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Emotional Distress Intolerance, Experiential Avoidance, and Anxiety Sensitivity: The Buffering Effect of Attentional Control on Associations with Posttraumatic Stress Symptoms

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Abstract

A number of individual difference factors, including emotional distress intolerance (EDI), experiential avoidance (EA), and anxiety sensitivity (ASI), have been implicated in the development and maintenance of posttraumatic stress (PTS) symptomatology. Attentional control (AC) has been shown to serve as a protective factor against the development of maladaptive psychological outcomes across a number of studies, even among those with outcome-specific vulnerabilities. The purpose of the present study was to examine AC as a moderator of the relations between three constructs pertaining to the way that people relate to their internal experiences (i.e., EDI, EA, AS) and PTS symptoms among a trauma exposed community sample (N = 903). As predicted, AC moderated the relations between each individual difference factor and PTS symptoms, such that as attentional control decreased, the strength of the association between each individual difference factor and PTS symptoms increased. Study results suggest that AC abilities may be one factor that differentiates those who recover from trauma from those who do not, even among those who may be vulnerable for developing PTS symptomatology. Clinical implications and results of a PTS cluster level analysis will be discussed.

Keywords: attentional control, trauma, PTSD, posttraumatic stress, distress tolerance, experiential avoidance, anxiety sensitivity

Emotional Distress Intolerance, Experiential Avoidance, and Anxiety Sensitivity: The Buffering Effect of Attentional Control on Associations with Posttraumatic Stress Symptoms

Although it is more common than not to experience trauma in one's lifetime, only a small fraction of trauma-exposed individuals go on to develop posttraumatic stress disorder (PTSD; Breslau, 2009). However, because PTSD is associated with severe psychological distress, as well as severe impairment in social, occupational, and family functioning (Brady, Killeen, Brewerton, & Lucerini, 2000), substantial effort has been put into identifying risk and resiliency factors that contribute to the pathogenesis of posttraumatic stress (PTS) symptomatology. A number of factors, especially those regarding how people relate to aversive internal experiences (e.g., emotional distress intolerance, experiential avoidance, anxiety sensitivity), have been identified as individual difference factors that contribute to the development and maintenance of PTS. Unfortunately, these factors are often studied in isolation rather than concurrently exploring the conditions under which these factors are more or less likely to relate to PTS. For example, it has been suggested that attentional control (AC; i.e., the strategic control of higher-order executive attention in regulating bottom-up, stimulus driven, emotional responses) may be a transdiagnostic protective factor against the development of maladaptive outcomes, even among those with outcome-specific vulnerabilities (Bardeen, Fergus, & Orcutt, 2015). As such, it may be particularly important to examine the role of AC in the relation between the individual difference factors described above and PTS symptoms.

PTS-related Individual Difference Factors

Among a number of PTS-related individual difference factors, constructs pertaining to the way people relate to their internal experiences (e.g., emotional distress intolerance,

experiential avoidance, anxiety sensitivity), have received considerable attention in the extant PTS literature. Emotional distress intolerance (EDI), defined as the perceived capacity to withstand the distress associated with negative emotions (Simons & Gaher, 2005), has been shown to be associated with PTS symptoms across a number studies (e.g., Fetzner, Peluso, & Asmundson, 2014; Marshall-Berenz, Vujanovic, & Zvolensky, 2011; Vujanovic, Hart, Potter, Berenz, Niles, & Bernstein, 2013). EDI may be especially relevant to PTS, as it has an incremental ability to predict PTS symptoms above frustration intolerance, intolerance of physical discomfort, and after statistically controlling for neuroticism and trauma history (Marshall-Berenz et al., 2011). Of note, although EDI is related to emotion regulation, it is also distinct in that the capacity to withstand negative emotions is fundamentally different from the processes that lead to the alteration of the emotions that one is experiencing (Brandt, Zvolensky, & Bonn-Miller, 2013).

Experiential avoidance (EA), defined as an unwillingness to stay in contact with unwanted inner experiences (e.g., thoughts, emotions, physical sensations), as well as steps taken to alter the frequency or form of unwanted inner experiences (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996), is another individual difference factor that is associated with a wide array of maladaptive outcomes (Chawla & Ostafin, 2007), and PTS more specifically (e.g., Pickett, Bardeen, & Orcutt, 2011; Marx & Sloan, 2005; Plumb, Orsillo, & Luterek, 2004). In fact, high levels of EA measured prior to a traumatic event predict increased PTS symptoms in the acute aftermath of the event and eight months later (Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011), thus providing temporal evidence of EA as a risk factor for the development of PTS.

Similarly, anxiety sensitivity (i.e., [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 identified as a risk factor for the development and maintenance PTS. 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. Interestingly, with the exception of panic disorder, PTS symptomatology is associated with higher levels of AS than all other anxiety disorders (Taylor, Koch, & McNally, 1992). In fact, AS is 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.

