

The Interaction of Extraversion and Anxiety Sensitivity on Social Anxiety: Evidence of Specificity Relative to Depression

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Neuroticism and extraversion have been linked to the etiologies and course of anxiety and mood disorders, such that neuroticism is broadly associated with numerous disorders and extraversion is most strongly associated with social anxiety and depression. While previous research has established the broad associations between temperament and emotional disorders, less is known about the specific, proximal factors that are associated with them, and very few studies have situated these risk factors into a larger etiological model that specifies how they may relate to one another. The current study examined the interaction of extraversion and anxiety sensitivity (AS) in predicting social anxiety symptoms in a large, diagnostically diverse clinical sample ($N = 826$). Symptoms were assessed with self-report and dimensional interview measures, and regression analyses were performed examining the main effects and interaction of extraversion and AS (examining both total and lower-order components) on social anxiety. Results showed that at higher levels of AS, the inverse relationship between extraversion and social anxiety was stronger, and the social concerns component of AS is responsible for this effect. This interaction was also observed with regard to depression symptoms, but the interaction was not present

after accounting for shared variance (i.e., comorbidity) between depression and social anxiety symptoms. Clinical and theoretical implications of the results are discussed.

Keywords: social anxiety; extraversion; anxiety sensitivity; depression

SOCIAL ANXIETY DISORDER IS CHARACTERIZED BY EXCESSIVE fear of social or performance situations in which embarrassment or humiliation may occur ([American Psychiatric Association, 2013](#)). Social anxiety disorder is one of the most common psychiatric disorders in the United States, after major depression and alcohol dependence ([Kessler et al., 2005](#)). The disorder tends to follow a chronic and unremitting course of illness ([Brown, Campbell, Lehman, Grisham, & Mancill, 2001](#)), and studies have shown that nearly two-thirds (62.9%) of people with lifetime social phobia meet criteria for at least one other *DSM-IV* disorder ([Ruscio et al., 2008](#)). Social anxiety disorder is a predictor of subsequent depression ([Stein, Chavira, & Jang, 2001](#)), and these two disorders have particularly high rates of comorbidity ([Kessler et al., 2005](#)).

Understanding how personality traits and related temperaments are associated with emotional disorders such as social anxiety disorder is important in order to explore the etiologies and high rates of comorbidity among these disorders. Two genetically based core dimensions of temperament have been shown to be involved in the etiology and course of emotional disorders: neuroticism (related to negative affectivity) and extraversion (related to positive affectivity) (e.g., [Brown, 2007](#); [L.A. Clark, Watson,](#)

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& Mineka, 1994; Hettema, Prescott, Myers, Neale, & Kendler, 2005). Neuroticism refers to a tendency towards negative emotions and stress reactivity, whereas extraversion refers to a tendency toward positive emotions, sociability, and assertiveness. The relationship between these traits in emotional disorders is relatively stable across samples, instruments, and data analytic strategies (e.g., Brown, Chorpita, & Barlow, 1998; D.A. Clark, Steer, & Beck, 1994; Watson, Clark, & Carey, 1988). High neuroticism and low extraversion have been linked to both social anxiety disorder and depression, and whether one or both conditions become manifest may depend on environmental determinants including direct experiences with rejection and humiliation (e.g., Barlow, 2002; Brown, 2007; L.A. Clark, 2005). Elevated levels of neuroticism and lower levels of extraversion characterize nearly all of the emotional disorders, according to a recent meta-analysis by Kotov and colleagues (Kotov, Gamez, Schmidt, & Watson, 2010). However, dimensional studies have found that low levels of extraversion are typically most marked in social anxiety disorder and depression, as compared to other emotional disorders, whereas neuroticism shows less specificity (e.g., Brown, 2007; Brown et al., 1998; Watson, Gamez, & Simms, 2005).

Previous research has established the broad associations between temperament and anxiety, mood, and substance use disorders (e.g., Kotov et al., 2010), but less is known about more specific, proximal factors that may mediate or moderate temperament's association with disorders. Several recent articles have suggested models for examining these associations in detail and argued for the import of a fine-grained, multivariate approach. For example, researchers have asserted that it is important to closely examine the precise intervening mechanisms between broad temperaments (e.g., neuroticism and extraversion) and symptoms in order to delineate specific mechanisms that lead to manifestations of different disorders (e.g., Barlow, 2000, 2002; Hong, 2013). Similarly, Nolen-Hoeksema and Watkins (2011) proposed a transdiagnostic model of psychopathology that emphasizes distal and proximal risk factors. This model illustrates how distal risk factors (environmental context or congenital biological characteristics) contribute to disorders through mediating proximal risk factors (e.g., biological factors leading to emotional, cognitive, or behavioral tendencies). Moderators (e.g., environmental factors or biological characteristics) interact with proximal risk factors to determine which specific disorder the individual will experience (Nolen-Hoeksema & Watkins).

One vulnerability that is relevant to the above models is anxiety sensitivity (AS), which is the belief

that physical sensations of anxiety will be associated with harmful consequences (Reiss, Peterson, Gursky, & McNally, 1986). Specifically, AS is thought to amplify anxiety responses by contributing to a self-perpetuating cycle in which symptoms of anxiety contribute to anxiety itself (Reiss et al., 1986). The higher-order trait can be broken down into three lower-order dimensions: physical concerns (fear of physical symptoms of anxiety; i.e., "it scares me when my heart beats rapidly"), cognitive concerns (fear of cognitive dyscontrol; i.e., "when I'm nervous, I worry that I may be mentally ill"), and social concerns (fear of publically observable anxiety symptoms; i.e., "it embarrasses me when my stomach growls") (e.g., Zinbarg, Barlow, & Brown, 1997). In a meta-analysis examining AS and emotional disorders, social anxiety disorder was shown to be strongly related to higher-order AS ($\rho = .49$) and also showed a strong and specific relation to the social component of AS ($\rho = .70$). Social anxiety disorder was also significantly, but more weakly, related to physical ($\rho = .31$) and cognitive ($\rho = .45$) components of AS. Depression was similarly related to higher-order AS ($\rho = .46$), with the strongest correlation for the cognitive component of AS ($\rho = .53$; $\rho = .40$ for physical; $\rho = .38$ for social) (Naragon-Gainey, 2010). A more recent study revealed that the social and cognitive components of AS (combined into a single factor) were uniquely related to social anxiety in a large sample of patients with anxiety and mood disorders (Drost et al., 2012).

While much research has focused on the association of broad traits (i.e., neuroticism and extraversion) and narrow social cognitive vulnerabilities (i.e., anxiety sensitivity) in relation to social anxiety, these risk factors have rarely been tested within a larger etiological model that specifies how they may relate to one another. In one comprehensive etiological model of social anxiety disorder, baseline temperamental vulnerabilities (e.g., extraversion) combine with an overestimation of the degree to which anxiety is visible and an increased attentional allocation to threat (e.g., negative perception by others; Rapee & Heimberg, 1997). Individuals with low levels of extraversion (and particularly, low levels of the sociability and ascendance components of extraversion; Naragon-Gainey, Watson, & Markon, 2009) may tend to feel less comfortable or more anxious in social situations overall. However, the above model would suggest that this trait is likely to be more problematic when greater attention is focused on anxiety sensations and others' perceptions of the anxiety symptoms, suggesting an interaction between these two vulnerabilities. AS (and particularly the social concerns component) seems to describe this

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