in the present sample was adequate (α = .78).

Traumatic Life Events Questionnaire (TLEQ). The TLEQ (Kubany et al., 2000) assesses exposure to 22 potentially traumatic events (e.g., assault, natural disaster). Participants are asked to identify the one event, from those reported, that is most distressing. The TLEQ has

demonstrated adequate psychometric properties, including convergent validity with other common measures of trauma, high retest reliability, and use in a range of populations (Kubany et al., 2000).

PTSD Checklist-Stressor Specific Version (PCL-S). The 17-item PCL-S (Weathers et al., 1991) is a self-report measure which assesses *DSM-IV* PTSD symptoms, in relation to a specific event, in a civilian population. Participants were asked to rate (1 = *not at all* to 5 = *extremely*) how much they have been bothered by each symptom in the past month in relation to the potentially traumatic event that they identified as most distressing on the TLEQ. The PCL-S has demonstrated adequate psychometric properties, including convergent validity with other measures assessing PTSD symptoms, adequate internal consistency, and retest reliability (Wilkins, Lang, & Norman, 2011). Consistent with evidence suggesting that PTSD is not a discrete clinical syndrome, but rather a dimensional construct (e.g., Forbes, Haslam, Williams, & Creamer, 2005; Ruscio, Ruscio, & Keane, 2002), the PCL-S items were summed to create a total score for use as a continuous variable. In the subsample (n = 176) of participants who completed the PCL-S (M = 28.70, SD = 11.41, Range = 17-64), Cronbach's coefficient alpha for the PCL-S total score was adequate (α = .86).

2.5. Data Analytic Strategy

SPSS version 19 (SPSS IBM, New York) was used to perform statistical analyses. Bivariate correlations were calculated to determine whether any demographic variables (i.e., sex, age, race/ethnicity) were significantly associated with variables of interest (i.e., T2 NA, anxiety, PTS symptoms), thus warranting inclusion as covariates in subsequent analyses (Tabachnick & Fidell, 2007). Next, three hierarchical regressions were conducted to test the hypothesized interactive effects. Consistent with Aiken and West (1991), covariate(s) and the predictor

variables of interest (AS [ASI-3] and EA [AAQ-II]) were mean centered and entered into the first step of each model. An interaction term, calculated as the product of the two centered predictor variables (AS and EA), was entered into the second step of each model. T2 NA, anxiety (DASS-21 Anxiety), and PTS symptoms (PCL-S), served as dependent variables in their respective models. Because baseline differences in NA were expected to account for considerable variance in NA following the emotionally evocative task, T1 NA was included as a covariate in the first step of the model in which T2 NA served as the dependent variable. Significant interaction effects were further examined via simple slopes analysis (Aiken and West 1991). Simple slopes analysis consists of constructing two simple regression equations in which the relationship between the independent variable (i.e., AS) and the dependent variable is tested at both high (+1 SD) and low (-1 SD) levels of the moderating variable (i.e., EA).

To examine the degree to which the three lower-order AS dimensions (i.e., social. cognitive, physical) accounted for any observed interaction effects, a post-hoc regression analysis was conducted for each of the interaction terms that significantly predicted one of the three outcomes variables. These analyses mirrored the primary regression models, except that the ASI-3 total score was replaced by the three ASI-3 subscale scores in the first step of each model. Additionally, three interaction terms, calculated as the product of each of the ASI-3 subscale scores by EA (AAQ-II), were entered into the second step of each model.

3. Results

3.1. Demographics as Potential Covariates

Race/ethnicity was assessed according to the National Institutes of Health policy on reporting race and ethnicity data. Race/ethnicity was collapsed into a single dummy coded variable (White and Non-Hispanic [*n* = 103, 52%] versus all others [*n* = 96, 48%]). Among

potential covariates, race/ethnicity was significantly associated with anxiety (r = -.18, p < .05), and sex was significantly associated with PTS symptoms (r = -.18, p < .05). Specifically, Non-Hispanic White participants, compared to all others participants, reported significantly lower levels of anxiety, (M = 1.64, SD = 2.22, and M = 2.69, SD = 3.46, respectively), and females reported significantly higher levels of PTS symptoms in comparison to males (M = 30.47, SD = 12.70, and M = 27.08, SD = 9.88, respectively). Accordingly, race/ethnicity and sex were included as covariates in subsequent regression models.