As described, EDI, EA, and AS are constructs which pertain to the way in which people relate to their internal experiences. Some evidence suggests that EDI and AS are lower-order dimensions of a higher-order affect sensitivity and tolerance construct (Bernstein, Zvolensky, Vujanovic, & Moos, 2009). However, EDI and AS have a differential pattern of relations with relevant outcomes (i.e., anxious arousal, negative affectivity, anhedonic depressive symptoms), and thus, as suggested by Bernstein et al. (2009), it is important to examine these lower-order constructs independent from one another. EA has been described as a broader construct than EDI (Simons & Gaher, 2005), encapsulating not only emotions and internal sensations, but all aversive internal experience. One major difference between EA and both AS and EDI, is that EA indicates an active role in which one chooses the degree to which s/he is willing to experience aversive internal experiences. Moreover, EA is explicit in its emphasis on avoidance of internal experience, whereas EDI and AS may lead to avoidance behaviors, but such avoidance is not central to conceptualizations of these constructs.

The Role of Attentional Control

Prospective research has shown that relatively higher levels of AC measured prior to a potentially traumatic event predict relatively lower levels of PTS symptoms in the acute aftermath of that event (Bardeen, Fergus et al., 2015). AC may help to reduce the likelihood of developing PTS symptomatology following trauma exposure by allowing one to temporarily disengage and shift attention from trauma-relevant stimuli, thus down-regulating sympathetic nervous system arousal, and negative affective states more broadly, and increasing the likelihood that one will remain in, and habituate to, trauma-relevant contexts. The strategic use of AC in this manner may decrease the likelihood that one will employ less adaptive regulatory strategies that have been shown to maintain PTS symptoms (e.g., substance use, physical avoidance of trauma cues). This conceptualization is consistent with evidence that (a) prolonged attending to threat information sustains negative affective states (Bardeen & Read, 2010; Compton, 2000) and (b) AC can be used to disengage and shift attention from PTS-related threat information (Bardeen & Orcutt, 2011), thus reducing trauma-related distress (Bardeen & Read, 2010).

Of particular importance to the present study, empirical evidence supports the hypothesis that AC may protect those who are vulnerable to maladaptive outcomes from experiencing such outcomes. For example, empirical research has shown that AC reduces the likelihood that (a) those who use worry and thought suppression to cope with emotional distress will experience higher levels of anxiety (Fergus, Bardeen, & Orcutt, 2012), (b) those who perceive themselves as having emotion regulation difficulties will be more likely to abandon goal-directed behavior when experiencing distress (Bardeen, Tull, Dixon-Gordon, Stevens, & Gratz, 2015), (c) those with public-speaking anxiety will exhibit decrements in speech performance (Jones, Fazio, & Vasey, 2012), and (d) those with higher levels of trait anxiety will respond with fear (i.e., panic symptoms) to a CO2 challenge (Richey, Keough, & Schmidt, 2012). Based on these findings, it

seems plausible that those who exhibit individual difference factors which reduce their ability to regulate trauma-related distress may be less likely to develop PTS symptomatology following trauma exposure if they have relatively higher levels of AC.

The Present Study

The purpose of the present study was to examine AC as a moderator of the relations between three factors related to the appraisal of inner experiences (i.e., EDI, EA, AS) and PTS symptoms among a trauma-exposed sample. As described, AC may serve as a transdiagnostic protective factor against the development of maladaptive outcomes, even among those with outcome-specific vulnerabilities (Bardeen, Tull et al., 2015). As such, we predicted that the relationship between the three noted PTS-related individual difference factors (i.e., EDI, EA, AS) and PTS symptoms would become significantly stronger as AC decreased. Evidence of this predicted moderation effect across three PTS-related individual difference factors will provide further evidence of AC as a protective factor against the development of maladaptive psychological outcomes.

To conduct a more fine-grained examination of the hypothesized interactive effects and PTS symptoms, we examined each significant interaction term in relation to the four PTS symptom clusters (i.e., Intrusion, Avoidance, Cognition, Hyperarousal). Given the exploratory nature of these cluster level analyses, our a-priori hypotheses were relatively limited in scope. Because the PTS-Cognition cluster (i.e., negative alterations in cognitions and mood) includes multiple items pertaining to negative emotions/affective states (e.g., pervasive negative emotional states [guilt, shame, fear], dysphoria) we predicted that the EDI by AC interaction term would be significantly more related to this symptom cluster than to the three other clusters. Additionally, we predicted that the EA by AC interaction term would be significantly more

related to the PTS-Avoidance symptom cluster than the three other clusters. This cluster includes the avoidance of both internal experiences (i.e., memories, thoughts, feelings) and external reminders (e.g., people, places, conversations) related to one's traumatic event, and as such, appears to be most relevant to EA. Finally, given that the PTS-Hyperarousal cluster includes items which appear to be particularly relevant to AS (e.g., hypervigilance, exaggerated startle response), we predicted that the AS by AC interaction term would be significantly more related to this symptom cluster than to the three other clusters.

