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Specificity of autonomic arousal to DSM-IV panic disorder and posttraumatic stress disorder

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ABSTRACT

Although research on the hierarchical model of anxiety and depression has confirmed that autonomic arousability (AA) is more germane to panic disorder with or without agoraphobia (PD/A) than other DSM-IV anxiety and mood disorders, studies have not evaluated the differential relevance of AA to posttraumatic stress disorder (PTSD). This issue was addressed in multivariate analytic models using 295 outpatients with anxiety and mood disorders. Consistent with prediction, the presence of current DSM-IV PTSD and PD/A was significantly predictive of AA, even when other forms of anxiety disorder comorbidity were held constant. Moreover, latent structural analyses indicated that PTSD and PD/A were the only DSM-IV anxiety disorder constructs to have significant direct effects on AA (in accord with previous findings, the DSM-IV constructs of generalized anxiety disorder, social phobia, and obsessive-compulsive disorder did not have significant structural relationships with AA). The current findings, which attest to the specificity of AA to PTSD and PD/A, are discussed in context of other clinically salient shared features of these disorders and their relevance to treatment and diagnostic classification.

Introduction

Researchers have long recognized the considerable overlap among anxiety and mood disorders at the diagnostic, symptom, and psychometric levels (e.g., Brown & Barlow, 2002; Kendall & Watson, 1989), leading many to question whether anxiety and depression are empirically distinct phenomena (e.g., Andrews, 1996). Based on a comprehensive review of the literature at the time, Clark and Watson (1991) concluded that although anxiety and depression share a significant nonspecific component encompassing general affective distress and other common symptoms, the two constructs could be distinguished by certain unique features. Accordingly, the authors proposed a tripartite model of anxiety and depression consisting of: (1) *negative affect*—comprised of symptoms of general distress such as worry, irritability, and tension; (2) *positive affect*—defined as the level of pleasurable engagement with the environment and characterized by features such as cheerfulness, sociability, and enthusiasm; and (3) *autonomic arousal*—characterized by symptoms such as rapid heart rate, shortness of breath, and trembling. The original tripartite model asserted that negative affect is a shared feature of anxiety and mood disorders (i.e., symptoms of tension, worry, irritability, etc., are present in both anxiety and depression). However, autonomic arousal was viewed as specific to anxiety, whereas low positive affect was posited to differentiate mood disorders from anxiety disorders.

Subsequently, a sizeable literature emerged on the viability of the tripartite structure in adult and child samples (e.g., Brown, Chorpita, & Barlow, 1998; Chorpita, Albano, & Barlow, 1998; Joiner, Catanzaro, & Laurent, 1996; Watson et al., 1995). Although these studies were largely supportive of the tripartite model (e.g., negative affect is a shared feature of the anxiety and mood disorders), several findings led to its reformulation in 1998 (Mineka, Watson, & Clark, 1998). For instance, in a sample of adult outpatients with anxiety and mood disorders, Brown et al. (1998) evaluated the structural relations of selected DSM-IV anxiety and mood disorder constructs (panic disorder/agoraphobia, PD/A; social phobia, SOC; generalized anxiety disorder, GAD; obsessive-compulsive disorder, OCD; unipolar depression, DEP) and dimensions of the tripartite model. Of note, virtually all the considerable covariance of the DSM-IV disorder constructs was explained by the higher-order dimensions of Negative Affect (NA) and Positive Affect (PA). NA evidenced significant paths to all of the disorder constructs, but had its strongest relationships with GAD and DEP (γs = .74 and .67, respectively), as well as PD/A (γ = .65). Counter to the original tripartite model, PA had significant direct effects on both DEP and SOC (γs = −.29 and −.28, respectively). Indeed, the finding that PA

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is germane to SOC in addition to the mood disorders has been replicated in several studies (e.g., Brown, 2007; Watson, Clark, & Carey, 1998). Finally, the results of Brown et al. (1998) indicated that autonomic arousal (AA) was positively related to PD/A only ($\gamma = .67$). The DSM-IV constructs of OCD and SOC had no unique relation to AA (γs = .02 and −.02, respectively). Whereas DEP also evidenced no relationship with AA, GAD was inversely related to AA (i.e., holding NA constant, an increase in GAD was associated with a decrease in AA). In addition to representing a possible important point of distinction between GAD and mood disorders, this finding is in accord with laboratory studies showing that the process of worry leads to a suppression of autonomic arousal (e.g., Borkovec, Lyonfields, Wiser, & Diehl, 1993).

Based on these and other findings, Mineka et al. (1998) forwarded a hierarchical model of anxiety and depression which revised the tripartite model in the following ways: (a) although NA is a common feature of all emotional disorders, it is more germane to some disorders (e.g., GAD, mood disorders) than to others (e.g., specific phobia); (b) low PA is relevant to both SOC and mood disorders; and (c) high AA is specific to PD/A. Moreover, whereas NA and PA are posited to reflect higher-order dimensions of temperament instrumental in the etiology and course of the emotional disorders (cf. neuroticism and extraversion; Brown, 2007), AA is construed as a lower-order symptom dimension (i.e., a symptom feature that distinguishes PD/A from other emotional disorders).