3.2. Predicting Anxiety

As seen in Table 1, race/ethnicity, EA, and AS were all significant predictors of anxiety. In the second step of the model, the interaction term significantly predicted anxiety. As predicted, simple slopes analysis revealed a significant positive association between AS and anxiety for participants with relatively higher (B = .18, β = .62, p < .001), but not lower (B = .05, β = .16, p = .09), EA (see Figure 1). The interaction effect was small to medium in size (Cohen's f^2 = .082; Aiken & West, 1991).

3.3. Predicting Posttraumatic Stress Symptoms

Sex, EA, and AS were all significant predictors of PTS symptoms (see Table 1). In the second step of the model, the interaction term significantly predicted PTS symptoms. As predicted, simple slopes analysis revealed a significant positive association between AS and PTS symptoms for participants with relatively higher (B = .41, β = .36, p < .001), but not lower (B = .11, β = .10, p = .35), EA (see Figure 2). The interaction effect was small in size (Cohen's f^2 = .025; Aiken & West, 1991).

3.4. Predicting Post-task Negative Affect

As expected, T1 NA was a significant predictor of T2 NA (see Table 1). When

accounting for T1 NA, neither EA or AS was a significant predictor of T2 NA. In the second step of the model, the interaction term (i.e., EA x AS) significantly predicted T2 NA. As predicted, simple slopes analysis revealed a significant positive association between AS and T2 NA for participants with relatively lower (B = .14, β = .30, p = .003), but not higher (B = -.03, β = -.07, p = .50), EA (see Figure 3). The interaction effect was small to medium in size (Cohen's f^2 = .039; Aiken & West, 1991).

3.5. Post-hoc Analysis

As seen in Table 2, the AS Physical dimension interacted with EA to predict anxiety (β = .14, p = .04). None of the other interaction terms in that model reached statistical significance. However, the AS Cognitive dimension by EA interaction term evidenced an effect in predicting anxiety that was similar in size to that of the AS Physical by EA interaction term (β = .11, p = .14). None of the other models evidenced a significant interaction effect (see Table 2). Consist with the primary analytic model in which anxiety served as the outcome variable, simple slopes analysis revealed a significant positive association between AS Physical and anxiety for participants with relatively higher (B = .17, β = .23, p = .02), but not lower (B = -.06, β = -.07, p = .48), EA. The interaction effect was small to medium in size (Cohen's f^2 = .078; Aiken & West, 1991).

4. Discussion

As predicted, EA and AS were both significant predictors of anxiety and PTS symptoms. These direct effects were qualified by significant interaction effects. Specifically, strong positive associations were observed between AS and both anxiety and PTS symptoms, but only among participants with relatively higher EA. These findings are consistent with previous research (Bardeen, Fergus, & Orcutt, 2013, 2014; Bardeen, Tull et al., 2014), and provide additional

support for the proposition that fear of anxiety-related bodily sensations may only be a risk-factor for the development of anxiety and PTS symptoms among those who try to escape such sensations (e.g., physical avoidance, substance use). In contrast, individuals who are high in AS but still willing to experience anxiety-related bodily sensations, may be less likely to develop anxiety symptomatology, as well as PTS symptomatology in the aftermath of a potentially traumatic event.

In addition, and as predicted, EA moderated the relation between AS and post-task NA, even after accounting for the autoregressive effects of pre-task NA. That is, fear of anxiety-related bodily sensations only predicted increases in NA following the emotionally evocative task for participants who reported greater willingness to experience uncomfortable internal experiences, whereas participants higher in AS who reported an unwillingness to stay in contact with such experiences did not report increased NA in response to the task. Among participants high in AS, those with high EA may have been using avoidance strategies (e.g., cognitive suppression, diverting their attention from the images on the screen) to alleviate distress during the emotionally evocative task, whereas those with low EA may have been more likely to fully engage in the task, thus experiencing increases in distress that are consistent with viewing negative valence inducing IAPS images (Lang et al., 1999).