Method

Participants and Procedure

Participant recruitment took place using Amazon Mechanical Turk (MTurk), an online labor market where researchers can recruit general population adults to complete questionnaires in exchange for payment. MTurk samples tend to be more demographically diverse than American undergraduate samples (Buhrmester, Kwang, & Gosling, 2011) and a number of studies support the quality of data collected via MTurk (e.g., Behrend, Sharek, Meade, & Wiebe, 2011; Buhrmester et al., 2011; Paolacci, Chandler, & Ipeirotis, 2010; Shapiro, Chandler, & Mueller, 2013). In addition, participation was restricted to MTurk workers with approval ratings above 95%, a method which has been shown to increase the likelihood that data is of high quality (Peer, Vosgerau, & Acquisti, 2014). This study was approved by the local institutional review board. Recruitment was limited to MTurk users located within the United Stated and over the age of 19. Informed consent and questionnaires were completed using a secure online survey program. Participants could complete the study from any computer with internet access. Participants were paid $1.50 upon study completion, an amount which is consistent with precedence for paying MTurk workers in similar questionnaire studies (Buhrmester et al., 2011).

To be included in the present study, participants had to endorse having experienced at least one potentially traumatic event (i.e., Criterion A of the Diagnostic and Statistical Manual of Mental Disorders [DSM-V]; American Psychiatric Association [APA], 2013). Of the 996 participants who completed a measure assessing lifetime trauma history, 63 (6.5%) participants did not report experiencing a potentially traumatic event traumatic event. The final sample (*N* = 903; 610 women) had an average age of 36.06 years (*SD* = 11.63, *range* = 19 - 65) and 83% self-identified as White, 7% as Black, 5% as Asian, 1% as American Indian or Alaska Native, and 4% endorsed "other". Additionally, 6% of participants reported being of Hispanic/Latino ethnicity.

Measures

Life Events Checklist for DSM-5 (LEC-5). The LEC-5 (Weathers, Litz et al., 2013) is an updated version of the original LEC, a psychometrically-sound self-report measure that assesses lifetime exposure to potentially traumatic events (Blake et al., 1990; Gray, Litz, Hsu, & Lombardo, 2004). Participants are provided with a list of 17 potentially traumatic events (e.g., sexual assault, motor vehicle accident, physical assault). For each event, respondents are asked to indicate whether the event happened to them, they witnessed it, they learned about it, it was part of their job, they are unsure, or the event did not apply to them. From the events reported, participants are asked to identify the one event that currently bothers them the most and reference this event when completing the PTSD Checklist-5-Civilian Version (Weathers, Blake et al., 2013). The frequency of trauma exposure was calculated by summing the LEC-5 events that were reported. This score served as a covariate in hierarchical multiple regression models. Participants who did not endorse experiencing a potentially traumatic event were excluded from the present study.

PTSD Checklist-5-Civilian Version (PCL-5). The PCL-5 (Weathers, Blake et al., 2013) is an updated version of the PCL (Weathers, Huska, & Keane, 1991), a psychometrically-sound self-report measure of PTS symptoms (e.g., Ruggiero, Del Ben, Scotti, & Rabalais, 2003; Weathers, Keane, & Davidson, 2001). Whereas the original PCL was designed to assess the 17 symptoms of PTSD as per the DSM-V, The PCL-5 was adapted to assess the 20 symptoms of PTSD as per the DSM-V (i.e., DSM-5 PTSD Criteria B, C, D, and E). Participants rate (0 = *not at all* to 4 = *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 LEC-5. Higher scores indicate greater PTS symptoms. Consistent with evidence suggesting that PTSD is not a discrete clinical syndrome, but rather a dimensional construct (e.g., Broman-Fulks et al., 2006; Forbes, Haslam, Williams, & Creamer, 2005; Ruscio, Ruscio, & Keane, 2002), PCL-5 items were summed to create an overall total score and symptom cluster scores (i.e., Intrusion, Avoidance, Cognition, Hyperarousal) for use as continuous variables. In the present study, internal consistency for the PCL-5-C total score was adequate ($\alpha = .96$).

