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Anxiety Symptomatology: The Association with Distress Tolerance and Anxiety Sensitivity

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Abstract

Research focused on psychological risk factors for anxiety psychopathology has led to better conceptualization of these conditions as well as pointed toward preventative interventions. Anxiety sensitivity (AS) has been well-established as an anxiety risk factor, while distress tolerance (DT) is a related construct that has received little empirical exploration within the anxiety psychopathology literature. The current investigation sought to extend the existing literature by examining both DT and the relationship between DT and AS across a number of anxiety symptom dimensions, including panic, generalized anxiety, social anxiety, and obsessive-compulsive anxiety. Participants ($N = 418$) completed a number of measures that assessed DT, AS, anxiety symptomatology, and negative affect. Findings indicated that DT was uniquely associated with panic, obsessive compulsive, general worry, and social anxiety symptoms, but that DT and AS were not synergistically associated with each of these symptom dimensions. These findings indicate that an inability to tolerate emotional distress is associated with an increased vulnerability to experience certain anxiety symptoms.

Anxiety disorders represent the most prevalent form of psychopathology in the United States, and result in substantial disability and economic burden (Greenberg et al., 1999; Kessler et al., 2005). They are highly comorbid with other Axis I diagnoses and often follow a chronic and recurrent course if left untreated (American Psychiatric Association, 2000).

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While there are many well-established psychological and pharmacological treatments for anxiety disorders (Chambless & Ollendick, 2001; Mitte, 2005), many individuals receive treatment after years of impairment or receive no treatment at all (Wang, Berglund, et al., 2005; Wang, Lane, et al., 2005). Additionally, while these treatments are effective, there is a sizable portion of individuals that do not show a favorable response (Slaap & den Boer, 2001). Recent anxiety research has seen a push for the identification and investigation of factors that are associated with and may place an individual at increased risk for problems with anxiety in order to better conceptualize these disorders as well as potentially prevent their development and bolster treatment success (Zvolensky, Schmidt, Bernstein, & Keough, 2006).

Anxiety sensitivity (AS) is one construct that has received substantial investigation over the past two decades and has been well-established as a risk factor in the anxiety literature (Zvolensky et al., 2006). Those with elevated levels of AS have an exaggerated or amplified fear of the physical, social, and cognitive consequences of anxiety-related sensations. Elevations in AS are seen among individuals with preexisting anxiety disorders including obsessive-compulsive disorder, panic disorder, generalized anxiety disorder, and social anxiety disorder (Taylor, Koch, & McNally, 1992). Among nonclinical samples, prospective studies indicate that AS predicts future occurrences of anxiety symptoms, spontaneous panic attacks, and anxiety disorders, with some specificity for panic disorder (Hayward, Killen, Kraemer, & Taylor, 2000; Maller & Reiss, 1992; Schmidt, Lerew, & Jackson, 1997, 1999; Schmidt, Zvolensky, & Maner, 2006; Weems, Silverman, & La Greca, 2000). There is also evidence that AS acts as a maintenance factor in anxiety (Ehlers, 1995). Taken together, these findings indicate that AS conveys a significant risk for the development and maintenance of anxiety.

While AS has been a major focus of risk factor research in anxiety psychopathology, distress tolerance (DT) is a related construct that has been relatively unexplored within the anxiety literature. Simons and Gaher (2005) suggested DT should be broadly defined as one's ability to experience and endure negative emotional states. Thus, DT is believed to affect the evaluation and consequences of experiencing negative emotional states such that those low in DT are more likely to be overly reactive to stress and distress. These individuals are also believed to exhibit poor coping abilities with respect to distress, and, as a result, attempt to avoid negative emotions by employing strategies aimed at quickly alleviating negative emotional states. The majority of the empirical investigations examining DT have assessed its ties with dysregulated behavior. Within this context, DT has been associated with self-injurious behavior, substance use, gambling, bulimia, borderline personality disorder, and antisocial personality disorder (Anestis, Selby, Fink, & Joiner, 2007; Buckner, Keough, & Schmidt, 2007; Daughters, et al., 2005; Daughters, Sargeant, Bornovalova, Gratz, & Lejuez, 2008; Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006; Nock & Mendes, 2008). These associations support the contention that individuals low in DT engage in dysregulated behavior in a misguided attempt to cope with their negative emotions.