Of note, results of the post-hoc analysis suggest that the interaction between EA and the broader construct of AS, rather than any one dimension of AS (i.e., social, cognitive, physical), is of primary importance in predicting both PTS symptoms and NA following the emotionally evocative task. In contrast, some degree of specificity was shown in predicting anxiety, with results of the post-hoc analysis suggesting that the fear of physical incapacitation due to the physical symptoms of anxiety may be driving the significant interaction between EA and AS in

predicting anxiety. This significant effect may be due, in part, to the measure of anxiety that was used in the present study. Specifically, five of seven items of the DASS-21 Anxiety Scale focus on physical symptoms of anxiety (e.g., trembling, difficulty breathing, heart rate), rather than assessing for other common features of anxiety pathology, such as cognitive symptoms (e.g., worry, difficulty concentrating). The noted interaction effect (ASI Physical x AAQ-II) may be more relevant to anxiety pathology for which physiological hyperarousal is central (e.g., panic disorder), and less relevant to pathology in which cognitive features play a large roll (e.g., generalized anxiety disorder). In addition, it is important to note that the difference in magnitude in the relations between the ASI-3 Physical x AAQ-II and the ASI Cognitive x AAQ-II interactions with DASS-21 Anxiety were small in magnitude (β = .11 vs. β = .14, respectively); and thus, caution is suggested in drawing conclusions from the noted significant effect until such time as it is replicated in a larger sample.

Taken together, results from the present study may be best understood in the context of theory on the role of EA in short- and long-term emotional distress (e.g., Hayes et al., 1996), which suggests that avoidance of unwanted inner experiences alleviates distress in the short-term, but paradoxically exacerbates distress in the long-term (Hayes et al., 1996). But why would individuals high in AS continue to use avoidance to alleviate distress in the short-term when the use of avoidance in such a way increases the likelihood of experiencing long-term distress (PTS and anxiety symptomatology), which is objectively worse (greater duration, intensity, and functional impairment)? As described by Hayes et al. (1996), “the immediate effects of experiential avoidance are often positive, and short-term consequences are much more important than long-term ones” (p. 1158). In the moment, when distress-related stimuli are present, individuals with relatively high AS coupled with high EA may overestimate the relative worth of

alleviating short-term distress in favor of gambling on long-term outcomes. Moreover, individuals high in EA may not have conscious knowledge of the relation between their avoidance behaviors and long-term distress, only knowing that such behaviors appear to provide immediate relief. With repeated exposure to such a strong negative reinforcement contingency, avoidance behaviors in response to specific contextual cues may take on a level of automaticity, and thus, be further removed from conscious awareness.

As noted, results are consistent with the proposition that fear of anxiety-related bodily sensations, in and of itself, may not be a risk factor for the development of anxiety and PTS symptomatology. Indeed, results from the present study suggest that AS is only a risk factor for these maladaptive outcomes when it is paired with an unwillingness to stay in contact with uncomfortable internal experiences. As noted by Kashdan et al. (2008), “prolonged, inflexible non-acceptance of emotional responses can consume attention, vitality and other resources, leaving fewer resources to cope and thrive in everyday life’’ (p. 437). On the other hand, those who are willing to experience arousal-related bodily sensations to which they are averse may have enough cognitive resources available to negotiate, and more flexibly adapt to, day to day stressors; and thus, may not experience the functional impairment that is associated with anxiety and trauma-related pathology.

Study limitations must be acknowledged. Although use of a sample consisting solely of undergraduate students may be viewed as a study limitation, because of the number of developmental tasks which confront adolescent undergraduates (e.g., choosing a career path, achieving independence from family, preparing for relationship commitment, developing new friendship circles), adolescent undergraduates are especially vulnerable, and prone, to experiencing stressful circumstances (Towbes & Cohen, 1996), and thus, may be a particularly

relevant population for examining the role of EA and AS in emotional distress. However, given that undergraduate students are likely functioning at higher level than individuals from a clinical sample, it will be important to replicate these findings in clinical samples in future research. Moreover, because the PCL-S total scale score and the DASS-21 Anxiety Scale score were used to be consistent with dimensional constructs (Crawford & Henry, 2004; Forbes et al., 2005; Ruscio et al., 2002), it may be beneficial to assess for anxiety and trauma-related disorders, as per the DSM-V (American Psychiatric Association [APA] 2013) in future research. Moreover, it will be important to assess for Axis I pathology more broadly, as per the DSM-V (APA, 2013), to determine the degree to which the noted interaction effect is transdiagnostic. In addition, the cross-sectional study design limits conclusions regarding the temporal relations among study variables. However, it is important to note that the EA by AS interaction effect has been shown to prospectively predict anxiety symptom severity (Bardeen et al., 2014). In regard to PTS symptomatology, both AS (Feldner et al., 2008; Marshall et al., 2010) and EA (Kumpula et al., 2011) have been shown to be prospective predictors. However, it will be important to use longitudinal study designs in future research to ensure that the interaction effect prospectively predicts PTS symptomatology. Finally, significant interaction effects were small to medium in size, explaining approximately 3-8% of variance in outcome variables. Importantly, these effect sizes are well above the threshold for being considered meaningful (i.e., at least 1% percent of variance; Evans, 1985).