Short form of the Attentional Control Scale (ACS-S): The original Attentional Control Scale (ACS: Derryberry & Reed, 2002) is a 20-item self-report measure that assesses one's ability to flexibly control attention. In a recent examination of the psychometric properties of the English version of the ACS, Judah, Grant, Mills, and Lechner (2014) conducted three studies which indicated that the ACS consists of items representing attentional focusing (e.g., "My concentration is good even if there is music in the room around me") and shifting (e.g., "After being interrupted or distracted, I can easily shift my attention back to what I was doing before"). Of the 20 items examined via exploratory factor analysis, only 12 items exhibited factor loadings high enough for retention. ACS-S items are rated on a 4-point scale (1 = *Almost never true of me*

to 4 = *Always true of me*), with higher scores indicating relatively better attentional control. The 12-item ACS-S total score evidenced adequate psychometric properties, including internal reliability and concurrent validity (Judah et al., 2014). In the present sample, Cronbach's coefficient alpha for the 12-item ACS total score was adequate (α = .87, *M* = 33.69, *SD* = 6.71, *Range* = 12-48).

Distress Tolerance Scale (DTS). The DTS (Simons & Gaher, 2005) is a 15-item measure that assesses the degree to which participants believe they can withstand the distress associated with negative emotional states. Specifically, the DTS is comprised of items which assess: one's perceived ability to tolerate negative emotions, the perception of negative emotions as distressing, difficulty concentrating when experiencing emotional distress, and the degree of effort one expends to alleviate emotional distress. DTS items are rated on a 5-point scale (1 = *strongly agree* to 5 = *strongly disagree*) based on the degree to which the participant agrees with each statement. Higher scores typically indicate greater tolerance of negative emotions; however, for the purpose of the present study, the scale was scored so that higher scores indicated emotional distress intolerance. The DTS has demonstrated adequate psychometric properties, including convergent and discriminant validity, internal consistency, and retest reliability over a 6-month period (Simons & Gaher, 2005). In the present study, internal consistency for the DTS total score was adequate (α = .93, *M* = 49.92, *SD* = 13.48, *Range* = 15-75).

Brief Experiential Avoidance Questionnaire. The BEAQ (Gámez et al., 2014) is a one-factor (15 items) short form of the 62-item Multidimensional Experiential Avoidance Questionnaire developed by Gámez et al. (2011). The BEAQ assesses experiential avoidance across six domains (i.e., behavioral avoidance, distress aversion, suppression, procrastination, repression/denial, and distress endurance). BEAQ items are rated on a 6-point scale (1 = *strongly*

disagree to 6 = *strongly agree*) based on the degree to which the participant agrees with each statement. Higher scores indicate greater experiential avoidance. The BEAQ has demonstrated adequate psychometric properties, including internal consistency and convergent validity (Gámez et al., 2014). In the present study, internal consistency for the BEAQ total score was adequate (α = .83, *M* = 47.99, *SD* = 11.54, *Range* = 15-79).

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. Higher scores indicate greater anxiety sensitivity. The ASI-3 has demonstrated adequate psychometric properties, including discriminant and convergent validity, internal consistency, and criterion-related validity (Taylor et al., 2007). In the present study, internal consistency for the ASI-3 total score was adequate (α = .94, *M* = 21.06, *SD* = 15.43, *Range* = 0-72).

Data Analytic Strategy

SPSS version 19 (SPSS IBM, New York) was used to perform statistical analyses. Three hierarchical regressions were conducted to test the hypothesized interactive effects. Consistent with Aiken and West (1991), predictor variables (i.e., TNE, EA, AS) and the moderator variable (i.e., AC) were mean centered and three interaction terms were calculated as the product of the moderator variable and each of the three predictor variables. AC and one of the three other predictor variables was entered into the first step of each model. The corresponding interaction term was entered into the second step of each model. PTS symptoms served as the outcome

variable in each model. Additionally, to provide a more stringent test of the targeted associations, we also statistically controlled for the total number of potentially traumatic events endorsed on the LEC-5 by adding this as a covariate in the first step of all regression models. Simple slopes analysis was used to further examine significant interaction effects (Aiken & West, 1991). Simple slopes analysis consists of constructing two simple regression equations in which the relationship between the independent variable and the dependent variable is tested at both high (+1 *SD*) and low (-1 *SD*) levels of the moderating variable (i.e., AC). This sequence was repeated with each PTS symptom cluster (i.e., Intrusion, Avoidance, Cognition, Hyperarousal) serving as an outcome variable. The False Discovery Rate was calculated to reduce the likelihood of Type I error (FDR; Benjamini & Hochberg, 1995). Results from the FDR analysis indicated that a familywise alpha level of $p < .038$ should be used when completing the regression analyses.

Results

Preliminary Analysis

Descriptive statistics and bivariate correlations for the study variables are presented in Table 1. Of the 17 potentially traumatic events listed on the LEC, participants endorsed experiencing an average of 8.6 events (*SD* = 4.37, *range* 1-17) in one of the following ways: *Happened to me, Witnessed it, Learned about it,* and *Part of my Job.* Participants were asked to identify the one event that caused the most distress (Table 2). Life threatening illness or injury was the most frequently endorsed most distressing event (*n* = 147; 16.3%), followed by transportation accident (*n* = 111; 12.3%) and sexual assault (*n* = 103; 11.4%). Considerable variability was observed in PTS symptoms, with some scores reaching clinical relevance (*Minimum* = 0, *Maximum* = 80, *M* = 18.29, *SD* = 17.44). The lowest scores indicated an absence of PTS symptoms and the highest were indicative of severe PTSD. A cut score of 30 to 35 is

recommended on the DSM-V updated version of the PTSD Checklist for identifying probable cases of PTSD in general population samples (Weathers et al., 2013). Between 18 and 22% of participants in the present study met or exceeded these cut scores.