While DT's link to dysregulated behavior is becoming established, research examining the association between DT and anxiety and its disorders is still in a nascent stage. As suggested, DT diminishes an individual's capacity to withstand and manage provocative and

emotional experiences. Thus, it is presumed that individuals low in DT are more susceptible to anxiety-related problems due to their perception that anxiety symptoms are overwhelming and uncontrollable. This inability to withstand negative affect is likely to intensify an individual's motivation to utilize coping strategies such as avoidance, safety aids, or ritualizing behaviors that have the unintended consequence of potentiating and maintaining anxiety problems. Despite the clear theoretical association between DT and anxiety, few investigations have examined this link. Daughters and colleagues (2009) found that low DT was associated with internalizing symptoms among female youth. Telch et al. (2003) reported that among patients with panic disorder, the addition of an agoraphobia diagnosis was associated with low DT. Among daily smokers, Marshall and colleagues (2008) reported that DT was associated with a history of panic. Additionally, several reports have suggested an inverse relationship between DT and AS such that individuals low in DT report elevated levels of AS (Anestis et al., 2007; Bernstein, Zvolensky, Vujanovic, & Moos, in press; Timpano, Buckner, Richey, Murphy, & Schmidt, 2009; Zvolensky et al., 2009). Despite the conceptual similarities between AS and DT, their latent structure indicates that they are unique constructs (Bernstein, et al., in press). Building on the reported association between AS and DT, Timpano and colleagues (2009) found that DT and AS interacted to predict hoarding behaviors. Specifically, they reported that individuals low in DT and high in AS were at greatest risk for experiencing hoarding symptoms. Taken together, these findings are promising and suggest that DT may play a role in the development and maintenance of anxiety; however, they also highlight the need for greater research focus in this area to more clearly delineate the role DT plays in anxiety and its correlates.

Investigations examining DT and anxiety have yet to evaluate the relationship between DT and a wide range of anxiety symptom dimensions. Additionally, theoretical and research findings indicate a connection between DT and AS, yet how this connection relates to anxiety symptoms has received limited exploration. Thus, the current investigation sought to extend the existing literature by more broadly examining both DT and AS across a number of anxiety symptom dimensions, including panic, generalized anxiety, social anxiety, and obsessive-compulsive anxiety. These analyses are largely exploratory in nature; however, concordant with previous investigations, we anticipated individuals low in DT would experience a greater level of anxiety symptoms than those high in DT. It was further expected that AS and DT would independently be associated with anxiety symptoms but may interact, as was found in the investigation by Timpano and colleagues (2009), such that individuals who are elevated on both constructs would experience the greatest elevation of anxiety symptoms.

Methods

Participants

The study sample was composed of 418 individuals from a large public university in the southeastern United States. Study participants were primarily female (71%) with an average age of 18.8 ($SD = 2.39$). The racial and ethnic makeup of the sample is as follows: Caucasian (69.4%), African American (11.5%), Hispanic/Latino (12.7%), Asian (4.5%), and other (1.9%).

Procedure

Participants registered for a testing session through the psychology department's secure and confidential electronic research sign-up database. After participants read and signed the consent form, they completed the self-report measures in a group setting of approximately 10 to 30 individuals. Study procedures were approved by the Institutional Review Board at Florida State University prior to the commencement of data collection. In exchange for their participation, participants received class research credit.

Measures

Anxiety Sensitivity Index (ASI)—The ASI is a self-report measure composed of 16 items that assess individuals' fear of consequences resulting from anxiety-related bodily sensations, anxiety sensitivity (Reiss, Peterson, Gursky, & McNally, 1986). Items are rated on a 5-point Likert scale from *very little* (0) to *very much* (4), with the summation of all items resulting in the final score. This measure has established good internal consistency (Cronbach's $\alpha = .82 - .91$; Peterson & Reiss, 1993). In the current sample, the average inter-item correlation was .35 and the Cronbach's alpha coefficient was .90.

Beck Anxiety Inventory (BAI)—The BAI is a self-report measure composed of 21 items that assess general anxiety symptomatology (Beck, Epstein, Brown, & Steer, 1988). Individuals rate the extent to which they have been bothered by the 21 physical and cognitive anxiety symptoms over the past week. The BAI has been widely employed in research settings and been shown to be both valid and reliable in clinical (coefficient alpha = .92) and nonclinical samples (coefficient alpha = .91; Beck, et al., 1988; Borden, Peterson, & Jackson, 1991).