Despite these limitations, the present study contributes to our understanding of the conditions under which AS is associated with anxiety and PTS symptomatology. To my knowledge, the present study is the first to provide evidence that AS only predicts increases in NA following an emotionally evocative task for those with lower levels of EA, thus providing

empirical evidence of the affect regulatory function of EA among those who fear anxiety-related bodily sensations. Study findings are consistent with theory on the role of EA in short- and long-term emotional distress (e.g., Hayes et al., 1996), and help to elucidate the motives for the use of avoidance among those high in AS, even though such avoidance increases the likelihood of experiencing long-term emotional distress. Because results of the present study, as well as previous research, suggest that AS may only be a vulnerability factor for the development of anxiety and PTS symptomatology among those with higher levels of EA, preemptive efforts to reduce EA may be beneficial for individuals with both high EA and high AS. Vulnerable individuals may be identified via self-report measures during primary care visits, in academic settings, or in other settings in which mass screening could be used. Vulnerable individuals could be offered brief interventions which seek to decrease experiential avoidance and increase experiential willingness (e.g., Acceptance and Commitment Therapy [Hayes et al., 2006]; Mindfulness-Based Stress Reduction [Kabat-Zinn, 1990]).

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Thousand Oaks, CA: Sage Publications, Inc.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment, 10,* 176.

Bardeen, J. R., Fergus, T. A., & Orcutt, H. K. (2014). The moderating role of experiential avoidance in the prospective relationship between anxiety sensitivity and anxiety. *Cognitive Therapy and Research, 38,* 465- 471.

Bardeen, J. R., Tull, M. T., Stevens, E. N., & Gratz, K. L. (2014). *The moderating role of emotional avoidance in the relationship between anxiety sensitivity and posttraumatic stress disorder*. Manuscript submitted for publication.

Bardeen, J. R., Fergus, T. A., & Orcutt, H. K. (2013). Experiential avoidance as a moderator of the relationship between anxiety sensitivity and perceived stress. *Behavior Therapy, 44,* 459-469.

Beck, A. T., & Steer, R. A. (1990). *Manual for the Beck Anxiety Inventory*. San Antonio, Tex: The Psychological Corporation.

Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K,…& Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action

Questionnaire-II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy, 42,* 676–688.

Chawla, N., & Ostafin, B. (2007). Experiential avoidance as a functional dimensional approach to psychopathology: An empirical review. *Journal of Clinical Psychology, 63,* 871-890.

Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 43,* 245-265.

Dymond, S., Dunsmoor, J. E., Vervliet, B., Roche, B., & Hermans D. (in press). Fear generalization in humans: Systematic review and implications for anxiety disorder research. *Behavior Therapy.*

Erk, S., Kiefer, M., Grothe, J., Wunderlich, A. P., Spitzer, M., & Walter, H. (2003). Emotional context modulates subsequent memory effect. *NeuroImage, 18,* 439–447.

Evans, M. G. (1985). A Monte Carlo study of the effects of correlated method variance in moderated multiple regression analysis. *Organizational Behavior and Human Decision Processes, 36,* 305–323.

Fedoroff, I. C., Taylor, S., Asmundson, G. J. G., & Koch, W. J. (2000). Cognitive factors in traumatic stress reactions: Predicting PTSD symptoms from anxiety sensitivity and beliefs about harmful events. *Behavioural and Cognitive Psychotherapy, 28,* 5-15.

Feldner, M. T., Zvolensky, M. J., Schmidt, N. B., & Smith, R. C. (2008). A prospective test of anxiety sensitivity as a moderator of the relation between gender and posttraumatic symptom maintenance among high anxiety sensitive young adults. *Depression and Anxiety, 25,* 190–199.

Foa, E. B., & Kozak, M. J. (1986). Emotional processing of fear: Exposure to corrective

information. *Psychological Bulletin, 99,* 20-35.