Predicting Total Posttraumatic Stress Symptoms

Emotional Distress Intolerance as a Predictor. As seen in Table 3, number of traumas, EDI, and AC were significant predictors of total PTS symptoms (*p*s < .001). In the second step of the model, the interaction term significantly predicted total PTS symptoms ($p = .019$). Simple slopes analysis revealed that the significant positive association between EDI and total PTS symptoms was significantly stronger at lower ($\beta = .28$, $p < .001$) versus higher ($\beta = .15$, $p < .001$) levels of attentional control. That is, AC appears to buffer the relationship between EDI and PTS symptoms because as attentional control abilities decrease, the strength of the association between difficulty tolerating negative emotions and PTS symptoms increases (see Figure 1).

Experiential Avoidance as a Predictor. Number of traumas, EA, and AC were significant predictors of total PTS symptoms (*p*s < .001; see Table 3). When controlling for number of traumatic events, the interaction term did not significantly predict total PTS symptoms ($p = .047$). The nonsignificant trend was examined via simple slopes analysis. Simple slopes analysis revealed that the relation between EA and total PTS symptoms was stronger at lower ($\beta = .35$, $p < .001$) versus higher ($\beta = .24$, $p < .001$) levels of attentional control. Although the interaction term did not reach our a-priori alpha level (FDR value of $p < .038$), it is notable that the pattern of effects is consistent with the pattern observed in the first model.

Anxiety Sensitivity as a Predictor. Number of traumas, AS, and AC were significant predictors of total PTS symptoms (*p*s < .01; see Table 3). When controlling for number of traumatic events, the interaction term did not significantly predicted total PTS symptoms ($p =$

.056). The nonsignificant trend was examined via simple slopes analysis. Simple slopes analysis revealed that the relation between EA and total PTS symptoms was stronger at lower (β = .50, p < .001) versus higher (β = .40, p < .001) levels of attentional control. Again, although the interaction term did not reach our a-priori alpha level (FDR value of p <.038), it is notable that the pattern of effects is consistent with the pattern observed in the first model.

Predicting Posttraumatic Stress Symptom Clusters

Emotional Distress Intolerance as a Predictor. Number of traumatic events, EDI, and AC were significant predictors of all PTS symptom clusters (ps < .01; see Table 3). As can be seen in Table 1, the interaction term significantly predicted two of the PTS symptom clusters (i.e., Cognition and Hyperarousal, ps < .05). For both Cognition and Hyperarousal, simple slopes analysis revealed that the significant positive association between EDI and each of these PTS symptom clusters was significantly stronger at lower (β = .29, p < .001; β = .26, p < .001, respectively) versus higher (β = .16, p < .001; β = .09, p = .028, respectively) levels of attentional control. The pattern of these interactive effects is consistent with those observed in relation to total PTS symptoms.

Experiential Avoidance as a Predictor. Number of traumatic events and EA were significant predictors of all PTS symptom clusters (ps < .001; see Table 3). AC was a significant predictor of all PTS symptom clusters (ps < .001), except for Avoidance (*ns*). As can be seen in Table 3, the interaction term significantly predicted Hyperarousal (p < .001). Simple slopes analysis revealed that the significant positive association between EA and the hyperarousal symptom cluster was significantly stronger at lower (β = .35, p < .001) versus higher (β = .18, p < .001) levels of attentional control. The pattern of this interactive effect is consistent with those observed in relation to total PTS symptoms.

Anxiety Sensitivity as a Predictor. Number of traumatic events and AS were significant predictors of all PTS symptom clusters (*p*s < .001; see Table 3). AC was a significant predictor of Cognition and Hyperarousal (*p*s < .001), but not Intrusion or Avoidance (*ns*). As can be seen in Table 3, the interaction term significantly predicted Hyperarousal ($p < .01$). Simple slopes analysis revealed that the significant positive association between AS and the hyperarousal symptom cluster was significantly stronger at lower ($\beta = .48$, $p < .001$) versus higher ($\beta = .35$, $p < .001$) levels of attentional control. The pattern of these interactive effects is consistent with those described above.