A salient limitation of the extant literature on the tripartite and hierarchical models is its omission of the major anxiety disorder category, posttraumatic stress disorder (PTSD). To our knowledge, PTSD has not been included in evaluations of the tripartite/hierarchical model to date, and thus its structural relationships with these dimensions are unknown. Nevertheless, there is descriptive evidence suggesting that high AA is not unique to PD/A but is also a prominent feature of PTSD (e.g., Brown, Campbell, Lehman, Grisham, & Mancill, 2001; Davidson & Foa, 1991; Jones & Barlow, 1990; Keane & Barlow, 2002). This phenotypic commonality is reflected by many of the DSM-IV diagnostic criteria for PTSD; namely, the features of re-experiencing (Criterion B; e.g., physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the trauma), and persistent hyperarousal (Criterion D; e.g., hypervigiliance, exaggerated startle response). In addition to the phenomenological similarities between panic attacks and PTSD re-experiencing symptoms (Mellman & Davis, 1985), research has shown that flashbacks can be induced in patients with PTSD by the same laboratory methods of panic provocation used for patients with PD/A (e.g., sodium lactate infusions; Jensen et al., 1997; Rainey et al., 1987). Moreover, researchers (Jones & Barlow, 1990; Keane & Barlow, 2002) have observed that the symptoms comprising the Criterion C cluster of DSM-IV PTSD have salient similarities to the features of PD/A. Specifically, that the numbing of general responsiveness in PTSD (e.g., restricted range of affect, avoidance of thoughts or feelings associated with the trauma) may represent avoidance of aversive emotional reactions and learned alarms ("learned alarms" are conditioned associations between intense basic emotions and thoughts, feelings, or situational reminders of the traumatic event; Keane & Barlow, 2002). These PTSD features are posited to be similar to interoceptive sensitivity and avoidance found in PD/A (i.e., patients with PD/A are reactive to and avoidant of emotions or activities that elicit physical symptoms that are viewed as dangerous or signal an impending panic attack).

The relevance of AA to PTSD is also indicated by the consistent finding that panic attacks are a common psychopathological response and sequelae to trauma. A substantial proportion of persons with PD/A report a history of trauma (e.g., David, Giron, & Mellman, 1995; Falsetti, Resnick, Dansky, Lydiard, & Kilpatrick, 1995; Leskin & Sheikh, 2002). Moreover, research has shown that the majority of trauma survivors experience panic attacks during their trauma (e.g., Bryant & Panasetis, 2001; Nixon & Bryant, 2003; Pfefferbaum, Stuber, Galea, & Fairbrother, 2006), and that the presence of peritraumatic panic attacks is predictive of the development of acute stress disorder (ASD) and PTSD (Bryant & Panasetis, 2001; Nixon & Bryant, 2003; Pfefferbaum et al., 2006). Ongoing panic attacks appear to be common in persons with ASD or PTSD. For instance, Nixon and Bryant (2003) found that 14 of 15 individuals with ASD reported persistent panic attacks compared to only 1 of 15 traumatized individuals without ASD. Falsetti and Resnick (1997) found that 69% (43 of 62) of a treatment-seeking sample of trauma survivors, the majority of whom met diagnostic criteria for PTSD, reported panic attacks during the two weeks preceding the assessment. These findings are bolstered by the results from clinical and epidemiological samples that reveal high current and lifetime diagnostic comorbidity of PTSD and PD/A (e.g., Brown, Campbell, et al., 2001; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Perkonigg, Kessler, Storz, & Wittchen, 2000). For instance, findings from a large-scale ($N = 1127$) comorbidity of outpatients with anxiety and mood disorders (Brown, Campbell, et al., 2001) indicated that the presence of PTSD was associated with a significantly elevated relative risk of PD/A. Indeed, a history of PD/A was present in 60% of patients with lifetime PTSD, a comorbidity pattern that was second only to major depression (82% of lifetime PTSD cases had lifetime major depression).

The goal of the present study was to extend the extant research by examining whether the relevance of AA is specific to PD/A and PTSD. Although the aforementioned descriptive data indicate that the features of AA are common in PTSD (e.g., a high co-occurrence of panic attacks and PD/A), multivariate analyses of this issue were undertaken to determine whether any differential relationships between PTSD (and PD/A) and AA are evident after holding other forms of diagnostic comorbidity and negative affectivity constant (cf. Brown et al., 1998). Thus, the analyses were conducted at both the diagnostic level (i.e., holding other current DSM-IV anxiety disorders constant, is the presence of DSM-IV PTSD and PD/A uniquely predictive of AA?), as well as in context of structural models which involved the dimension of NA and latent continuous variables corresponding to the major DSM-IV anxiety disorder constructs (i.e., extending the results of Brown et al., 1998, does the latent construct of PTSD, in addition to PD/A, have a significant direct effect on AA?).

Method

Participants

The sample consisted of 295 outpatients who presented for assessment or treatment at the Center for Anxiety and Related Disorders at Boston University. Women constituted the larger portion of the sample (70%); average age was 33.93 years (SD = 11.84, range = 18–74). The sample was predominantly Caucasian (88%; African-American = 4%, Asian = 4%, Latino/Hispanic = 3%). Diagnoses were established with the Anxiety Disorders Interview Schedule for DSM-IV: Lifetime version (ADIS-IV-L; Di Nardo, Brown, & Barlow, 1994), a semi-structured interview designed to ascertain reliable diagnosis of the DSM-IV anxiety, mood, somatoform, and substance use disorders, and to screen for the presence of other conditions (e.g., psychotic disorders). For each diagnostic section, the ADIS-IV-L provides dimensional assessment of the key and associated features of disorders (0–8 ratings); in most sections, these features are dimensionally rated regardless of whether a formal DSM-IV diagnosis is under consideration. At the