Forbes, D., Haslam, N., Williams, B. J., & Creamer, M. (2005). Testing the latent structure of posttraumatic stress disorder: A taxometric study of combat veterans. *Journal of Traumatic Stress, 18,* 647-656.

Ginsburg, G. S., & Drake, K. (2002). Anxiety sensitivity and panic attack symptomatology among African American adolescents. *Journal of Anxiety Disorders, 16,* 83–96.

Hayward, C., Killen, J. D., Kraemer, H. C., & Taylor, C. B. (2000). Predictors of panic attacks in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 207–214.

Jarvis, B. G. (2004). DirectRT (Version 2004.1) [Computer Software]. New York, NY: Empirisoft Corporation.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy, 44,* 1–25.

Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64,* 1152–1168.

Kabat-Zinn, J. (1990). *Full catastrophe living: using the wisdom of your body and mind to face stress, pain, and illness.* New York: Delacourt.

Kashdan, T. B., Zvolensky, M. J., & McLeish, A. C. (2008). Anxiety sensitivity and affect regulatory strategies: Individual and interactive risk factors for anxiety-related symptoms. *Journal of Anxiety Disorders, 22,* 429–440.

Kubany, E. S., Haynes, S. N., Leisen, M. B., Owens, J. A., Kaplan, A. S., … & Burns, K. (2000).

Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: The Traumatic Life Events Questionnaire. *Psychological Assessment, 12,* 210-224.

Kumpula, M. J., Orcutt, H. K., Bardeen, J. R., & Varkovitzky, R. L. (2011). Peritraumatic dissociation and experiential avoidance as prospective predictors of posttraumatic stress symptoms. *Journal of Abnormal Psychology, 120,* 617-627.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1999). International affective picture system (IAPS): Technical Manual and Affective Ratings. Gainesville, FL: The Center for Research in Psychophysiology, University of Florida.

Lovibond, S. H., & Lovibond, P. F. (1995a). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney: Psychology Foundation.

Lovibond, P. F., & Lovibond, S. H. (1995b). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy, 33,* 335–343.

Marshall, G. N., Miles, J. N. V., & Stewart, S. H. (2010). Anxiety sensitivity and PTSD symptom severity are reciprocally related: Evidence from a longitudinal study of physical trauma survivors. *Journal of Abnormal Psychology, 119,* 143–150.

Naragon-Gainey, K. (2010). Meta-analysis of the relations of anxiety sensitivity to the depressive and anxiety disorders. *Psychological Bulletin, 136,* 128–150.

Orme, B. (2005). SSI Web v5. Software for web interviewing and conjoint analysis. Sequin, WA: Sawtooth Software, Inc.

Pretz, J. E., Totz, K. S., & Kaufman, S. B. (2010). The effects of mood, cognitive style, and cognitive ability on implicit learning. *Learning and Individual Differences, 3,* 215-219.

Reiss, S., & McNally, R. J. (1985). Expectancymodel of fear. In S. Reiss, & R. R. Bootzin (Eds.), *Theoretical issues in behavior therapy* (pp. 107–121). San Diego, CA: Academic Press.

Ruscio, A. M., Ruscio, J., & Keane, T. M. (2002). The latent structure of posttraumatic stress disorder: A taxometric investigation of reactions to extreme stress. *Journal of Abnormal Psychology, 111,* 290-301.

Schmidt, N. B., Lerew, D. R., & Jackson, R. J. (1997). The role of anxiety sensitivity in the pathogenesis of panic: Prospective evaluation of spontaneous panic attacks during acute stress. *Journal of Abnormal Psychology, 106,* 355–364.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Allyn & Bacon.

Taylor, S., Koch, W. J., & McNally, R. J. (1992). How does anxiety sensitivity vary across anxiety disorders? *Journal of Anxiety Disorders, 6,* 249-259.

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., et al. (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment, 19,* 176–188.

Towbes, L. C., & Cohen, L. C. (1996). Chronic stress in the lives of college students: Scale development and prospective prediction of distress. *Journal of Youth and Adolescence, 25,* 199-217.

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,* 1063–1070.

Weathers, F. W., Huska, J. A., & Keane, T. M. (1991). *PCL-C for DSM-IV*. Boston: National

Center for PTSD -Behavioral Science Division.

Wilkins, K. C., Lang, A. J., Norman, S. B. (2011). Synthesis of the psychometric properties of the PTSD checklist (PCL), military, civilian, and specific versions. Depression and Anxiety, 28, 596-606.