Discussion

The purpose of the present study was to examine AC as a moderator of the relations between three PTS-related individual difference factors (i.e., EDI, EA, AS) and PTS symptoms. After controlling for the variance explained in total PTS symptoms by number of potentially traumatic events and reducing our alpha level to reduce the likelihood of Type I error, AC moderated the relation between EDI, but not AS or EA, and total PTS symptoms. The pattern of relations indicated that as attentional control decreased, the strength of the association between each EDI and PTS symptoms increased. This result is consistent with evidence from a number of studies which suggest that AC may protect those who are vulnerable to maladaptive psychological outcomes from experiencing such outcomes (Bardeen, Tull et al., 2015; Fergus et al., 2012; Jones et al., 2012; Richey et al., 2012). Of note, although the EA by AC and AS by AC interaction terms did not predict total PTS symptoms when the alpha level was reduced to .038, the pattern of effects for these marginally significant effects (*ps* = .047 and .056, respectively) is consistent with the pattern observed for the EDI by AC interaction. The PTS-related individual difference factors in the present study are related in that they share an overarching theme of

difficulties in relating to uncomfortable internal experiences. As such, and in combination with evidence that AC can be used to regulate trauma-related distress (Bardeen, Fergus et al., 2015; Bardeen & Read, 2010), these findings may be best understood by considering the self-regulatory function of AC.

In Gross's (1998) process model of emotion regulation, the ability to flexibly control attention is essential for maintaining psychological well-being. Specifically, effortful attention deployment is considered the gatekeeper of emotion regulation, directly impacting subsequent stages of emotion regulation. As such, the ability to temporarily disengage and shift attention from trauma-relevant stimuli in the acute aftermath of traumatic event may help to down-regulate sympathetic nervous system arousal, and negative affective states more broadly, thus increasing the likelihood that one will remain in, and habituate to, trauma-relevant contexts rather than employing less adaptive regulatory strategies that have been shown to maintain PTS (e.g., substance use, physical avoidance of trauma cues). Although the intensity of the negative internal experience is reduced, it is still experienced. Thus, the combination of reduced arousal (within a range which increases the likelihood of emotional processing) and exposure to threat-stimuli may reduce the likelihood of fear acquisition. Of note, in the context of the present study, we apply Gross's model broadly to uncomfortable internal experiences rather than being specific to emotions.

In regard to the symptom cluster analyses, our a-priori hypotheses were partially supported. Although the EDI by AC interaction term was not significantly more related to the Cognition cluster than to other clusters, it was the only interaction term that significantly predicted this symptom cluster. This finding suggests that AC can be used to buffer the effect of difficulty tolerating negative emotions on PTS symptoms pertaining to negative emotions

/affective states. Interestingly, all interaction effects emerged as relevant to the Hyperarousal cluster, but not the Intrusion and Avoidance clusters. This finding may help to explain emerging evidence that supports AC as a transdiagnostic protective factor for a number of psychological problems. That is, the Hyperarousal symptom cluster includes multiple items that pertain to a wide array of pathological presentations (e.g., hypervigilance, exaggerated startle response, concentration difficulties, sleep difficulties).

When examined prospectively, hyperarousal, in comparison to the other symptom clusters, has the greatest impact on recovering from PTSD (Schell, Marshall, & Jaycox, 2004). Moreover, individuals who identify hyperarousal as being most bothersome, compared to individuals who identify one of the other symptom clusters as being most bothersome, improve significantly less and exhibit a more chronic course of symptomatology (Schell et al., 2004). Taken together, empirical research suggests that hyperarousal symptoms may determine whether posttraumatic reactions develop into clinically significant pathology, as well as determining the course of symptom expression once clinically significant symptoms are present. The present results suggest that the AC buffers the effect of three PTS-related individual difference factors (EDI, EA, AS) on Hyperarousal symptoms, which may reduce the likelihood of developing clinically significant PTS symptoms in the aftermath of traumatic event. AC abilities may be one factor that differentiates those who recover from trauma exposure from those who do not.

Study limitations must be acknowledged. In particular, relations among the study variables might have been inflated as a result of our monomethod assessment. Moreover, although evidence suggests a dimensional, rather than categorical (presence versus absence), conceptualization of PTS (e.g., Broman-Fulks et al., 2006; Forbes et al., 2005; Ruscio et al., 2002), and there was considerable variability in PTS symptoms with a substantial proportion

reporting appreciable posttraumatic stress symptomatology, replication of the results from the present study in a clinical population, with a thorough assessment of diagnostic history, as well as more information regarding trauma exposure (e.g., time since trauma), will be important in ensuring generalizability of findings to those diagnosed with PTSD. Although prior studies have examined trauma and PTS using internet samples (e.g., Fetzner et al., 2014), it is important to consider the quality of data obtained via remote collection. An accumulating body of evidence supports MTurk as a viable method for data collection (Buhrmester et al., 2011; Paolacci et al., 2010; Shapiro et al., 2013). Importantly, methods shown to increase the quality of remotely collected data were used in the present study (e.g., approval ratings above 95%; Peer et al., 2014). Although MTurk samples are consistently more diverse than American undergraduate samples (Buhrmester et al., 2011; Paolacci et al., 2010), MTurk samples do not necessarily represent the general population, and thus, replication of results of the present study in general population sample would improve generalizability. Additionally, given that our sample was largely White (83%), it will be important to ensure that study results replicate in more demographically diverse samples, including not only ethnic and racial diversity, but also diversity regarding other potentially important demographic variables (e.g., education, marital status, income). Finally, our cross-sectional study design precludes causal inferences regarding the relations among the variables of interest. The use of longitudinal and experimental research designs will be important in future research to better understand the temporal relations among study variables.