Beck Depression Inventory (BDI-II)—The BDI-II is a self-report measure composed of 21 items that assess depressive symptomatology (Beck, Steer, & Brown, 1996). This measure has been shown to be valid and reliable among college and clinical samples (Dozois, Dobson, & Ahnberg, 1998; Steer & Clark, 1997) and has demonstrated discriminative validity (Riskind, Beck, Brown, & Steer, 1987).

Distress Tolerance Scale (DTS)—The DTS is a self-report measure composed of 14 items that assess one's ability to tolerate emotional distress (Simons & Gaher, 2005). Items are rated on a 5-point Likert scale from *strongly agree* (1) to *strongly disagree* (5). Higher scores indicate a greater ability to withstand emotional distress. This measure has shown good internal consistency as well as convergent and divergent validity (Simons & Gaher, 2005). In the current sample, the average inter-item correlation was .48 and the Cronbach's alpha coefficient was .93.

Obsessive Compulsive Inventory–Revised (OCIR)—The OCIR is a self-report measure composed of 18 items that assess common OCD symptoms (Foa et al., 2002). Individuals report the extent to which they have been bothered by each symptom using a 5-point Likert scale from *not at all* (0) to *very much* (4). The OCIR has been found to demonstrate good test-retest reliability, good internal consistency, and to differentiate between patients with and without OCD (Foa et al.).

Panic Disorder Self-Report (PDSR)—The PDSR is a self-report measure composed of 24 items that assess recent panic disorder symptomatology (Newman, Holmes, Zuellig, Kachin, & Behar, 2006). Individuals indicate whether or not they have had a panic attack in the past 6 months and whether or not it came out of the blue. If they answer in the affirmative to both of these questions they go on to answer questions regarding the *DSM-IV* panic disorder criteria including symptoms, behavior change, and worry about the attacks. A composite score is attained by totaling the measure's items. This measure has demonstrated good convergent and divergent validity as well as test-retest reliability (Newman et al., 2006).

Penn State Worry Questionnaire (PSWQ)—The PSWQ is a self-report measure composed of 16 items that assess an individual's general tendency to engage in excessive worry (Meyer, Miller, Metzger, & Borkovec, 1990). Individuals indicate the extent to which each statement is applicable to them on a five-point Likert scale from not at all (1) to very (5). The PSWQ has been reported to have high internal consistency and test-retest reliability (Davey, 1993; Meyer et al., 1990; Molina & Borkovec, 1994; Stanley, Novy, Bourland, Beck, & Averill, 2001).

Social Interaction Anxiety Scale (SIAS)—The SIAS is self-report measure composed of 20 items that assess fears related to social interactions (Mattick & Clarke, 1998). The items are rated on a 5-point Likert scale that indicates the extent to which it is representative of the individual. The scale has been found to demonstrate good internal consistency in clinical and nonclinical samples (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992; Mattick & Clarke, 1998; Osman, Gutierrez, Barrios, Kopper, & Chiros, 1998).

Statistical Analyses

All analyses were conducted using PASW 18. To examine whether DT was associated with anxiety symptomatology above and beyond the effects of anxiety sensitivity, depression, and general anxiety, we constructed separate hierarchical linear regressions for each of the anxiety symptom measures (i.e., OCIR, PDSR, PSWQ, and SIAS). The ASI, BAI, and BDI-II were entered into the first step of the regressions with DTS entered at the second step. The R^2 change was assessed at the second step to determine DT's effect size.

To test whether the ASI and DTS act synergistically in their association with the symptom measures, four separate sets of moderational analyses were conducted. An interaction term was created by multiplying the centered total scores for the ASI and DTS. Each anxiety symptom measure served as the dependent variable in a separate linear multiple regression while the centered DTS and ASI scores and their interaction term were entered simultaneously as independent variables. The ASI and DTS scores were centered in order to reduce multicollinearity (Holmbeck, 2002). Simultaneously entering the DTS and ASI main effects and the interaction term in the regression equation ensured that observed interactions were not attributable to the main effects of these variables (Cohen & Cohen, 1983).