Table 1

Regression Analyses with Negative Affect, Anxiety, and Posttraumatic Stress Symptoms as Outcome Variables

Predictor	T2 PANAS-NA			DASS-Anxiety			PCL-S[1]		
	ΔR^2	Step 1 β	Step 2 β	ΔR^2	Step 1 β	Step 2 β	ΔR^2	Step 1 β	Step 2 β
Step 1	.31***			.39***			.33***		
Sex		--	--		--	--		.17**	.18**
Race/ethnicity		--	--		-.13*	-.14*		--	--
T1 PANAS-NA		.50***	.57***		--	--		--	--
ASI-3		.11	.12		.44***	.39***		.25***	.23***
AAQ-II		-.03	-.03		.26***	.24***		.40***	.38***
Step 2	.03**			.05***			.02*		
AAQ-II x ASI-3			-.18**			.23***			.13*

Note. N = 199. [1]*n* = 176 participants who reported experiencing a potentially traumatic event. T1 = pre-task; T2 = post-task; PANAS-NA = Positive and Negative Affect Schedule-Negative Affect Scale; DASS-Anxiety = Depression, Anxiety, and Stress Scales - Anxiety Scale; PCL = Posttraumatic Stress Disorder Checklist-Stressor Specific Version; Sex (1 = male, 2 = female); Race/ethnicity (1 = participants that did not self-identify as White or Non-Hispanic, 2 = White and Non-Hispanic); ASI-3 = Anxiety Sensitivity Index–3; AAQ-II = Acceptance and Action Questionnaire-II.

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

Table 2

Post-hoc Regression Analyses with Negative Affect, Anxiety, and Posttraumatic Stress Symptoms as Outcome Variables

Predictor	T2 PANAS-NA			DASS-Anxiety			PCL-S[1]		
	ΔR^2	Step 1 β	Step 2 β	ΔR^2	Step 1 β	Step 2 β	ΔR^2	Step 1 β	Step 2 β
Step 1	.31***			.41***			.37***		
Sex		--			--	--		.18**	.20**
Race/ethnicity		--			-.12*	-.14*		--	--
T1 PANAS-NA		.50***	.57***		--	--		--	--
AAQ-II		-.05	-.05		.26***	.23***		.39***	.37***
ASI-3-Cognitive		-.03	.05		.33***	.26***		.33***	.27***
ASI-3-Physical		.03	-.03		.09	.08		-.02	-.02
ASI-3-Social		.15	.13		.12	.15*		.02	.04
Step 2	.03			.04**			.01		
AAQ-II x ASI-3-Cognitive			-.06			.11			.11
AAQ-II x ASI-3-Physical			-.08			.14*			.05
AAQ-II x ASI-3-Social			-.08			-.01			-.04

Note. N = 199. [1]*n* = 176 participants who reported experiencing a potentially traumatic event. T1 = pre-task; T2 = post-task; PANAS-NA = Positive and Negative Affect Schedule-Negative Affect Scale; DASS-Anxiety = Depression, Anxiety, and Stress Scales - Anxiety Scale; PCL = Posttraumatic Stress Disorder Checklist-Stressor Specific Version; Sex (1 = male, 2 = female); Race/ethnicity (1 = participants that did not self-identify as White or Non-Hispanic, 2 = White and Non-Hispanic); ASI-3 = Anxiety Sensitivity Index–3; AAQ-II = Acceptance and Action Questionnaire-II.

