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Anxiety sensitivity as a mechanism for gender discrepancies in anxiety and mood symptoms

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ABSTRACT

Despite the well-established gender differences in the prevalence of anxiety and depressive disorders, there is a dearth of research looking at sex-linked, variable risk factors that could serve as appropriate intervention targets to ameliorate these discrepancies. One such potential variable risk factor is anxiety sensitivity (AS), or a fear of anxiety related sensations. Studies have established elevated AS in women compared to men, and that AS prospectively predicts the development of anxiety and depressive symptoms. Additionally, research has demonstrated some specificity with regard to the lower-order AS dimensions (physical, cognitive, and social concerns) in relation to symptoms of anxiety and depression. The purpose of the current study was to examine whether overall AS, as well as lower-order AS dimensions, statistically mediate the relations between gender and anxiety and depressive symptoms in a sample of individuals with elevated AS presenting for an AS intervention. Data for the current study were collected from participants (N = 106) at baseline prior to randomization to treatment condition. Results revealed that overall AS statistically mediated the relations between gender and symptoms of anxiety and depression. Significant statistical mediation was also found for AS physical and social concerns for anxiety symptoms, and AS cognitive concerns for depressive symptoms. These results suggest the possible importance of AS in the gender discrepancies in anxiety and depression. Future research should examine whether an AS intervention can help ameliorate this prevalence gap.

Substantial evidence indicates significant gender differences in the development and rates of anxiety and mood conditions (Bourdon et al., 1988; Nolen-Hoeksema and Girgus, 1994; Yonkers and Gurguis, 1995). Large community-based studies have repeatedly shown women to be at greater risk for most anxiety (Angst et al., 1984; Kessler et al., 2012) and mood disorder symptoms (Angst et al., 2002; Maciejewski et al., 2001). Some studies find that the elevated risk for women begins in childhood and adolescence (Hankin et al., 2007; Lewinsohn et al., 1998) and continues through adulthood (Bruce et al., 2005; Kendler et al., 2005), while other work has found that risk for depression in women dramatically increases after puberty (e.g., Wade et al., 2002; Hankin et al., 1998). Given the evidence of different rates of mood and anxiety disorders in men and women, it is possible that sex-linked risk factors for anxiety and mood pathology may play a role in this discrepancy.

Identifying sex-linked risk factors that help elucidate the well-established gender differences in anxiety and mood pathology is critical to enhancing our understanding and subsequent treatment of these disorders. Kraemer et al. (1997) proposed guidelines for establishing risk factors that include: a clearly defined outcome, clearly defined risk factor, temporal precedence of the risk factor, and demonstration that the risk factor predicts subsequent outcome. Furthermore, risk factors are considered fixed when they cannot be changed. Research has proposed several fixed risk factors to help explain gender differences in anxiety and mood pathology. For instance, differential prevalence rates of anxiety may be partially explained by genetics (Barlow, 2000), overall physiological reactivity (Kajantie and Phillips, 2006; Kelly et al., 2008; Rohrmann et al., 2003), and evolutionary influences (Craske, 2003; Taylor et al., 2000). Although fixed risk factors are relevant for understanding gender differences, identifying differences in variable risk factors (or risk factors that can be altered; Kraemer et al., 1997) provides greater promise for improving our prevention and treatment of anxiety and mood conditions. As such, variable risk factors may prove a more fruitful area to investigate in terms of our ability to ameliorate increased risk among women.

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One such variable risk factor is anxiety sensitivity (AS), or a fear of anxiety related sensations, which has been shown to prospectively predict the development of both anxiety and mood pathology (Schmidt et al., 2006), and be malleable through intervention (e.g., Schmidt et al., 2007; Smits et al., 2008; Watt et al., 2006). AS reflects an individual's tendency to respond fearfully to symptoms of anxiety arising from the belief that these symptoms will have negative cognitive, physical, or social consequences (Reiss and McNally, 1985). Individuals with elevated AS are likely to interpret benign symptoms of anxiety as potentially harmful or dangerous. For instance, an individual with elevated AS may interpret a racing heart as indicative of a pending heart attack rather than merely an uncomfortable sensation. AS is composed of three lower-order dimensions: Cognitive concerns, physical concerns, and social concerns. AS cognitive concerns reflect the tendency to respond anxiously to feelings of cognitive dyscontrol, such as experiencing racing thoughts, and interpret those feelings of cognitive dyscontrol to be indicative of an impending mental catastrophe (e.g., going crazy or losing their mind). AS physical concerns reflect the tendency to respond anxiously to physiological symptoms of anxiety, such as shortness of breath, and interpret those symptoms to be indicative of an impending physical catastrophe (i.e., having a heart attack or stroke). AS social concerns reflect the tendency to fear potential negative evaluations resulting from others noticing publically-observable symptoms of anxiety, such as sweating.