Results

Table 1 presents zero-order correlations between study variables as well as means and standard deviations. Consistent with expectation and prior research, the DTS was significantly and negatively associated with the OCIR, PDSR, PSWQ, and SIAS. The zero-order level of association suggested DT was moderately to substantially associated with these various anxiety symptom domains. The robustness of the relationship between the DTS and the anxiety symptom measures was further assessed by constructing separate hierarchical regression equations for each of the anxiety symptom measures. As can be seen in Table 2, despite controlling for the ASI, BAI, and BDI-II, DTS remained significantly associated with the OCIR, PDSR, PSWQ, and SIAS. The effect size of DT's unique contribution to these anxiety symptom measures was strongest for the PSWQ, followed by the SIAS and then PDSR and OCIR. These results suggest that the association between the DTS and these measures of anxiety symptomatology are robust and independent of their shared association with anxiety sensitivity, depression, and general anxiety.

Additionally, we sought to examine whether DT and AS acted synergistically in their association with anxiety symptoms. To examine moderator effects, we assessed the interaction between the DTS and ASI. Separate linear regression equations were constructed, as described above, for each anxiety measure. Results indicated that the interaction term was not significantly associated with the OCIR ($\beta = -.05, p = .22$), PDSR ($\beta = -.07, p = .17$), PSWQ ($\beta = .01, p = .78$) or SIAS ($\beta = .05, p = .25$) above and beyond the main effects of the DTS and ASI. These results indicate that DT and AS were not synergistically associated with panic, obsessive compulsive, general worry, and social anxiety symptoms.

Discussion

The primary aim of this study was to examine the relationship between DT and anxiety symptomatology. Though research has begun to explore the connection between DT and the important anxiety risk factor AS, to our knowledge this is the first study to examine DT and the association between DT and AS across a range of anxiety symptom dimensions. Consistent with expectation, DT was negatively associated with each of the anxiety symptom measures (panic, social anxiety, obsessive compulsive, and anxious worry). Findings further indicated that DT was independently associated with these anxiety disorder symptom measures beyond their shared relationship with depression and anxiety. These results indicate that DT is associated with a broad range of anxiety symptomatology and that this association is not accounted for by the effects of general negative affect. These findings support our conjecture that DT is associated with and may therefore play an important role in anxiety symptomatology.

Consistent with past work (Anestis et al., 2007; Bernstein et al., in press; Timpano et al., 2009), DT was related to AS such that as an individual's tolerance for distress decreases their fear of anxiety related symptoms increases. Because of conceptual similarities between DT and AS it was important to determine whether these are distinct constructs that are uniquely associated with anxiety symptomatology. The regression equations that

simultaneously assessed the effects of AS and DT supported our hypothesis that these two constructs are uniquely associated with various anxiety symptoms. We failed to find support for the idea that DT and AS may be synergistically related to the symptom measures. Despite the theoretical similarities between AS and DT (Schmidt, Richey, Cromer, & Buckner, 2007), the current investigation adds to the emerging literature indicating that these two constructs should be viewed as related but distinct constructs.

DT is also conceptually similar to other anxiety-related constructs such as frustration discomfort (Harrington, 2005, 2006). Rational-emotive therapy posits that frustration intolerance, an inability to accept the divergence between our expectations and reality, is one of two categories of irrational beliefs. Emotional intolerance, a subscale of frustration discomfort that reflects the belief that emotions and cognitions associated with emotional distress are intolerable, is similar to Simons and Gaher's (2005) definition of DT (Harrington, 2005, 2006). Similar to DT, initial results indicate that emotional intolerance is uniquely associated with anxiety, controlling for negative affect (Harrington, 2006). Future investigation regarding the potential overlap between these two constructs is warranted in order to more clearly elucidate DT and its relationship to other psychopathological constructs.