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

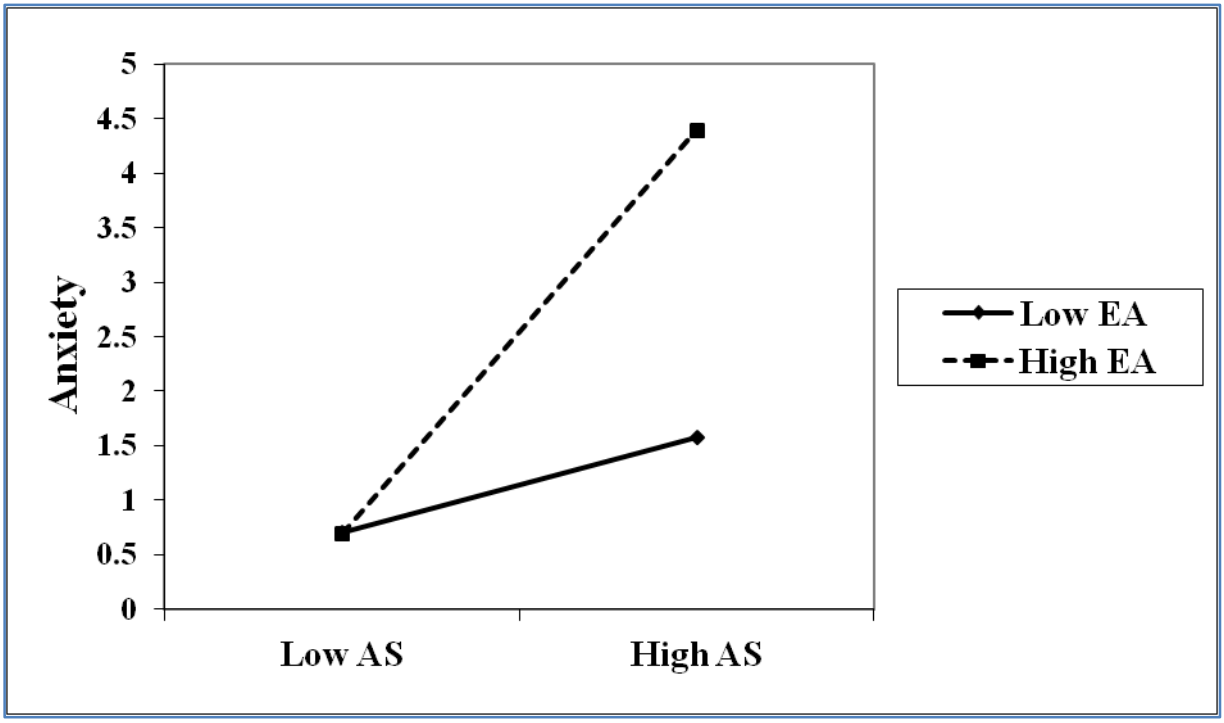

Figure 1. The interaction effect (experiential avoidance [EA] by anxiety Sensitivity[AS]) was a significant predictor of anxiety, $\beta = .23$, $p < .001$. Simple slopes analysis revealed a significant positive association between AS and anxiety for participants with relatively higher, but not lower, EA.