Investigations into gender differences in AS have repeatedly shown women to have higher levels of AS in both nonclinical (Deacon et al., 2003; Stewart et al., 1997; Zvolensky et al., 2001) and clinical samples (Schmidt and Koselka, 2000). For example, Deacon et al. (2003) found female college students to have significantly higher AS scores ($d = .23$, $p < .05$, small effect) than males in one sample and marginally higher AS scores ($d = .19$, $p = .10$, small effect) in another sample. Schmidt and Koselka (2000) also found significantly higher AS among women, compared to men, in a sample of individuals with a diagnosis of panic disorder ($d = .47$, $p < .05$, medium effect). Similar to the etiology of gender differences in anxiety disorders, the gender disparity AS has been shown to begin in childhood and adolescence (Walsh et al., 2004; Wright et al., 2010) and continue through adulthood (Armstrong and Khawaja, 2002).

In contrast to the evidence that women have higher overall AS, the extant work examining lower-order AS dimensions is less consistent. Studies utilizing undergraduate populations have shown women to have higher levels of AS physical concerns than men, but have shown no sex difference in AS cognitive concerns (Foot and Koszycki, 2004; Stewart et al., 1997; Zvolensky et al., 2001). With regard to AS social concerns, some data suggest no gender difference (Stewart et al., 1997), while other data suggest greater AS social concerns either among men (Foot and Koszycki, 2004) or among women (Zvolensky et al., 2001). However, these findings are limited by the undergraduate, nonclinical populations from which the data were derived. Additionally, given the psychometric problems suggested with AS subscale measurement (e.g., overrepresentation of physical concerns, inadequate measurement of cognitive and social concerns) using the original Anxiety Sensitivity Index and the Anxiety Sensitivity Index - Revised (Reiss et al., 1986; Taylor et al., 2007), which were used in the aforementioned studies, re-examining gender differences in lower-order AS dimensions using the updated Anxiety Sensitivity Index − 3 is warranted (Taylor et al., 2007).

Recent evidence has indicated that there are specific relations between lower-order dimensions of AS and clusters of the mood and anxiety disorders (Allan et al., 2014, 2015; Olatunji and Wolitzky-Taylor, 2009; Olthuis et al., 2014). Specifically, the AS cognitive concerns dimension appears to be most associated with mood and anxiety disorders characterized by pervasive worry and sadness, commonly called distress disorders (e.g., depression, generalized anxiety, post-traumatic stress disorder) and the AS physical concerns dimension appears to be most associated with anxiety disorders characterized by high physiological arousal and phobic avoidance of others and the external world, commonly called fear disorders (e.g., panic, social anxiety, specific phobia; Allan et al., 2014, 2015; Olthuis et al., 2014; Watson, 2005). However, there are some studies which have found relations between AS cognitive concerns and fear disorders (e.g., panic disorder; Rector et al., 2007) as well as relations between AS physical concerns and distress disorders (e.g., PTSD; Asmundson and Stapleton, 2008; Fetzner et al., 2012). In contrast, AS social concerns appears to operate as a general risk factor for both fear and distress disorder symptoms, although stronger associations are generally found between AS social concerns and social anxiety (Allan et al., 2014; Naragon-Gainey, 2010).

1. The current study

Since women tend to have higher levels of anxiety and mood symptoms (Kessler et al., 2012; Maciejewski et al., 2001) as well as higher levels of AS (Deacon et al., 2003; Schmidt and Koselka, 2000), it is plausible that AS may statistically mediate the relations between gender and anxiety and mood symptoms. In fact, one study found that overall AS (as measured by the original ASI) mediated the relationship between gender and a specific symptom (phobic avoidance) of panic disorder (Schmidt and Koselka, 2000). The current study was designed to further advance the literature by examining whether AS statistically mediated the relations between gender and symptoms of 1) physiological anxiety, and 2) depression, as well as investigating the role of lower-order AS dimensions using the psychometrically sound ASI-3. It was hypothesized that AS would statistically mediate the relations between gender and both physiological anxiety and depressive symptoms, such that females would display greater levels of AS and in turn greater levels of physiological anxiety and depressive symptoms. Given the aforementioned specific relations between lower-order AS dimensions and fear and distress disorders (e.g., Allan et al., 2015), it was also hypothesized that AS physical concerns would uniquely mediate the relations between gender and symptoms of physiological anxiety and that AS cognitive concerns would uniquely mediate the relations between gender and depressive symptoms. Because AS social concerns appears to operate more as a general risk factor (e.g., Allan et al., 2015; Naragon-Gainey, 2010), it was hypothesized that AS social concerns would uniquely mediate the relations between gender and both physiological anxiety and depressive symptoms.

2. Methods

2.1. Participants

The current sample consisted of 106 adults presenting for an investigation evaluating the effects of a computerized intervention targeting AS cognitive concerns in anxiety, PTSD, and suicide. Participants were recruited from the community through a variety of methods including: flyers, newspaper and billboard advertisements, and referrals from local community clinics. Eligibility criteria included being 18 years of age or older, English-speaking, and reporting elevated ASI-3 cognitive concerns (greater than or equal to a 9 on the ASI-3 cognitive concerns subscale) during a phone screening. In terms of exclusionary criteria, participants were excluded if they demonstrated evidence of current or past psychotic-spectrum disorders, uncontrolled bipolar-spectrum