Like any study, the present investigation has a number of limitations that deserve comment and suggest future work in this area. First, the present study examined a nonclinical sample. While further research is warranted to examine whether the current findings hold in clinical samples, it should be noted that the current sample range extended well into the clinical range on each of the measures (Foa et al., 2002; Fresco, Mennin, Heimberg, & Turk, 2003; Newman et al., 2006; Peters, 2000). Second, the study was conducted utilizing a relatively homogeneous sample with participants relatively similar in terms of their education, ethnicity, and socioeconomic status, and men were underrepresented. This homogeneity may affect the relationships found in the current study and future analyses should focus on more diverse populations. Next, DT uniquely accounted for 1% to 7% of the variance across the four anxiety symptom measures. While those percentages of variance may not represent large effect sizes, they do represent a robust increase in variance accounted for above and beyond three potent covariates (i.e., depression, anxiety, and anxiety sensitivity). Finally, the cross-sectional nature of the study does not allow for investigation of the role DT plays in the pathogenesis and maintenance of anxiety pathology. Further experimental and prospective research is needed to ascertain whether DT acts as a risk factor in the development or maintenance of anxiety problems.

Despite these limitations, this study provides important information pertaining to DT's unique association with anxiety across a range of anxiety symptomatology. Our data suggest that an inability to tolerate distress is associated with an increased vulnerability to experience anxiety symptoms, including panic, generalized anxiety, social anxiety, and obsessive-compulsive anxiety. These findings point to the need to further explicate the role DT plays in anxiety (e.g., vulnerability factor, maintaining factor) in order to inform targeted prevention or treatment programs for anxious individuals, particularly with regard to how DT may relate to behavior avoidance within anxiety pathology. Current efficacious treatments for anxiety disorders may be bolstered by focusing on increasing patients' distress

tolerance and thereby potentially decreasing common maladaptive behaviors such as behavioral avoidance.

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Table 1
Bivariate Correlations, Means, and Standard Deviations for Study Variables

	Means (SD)	DTS	ASI	OCIR	PDSR	PSWQ	SIAS	BAI	BDI-II
DTS	3.47 (0.82)	-							
ASI	15.92 (10.35)	-.47***	-						
OCIR	12.78 (10.98)	-.41***	.51***	-					
PDSR	1.89 (4.39)	-.32***	.31***	.23***	-				
PSWQ	45.60 (13.27)	-.56***	.54***	.45***	.31***	-			
SIAS	21.08 (13.41)	-.41***	.49***	.42***	.11*	.47***	-		
BAI	8.64 (9.32)	-.49***	.63***	.47***	.44***	.50***	.42***	-	
BDI-II	7.69 (7.84)	-.47***	.49***	.52***	.33***	.52***	.46***	.58***	-

Note. Zero-order correlations between study variables.

DTS = Distress Tolerance Scale; ASI = Anxiety Sensitivity Index; BAI = Beck Anxiety Inventory; BDI-II = Beck Depression Inventory; PDSR = Panic Disorder Self-Report; OCIR = Obsessive Compulsive Inventory-Revised; PSWQ = Penn State Worry Questionnaire; SIAS = Social Interaction Anxiety Scale.

* $p < .05$,

*** $p < .001$

Table 2
Predicting Anxiety Symptoms Using Distress Tolerance Controlling for Anxiety, Depression and Anxiety Sensitivity

	R²	β	<i>t</i>
Dependent Variable: OCI-R			
Step 1: Covariates	.36		
BDI-II	.32	6.52***	
BAI	.11	1.89	
ASI	.29	5.48***	
Step 2: Main Effects	.01		
DTS	-.11	-2.3*	
Dependent Variable: PDSR			
Step 1: Covariates	.20		
BDI-II	.11	1.92	
BAI	.35	5.53***	
ASI	.04	.69	
Step 2: Main Effects	.01		
DTS	-.11	-2.08*	
Dependent Variable: PSWQ			
Step 1: Covariates	0.38		
BDI-II	.29	5.82***	
BAI	.13	2.26*	
ASI	.31	5.91***	
Step 2: Main Effects	0.7		
DTS	-.31	-6.76***	
Dependent Variable: SIAS			
Step 1: Covariates	.31		
BDI	.27	5.15***	
BAI	.05	.93	
ASI	.33	6.16***	
Step 2: Main Effects	.02		
DTS	-.15	-3.12**	

Note. OCIR = Obsessive Compulsive Inventory-Revised; PSWQ = Penn State Worry Questionnaire; SIAS = Social Interaction Anxiety Scale; DTS = Distress Tolerance Scale; ASI = Anxiety Sensitivity Index; BAI = Beck Anxiety Inventory; BDI-II = Beck Depression Inventory.

* $p < .05$,

** $p < .01$,

 $p < .001$

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