



# Anxiety Sensitivity Index (ASI-3) subscales predict unique variance in anxiety and depressive symptoms



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## ABSTRACT

Anxiety sensitivity (AS) has been implicated in the development and maintenance of a range of mental health problems. The development of the Anxiety Sensitivity Index – 3, a psychometrically sound index of AS, has provided the opportunity to better understand how the lower-order factors of AS – physical, psychological, and social concerns – are associated with unique forms of psychopathology. The present study investigated these associations among 85 treatment-seeking adults with high AS. Participants completed measures of AS, anxiety, and depression. Multiple regression analyses controlling for other emotional disorder symptoms revealed unique associations between AS subscales and certain types of psychopathology. Only physical concerns predicted unique variance in panic, only cognitive concerns predicted unique variance in depressive symptoms, and social anxiety was predicted by only social concerns. Findings emphasize the importance of considering the multidimensional nature of AS in understanding its role in anxiety and depression and their treatment.

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## 1. Introduction

Anxiety sensitivity (AS) is an important individual difference factor that has received research attention for its role in the development and maintenance of mental health problems (e.g., [Calkins et al., 2009](#); [Schmidt, Mitchell, & Richey, 2008](#); for reviews, see [Naragon-Gainey, 2010](#); [Olatunji & Wolitzky-Taylor, 2009](#)). More specifically, AS is an enduring fear of arousal-related sensations that arises from the tendency to interpret these sensations catastrophically, believing that they will have serious physical, psychological, or social consequences ([Reiss, 1991](#); [Reiss & McNally, 1985](#)). For example, an individual with high AS who experiences a racing heart might fear this sensation portends a heart attack. In contrast, individuals with low AS regard these sensations as unpleasant but harmless ([McNally, 1999](#)).

Psychometric studies largely support the idea that AS, as measured by the Anxiety Sensitivity Index (ASI; [Peterson & Reiss, 1992](#)), constitutes a global construct composed of several lower-order factors detailing fear of specific anxiety symptoms and associated catastrophic consequences. The most consistent factor solution to

the ASI includes three lower-order factors: physical concerns, cognitive concerns, and social concerns ([Taylor, 1999](#)). High scores on the physical concerns factor denote worry about the physical health consequences of arousal sensations (e.g., heart palpitations leading to a heart attack). High cognitive concerns are associated with worries that psychological symptoms, such as concentration difficulties, might lead to cognitive consequences such as mental incapacitation. Finally, high social concerns result from thoughts that publicly observable anxiety symptoms might lead to social censure or rejection. These lower-order factors are important as they may reflect unique mechanisms through which AS acts as a vulnerability factor for specific mental health symptoms.

[Clark's cognitive theory of panic \(1986\)](#) provides one useful model for understanding the role of AS in the development and maintenance of mental health problems. Clark suggested that when an individual interprets an otherwise benign arousal-related sensation catastrophically, in the manner of those with high AS, his/her perception of threat is enhanced, leading to increased severity of arousal symptoms and ultimately some type of maladaptive behaviour (e.g., panic attack, avoidance). In accordance, research has widely shown high levels of AS among those with panic disorder (PD; e.g., [Taylor, Koch, McNally, & Crockett, 1992](#)). Longitudinal studies show that high AS predicts the development of panic attacks ([Maller & Reiss, 1992](#); [Schmidt, Lerew, & Jackson, 1997](#); [Schmidt, Lerew, & Jackson, 1999](#); [Schmidt et al., 2008](#)) and has a pathoplastic

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relation with panic (Schmidt & Bates, 2003). Consistent with its theoretical role in motivating avoidance, AS is positively associated with agoraphobia symptoms (White, Brown, Somers, & Barlow, 2006).

Research suggests that physical, as compared to social or cognitive, concerns are most closely associated with PD (Rodriguez, Bruce, Pagano, Spencer, & Keller, 2004) and that individuals with PD have higher AS physical concerns than those with other anxiety disorders or a community sample (Carleton, Abrams, Asmundson, Antony, & McCabe, 2009; Rector, Szacun-Shimizu, & Leybman, 2007; Zinbarg, Barlow, & Brown, 1997). Similarly, studies have shown that physical concerns are the most predictive of fearful responding to CO<sub>2</sub> challenge, a panic-related phenomena (Brown, Smits, Powers, & Telch, 2003; Carter, Suchday, & Gore, 2001; Zinbarg, Brown, Barlow, & Rapee, 2001; Zvolensky, Feldner, Eifert, & Stewart, 2001). In addition, longitudinal studies have found AS physical concerns to predict panic-relevant symptoms (Grant, Beck, & Davila, 2007), behavioural avoidance (among adolescents; Wilson & Hayward, 2006), and the clinical course of PD (Benitez et al., 2009). In fact, newer models of PD highlight the AS physical concerns factor, as opposed to global AS, as an active panicogenic factor (Pilecki, Arentoft, & McKay, 2011).

Beyond PD, high levels of AS have also been associated with social phobia (SP; e.g., Ball, Otto, Pollack, Uccello, & Rosenbaum, 1995; Norton, Cox, Hewitt, & McLeod, 1997). This is likely due to the fear of negative evaluation resulting from a display of observable anxiety symptoms (Cox, Borger, & Enns, 1999). Research has also shown that lower AS levels predict recovery from SP (Vriends et al., 2007). Of the AS subscales, social concerns has consistently been most closely linked with social anxiety. A number of studies have found that high social concerns could differentiate those with SP from those with PD or major depression or healthy controls (Rector et al., 2007; Rodriguez et al., 2004; Zinbarg et al., 1997). However, it should be noted that Rector et al. (2007) found that high AS cognitive concerns might also predict SP.