Despite these limitations, the present study suggests that AC abilities reduce the impact of PTS-related individual difference factors on PTS symptoms following trauma exposure. The present study also supports a growing body of evidence which suggests that AC may protect

those who are vulnerable to maladaptive psychological outcomes from experiencing such outcomes. Importantly, AC abilities can be significantly improved through clinical intervention (Jha, Krompinger, & Baime, 2007) and mindfulness training techniques (Bherer et al., 2008; Zylowska et al., 2008). In addition, preliminary evidence has shown attention training programs to be effective in treating multiple forms of anxiety pathology (for a review, see Beard, Sawyer, & Hofmann, 2012). Preliminary evidence suggests that the beneficial effects of attention modification programs for treating anxiety are the result of enhancing one's ability to disengage attention from threat stimuli (Heeren, Lievens, & Philippot, 2011). Thus, a number of treatment techniques that target AC may be beneficial in treating PTS symptomatology. Moreover, these treatment techniques may be more palatable to clients than gold standard exposure-based treatments, which have been shown to have relatively high drop-out rates.

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Table 1

Correlations

Variables	1	2	3	4	5	6	7	8	9	10
1. Traumas	--									
2. PCL Total Score	.26***	--								
3. PCL Intrusion	.25***	.89***	--							
4. PCL Avoidance	.21***	.77***	.68***	--						
5. PCL Cognition	.22***	.94***	.77***	.66***	--					
6. PCL Arousal	.26***	.91***	.74***	.60***	.80***	--				
7. AC	-.03	-.28***	-.21***	-.17***	-.28***	-.29***	--			
8. EDI	-.07*	-.32***	-.24***	-.24***	-.33***	-.29***	.39***	--		
9. EA	.03	.38***	.28***	.29***	.38***	.36***	-.44***	-.44***	--	
10. AS	.18***	.54***	.46***	.41***	.50***	.52***	-.43***	-.41***	.53***	--

Note. $N = 903$. Traumas = number of potentially traumatic events endorsed on the Life Events Checklist – 5; PCL = Posttraumatic Stress Disorder Checklist-Civilian Version 5; AC = attentional control; EDI = emotional distress intolerance; EA = experiential avoidance; AS = anxiety sensitivity.

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

Table 2

Frequency of Most Distressing Events

Traumatic Event	Frequency of Endorsement
Life-threatening illness or injury	147 (16.3%)
Transportation accident	111 (12.3%)
Sexual assault	103 (11.4%)
Other very stressful event	86 (9.5%)
Physical assault	71 (7.9%)
Sudden accidental death	67 (7.4%)
Natural disaster	67 (7.4%)
Sudden violent death	55 (6.1%)
Other unwanted sexual experience	50 (5.5%)
Severe human suffering	44 (4.9%)
Serious accident	29 (3.2%)
Fire or explosion	28 (3.1%)
Assault with a weapon	17 (1.9%)
Combat or war-zone exposure	13 (1.4%)
Captivity	6 (0.7%)
Exposure to toxin	5 (0.6%)
Serious harm or death you caused	4 (0.4%)

Note. N = 903. Participant endorsement of the most distressing potentially traumatic event that they have experienced in their lifetime.

Table 3

Regression Analyses with Posttraumatic Stress Symptoms as the Outcome Variable and Tolerance of Negative Emotions as the Predictor Variable

Predictor	PCL Total Score			PCL Intrusion			PCL Avoidance			PCL Cognition			PCL Arousal		
	ΔR^2	Step 1 β	Step 2 β	ΔR^2	Step 1 β	Step 2 β	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	.15***			.14***			.10***			.19***			.20***		
EDI		.21***	.21***		.16***	.16***		.19***	.19***		.23***	.23***		.18***	.18***
AC		-.23***	-.23***		-.17***	-.17***		-.10**	-.10**		-.22***	-.22***		-.26***	-.25***
Traumas		.24***	.23***		.23***	.23***		.19***	.19***		.19***	.19***		.23***	.23***
Step 2	.01*			.00			.00			.01*			.01**		
EDIxAC			-.07*			-.04			-.03			-.07*			-.09**