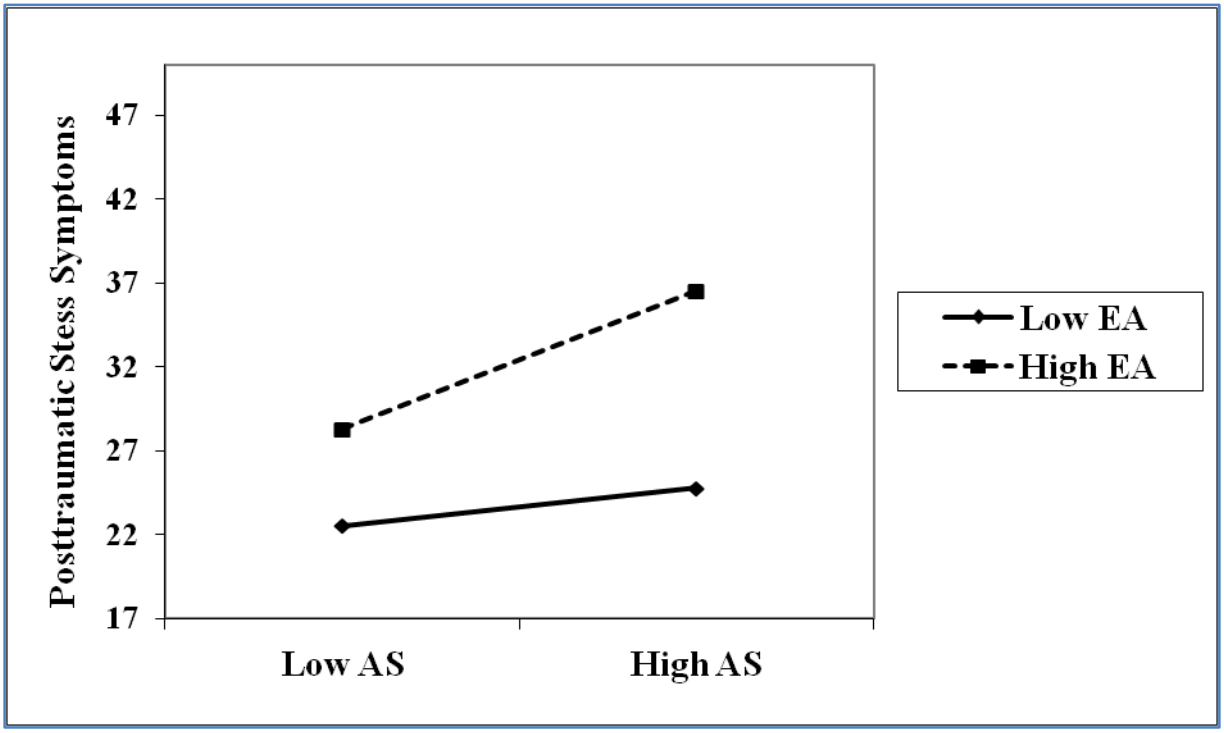

Figure 2. The interaction effect (experiential avoidance [EA] by anxiety Sensitivity[AS]) was a significant predictor of posttraumatic stress (PTS) symptoms, $\beta = .13$, $p < .05$. Simple slopes analysis revealed a significant positive association between AS and PTS symptoms for participants with relatively higher, but not lower, EA.

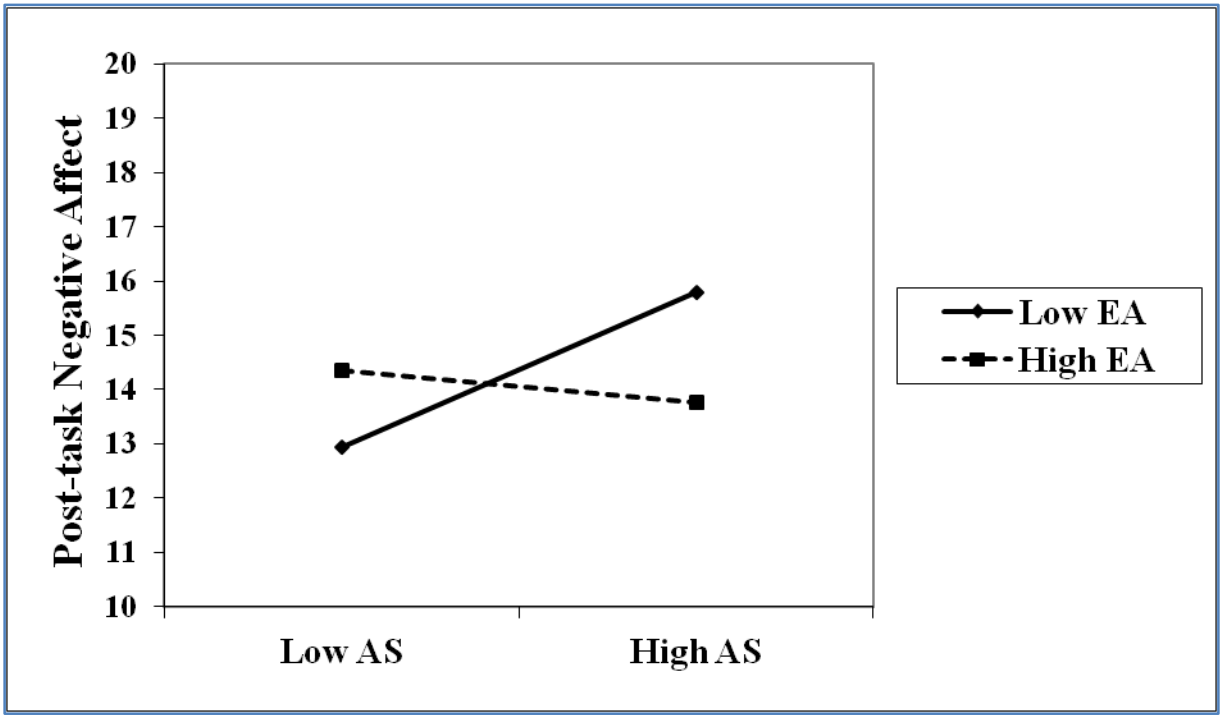

Figure 3. The interaction effect (experiential avoidance [EA] by anxiety Sensitivity [AS]) was a significant predictor of post-task (T2) negative affect (NA), β = -.18, p < .01. Simple slopes analysis revealed a significant positive association between AS and T2 NA for participants with relatively lower, but not higher, EA.