High AS has also been found among those with generalized anxiety disorder (GAD; e.g., Deacon & Abramowitz, 2006; Rodriguez et al., 2004) and non-clinical worriers (e.g., Viana & Rabian, 2008). Researchers have speculated that this connection may be due to the fear of uncontrollable psychological symptoms (i.e., worry) that can characterize both individuals with high AS and those with GAD (Rector et al., 2007). Consistent with this hypothesis, some studies suggest that GAD might be characterized by high AS cognitive concerns. For instance, of GAD, major depression, and SP, Rodriguez et al. (2004) found that AS cognitive scores were most closely associated with GAD. Similarly, Rector et al. (2007) found that those with GAD had higher cognitive concerns than those with SP, though not than those with PD.

Studies also consistently show that people with PTSD and PTSD symptoms have higher AS than those without (e.g., Asmundson & Stapleton, 2008; Hagh-Shenas, Goodarzi, Dohbozorgi, & Farashbandi, 2005). Second to PD, AS levels are highest amongst those with PTSD as compared to any other anxiety disorder (Taylor, Koch, & McNally, 1992). Moreover, the severity of PTSD symptoms is correlated with AS (Fedoroff, Taylor, Asmundson, & Koch, 2000; Stephenson, Valentiner, Kumpula, & Orcutt, 2009), and with AS physical concerns in particular (Asmundson & Stapleton, 2008; Feldner, Lewis, Leen-Feldner, Schnurr, & Zvolensky, 2006). However, studies have also found that AS cognitive concerns are particularly predictive of PTSD-relevant symptoms (Feldner et al., 2006; Lang, Kennedy, & Stein, 2002; Vujanovic, Zvolensky, & Bernstein, 2008). Researchers have suggested that high AS may amplify an individual's emotional reaction to trauma, making those with high AS more likely to develop PTSD after trauma exposure (Taylor, 2004). This hypothesis is supported by longitudinal studies showing that those with high AS were more likely to develop

PTSD symptoms after a trauma (e.g., Keogh, Ayers, & Francis, 2002). However, researchers have also postulated that high AS might arise from trauma exposure (Taylor, 2004). Recent work supports a reciprocal relationship between AS and PTSD symptom levels in the year following a traumatic physical injury (Marshall, Miles, & Stewart, 2010).

It is not only anxiety disorders that have been associated with high AS. Researchers have also found higher levels of AS among individuals with depression as compared to healthy controls, on par with the magnitude of AS elevations among those with SP and GAD (Otto, Pollack, Fava, Uccello, & Rosenbaum, 1995). Longitudinal research has shown high AS to predict levels of depression five weeks later (Schmidt et al., 1997). Several studies have shown that only the cognitive, and not the physical or social, factor of AS, predicts depressive symptoms in clinical (Cox, Enns, & Taylor, 2001; Taylor, Koch, Woody, & McLean, 1996; Zinbarg et al., 2001) and non-clinical samples (Deacon, Abramowitz, Woods, & Tolin, 2003). Carleton et al. (2009) found that AS cognitive concerns can distinguish between those with a depressive disorder vs. healthy controls, even when the total ASI score cannot. Furthermore, depression, but not anxiety disorders, predicts scores on the AS cognitive concerns subscale (Rodriguez et al., 2004). Similarly, individuals with anxiety disorders with comorbid depression score higher on AS cognitive, but not physical or social, concerns, vs. individuals with anxiety disorders without comorbid depression (Rector et al., 2007). Given these findings, researchers have suggested that AS cognitive concerns might be a “depression-specific form of anxiety sensitivity” (Taylor et al., 1996, p. 478). Depressive symptoms may be intensified by the fear of losing control captured by AS cognitive concerns (Watt & Stewart, 2008). However, our understanding of the specific link between depression and AS cognitive concerns is not completely clear; several studies have found major depression (Rodriguez et al., 2004) or depressive symptoms (Rector et al., 2007) to also be associated with high AS social concerns.

Unfortunately, much of the research into the relation between AS lower-order factors and psychopathology is limited due to the measurement of AS using the original ASI (Peterson & Reiss, 1992). The original 16-item ASI includes a physical concerns factor composed of eight items while the social and cognitive concerns factors are made up of four items each. This may limit the reliability of these latter two factors and fail to adequately index the social and cognitive concerns constructs. Moreover, some of the items in the ASI may lack sufficient content validity because they do not target specific dimensions (Taylor et al., 2007). In the past, revisions to the ASI (Taylor & Cox, 1998a,b) have generally lacked a stable factor structure. Given these limitations, we cannot be entirely confident with the results of past studies of the relations between the ASI subscales and emotional disorder symptoms.

More recently, Taylor et al. (2007) constructed a new version of the ASI, the ASI-3. The ASI-3 consists of 18 items, with six items each comprising the physical, cognitive, and social concerns subscales. The comprehensive construction and validation of the measure included a factor analysis replicated in six clinical and non-clinical samples from North American and European countries. The ASI-3 demonstrates good internal consistency, and convergent, discriminant, and criterion-related validity (Taylor et al., 2007). The use of the ASI-3 is thus preferred to the original ASI when studying the dimensions of AS.

After the development of the ASI-3, Taylor et al. (2007) called for further research into whether the prediction of psychopathology differs among the ASI-3 subscales. Only a few studies have addressed this research gap. Among trauma-exposed adults, Fetzer, Collimore, Carleton, and Asmundson (2011) found the physical concerns subscale of the ASI-3 to be the most robust predictor of PTSD symptoms. Whereas past research has also

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