Regression Analyses with Posttraumatic Stress Symptoms as the Outcome Variable and Experiential Avoidance as the Predictor Variable

	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β
Step 1	.23***			.15***			.13***			.21***			.22***		
EA		.29***	.29***		.21***	.21***		.26***	.26***		.30***	.30***		.26***	.26***
AC		-.18***	-.17***		-.14***	-.14***		-.06	-.05		-.17***	-.17***		-.21***	-.20***
Traumas		.24***	.24***		.24***	.24***		.20***	.19***		.20***	.20***		.24***	.23***
Step 2	.00^			.00			.01			.00			.01***		
EAxAC			-.07^			-.01			-.05			-.05			-.09**

Regression Analyses with Posttraumatic Stress Symptoms as the Outcome Variable and Anxiety Sensitivity as the Predictor Variable

	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β	ΔR2	Step 1 β	Step 2 β
Step 1	.33***			.24***			.19***			.26***			.32***		
AS		.46***	.45***		.40***	.40***		.39***	.39***		.45***	.41***		.43***	.42***
AC		-.10**	-.10**		-.05	-.05		.00	.00		-.12***	-.12***		-.13***	-.12***
Traumas		.18***	.17***		.18***	.18***		.14***	.14***		.14***	.14***		.17***	.17***
Step 2	.00			.00			.00			.01*			.01**		
ASxAC			-.05			-.04			-.01			-.05			-.07**

Note. N = 903. PCL = Posttraumatic Stress Disorder Checklist-Civilian Version 5; EDI = emotional distress intolerance; AC = attentional control; EA = experiential avoidance; AS = anxiety sensitivity; Traumas = number of potentially traumatic events endorsed on the Life Events Checklist - 5.

^p < .05. *p < .038. **p < .01. ***p < .001

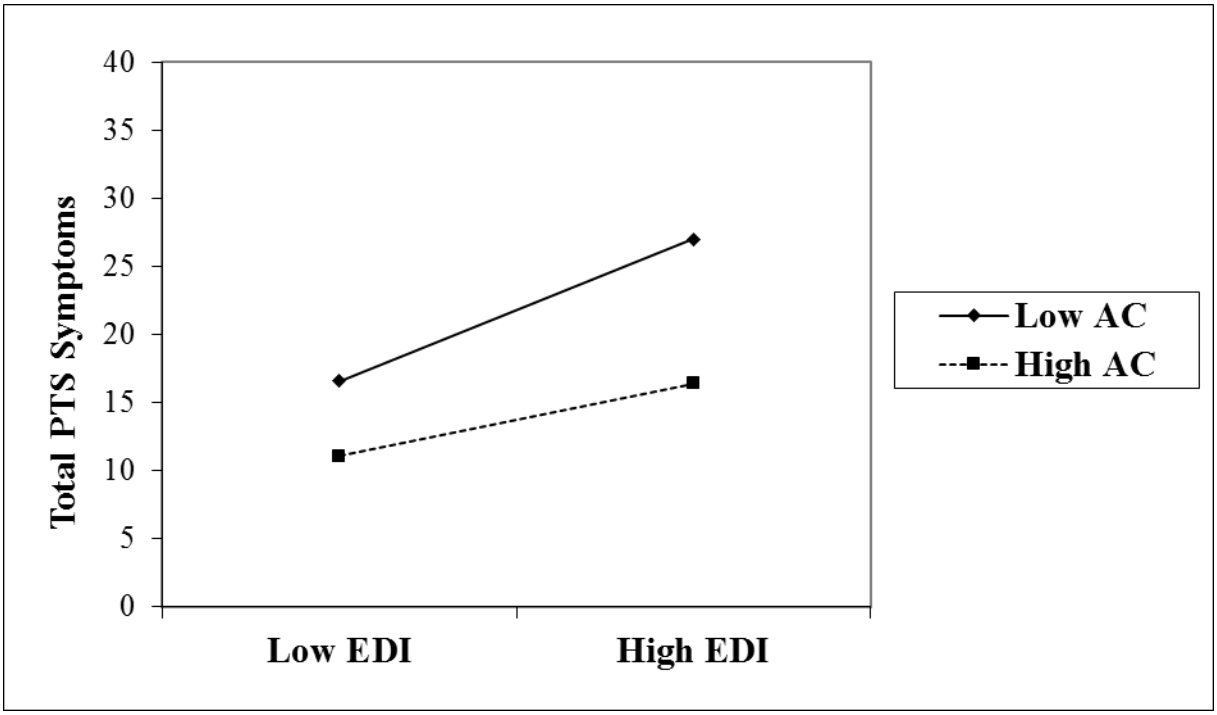

*Figure 1.*The interaction effect (emotional distress intolerance [EDI] by attentional control [AC]) predicting total posttraumatic stress (PTS) symptoms.