



Psychometric properties of the anxiety sensitivity index-3 in an acute and heterogeneous treatment sample



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ABSTRACT

Anxiety sensitivity (AS) is associated with various forms of psychopathology. The most common measure of AS is the anxiety sensitivity index-3 (ASI-3). The current study examined the psychometric properties and factor structure of the ASI-3 in an acute and comorbid population seeking treatment for a broad range of psychopathology ($N = 382$). Results confirmed a bi-factor structure and suggested that the ASI-3 demonstrates adequate psychometric properties in a transdiagnostic sample. The ASI-3 also showed adequate sensitivity to change over the course of partial hospital treatment. Findings regarding associations between specific anxiety disorders and subscales of the ASI-3 are discussed. Overall, the current results support the use of the ASI-3 to assess AS in heterogeneous treatment-seeking samples. This work is of particular utility for researchers examining the concept of AS transdiagnostically.

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1. Introduction

Anxiety sensitivity (AS) refers to the tendency to fear physical sensations associated with anxiety due to concerns about potential physical, social, or cognitive consequences (Reiss, 1991). Individuals with high levels of AS tend to misinterpret bodily sensations as danger signals (e.g. chest palpitations as a heart attack), which amplifies anxiety (Reiss, 1991). AS plays a role in the development and maintenance of anxiety disorders, in particular panic disorder (PD; Olatunji & Wolitzky-Taylor, 2009; Schmidt, Lerew, & Jackson, 1999; Taylor, 1999), and is a risk factor for mood disorders and suicidality (Capron et al., 2012; Olatunji & Wolitzky-Taylor, 2009). It is crucial that researchers have valid tools to assess AS in transdiagnostic samples.

Taylor et al. (2007) created the 18-item ASI-3 to measure the three most supported AS domains: social (i.e., fear of exhibiting symptoms in public that may elicit embarrassment), cognitive (i.e., fear of losing cognitive control or experiencing concentration difficulties), and physical (i.e., fear that physical sensations are a sign

of an immediate physical problem). The ASI-3 has demonstrated good convergent, divergent, and construct validity, and researchers have replicated a three-factor structure in both clinical and non-clinical samples (Farris et al., 2015; Kemper, Lutz, Bähr, Rddel, & Hock, 2011; Wheaton, Deacon, McGrath, Berman, & Abramowitz, 2012). However, other studies have confirmed a bi-factor structure with three independent subfactors in a non-clinical sample (Ebesutani, McLeish, Luberto, Young, & Maack, 2014). The subscales have shown specific relationships with different disorders. For example, relationships are present between the physical subscale and PD, hypochondriasis, and specific phobia (Allan, Capron, Raines, & Schmidt, 2014; Wheaton et al., 2012); the social subscale and social anxiety disorder (SAD; Allan et al., 2014; Wheaton et al., 2012); and the cognitive subscale and Generalized Anxiety Disorder (GAD), Post Traumatic Stress Disorder (PTSD), and Major Depressive Disorder (MDD; Allan et al., 2014; Wheaton et al., 2012).

However, to date, only one study has examined the psychometric properties of the English version of the ASI-3 in a clinically mixed anxious and depressed sample (Allan et al., 2014). Consequently researchers have called for further validation in individuals seeking treatment for a broad range of psychopathology. Furthermore, no studies have examined sensitivity to change. These are necessary steps in order to further examine AS as a transdiagnostic intervention target. The current study aimed to fill these gaps by examining the ASI-3 in an acute, heterogeneous psychiatric sample. We expected the ASI-3 to demonstrate good reliability, convergent

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Table 1
Demographic and clinical characteristics (N = 382).

Demographic characteristics ^a	N	(%)	Clinical characteristics ^c	N	(%)
Female	202	(52.9%)	Major depressive disorder	200	(52.4%)
Age (M, SD)	33.43	(12.88)	Panic disorder	81	(21.2%)
Race			Social anxiety disorder	102	(26.7%)
White	342	(89.5%)	Generalized anxiety disorder	103	(27.0%)
Asian	13	(3.4%)	Post traumatic stress disorder	38	(9.9%)
Black or African-American	10	(2.6%)	Obsessive compulsive disorder	33	(8.6%)
American Indian or Alaskan Native	4	(1.0%)	Mood disorder (psychotic features)	14	(3.7%)
Did not specify	3	(3.2%)	Lifetime	43	(11.3%)
Ethnicity			Psychotic disorder	13	(3.4%)
Non-Latino/a	361	(94.5%)	Lifetime	27	(7.1%)
Education			body dysmorphic disorder	18	(4.7%)
At least high school or GED	381	(99.7%)	current smoking/use of tobacco ^b	96	(25.1%)
At least 4-year college graduate	206	(53.9%)	engaged in vigorous physical activity in past week ^d	195	(51%)
			duration of treatment (M days, SD)	11.35	(4.55)

^a Note that patients may endorse multiple races.

^b Note that for this item N = 381.

^c Note that n = 43 individuals did not complete the MINI. Percentages are based off of N = 339. Percentages exceed 100% due to comorbidity.

^d As reported on the International Physical Activity Questionnaire (Soundy, Taylor, Faulkner, & Rowlands, 2007).

validity, divergent validity and sensitivity to change. Based on prior studies (Kemper et al., 2011; Wheaton et al., 2012; Farris et al., 2015; Ebesutani et al., 2014), we compared a three-factor and a bi-factor model. We also hypothesized that the physical subscale would be related to PD, the social subscale would be related to SAD, and the cognitive subscale would be related to GAD and PTSD.

2. Methods

2.1. Participants and measures

Participants were patients seeking treatment at an insurance-based Partial Hospital Program in New England for mood, anxiety, personality, and psychotic disorders (see Beard & Björgvinsson, 2013; Björgvinsson et al., 2014 and Table 1). The partial hospital delivers evidence-based therapies, case management, and medication.

The Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) is a structured interview assessing for DSM-IV Axis I disorders with strong reliability and validity in relation to the Structured Clinical Interview for DSM-IV (SCID-IV), and inter-rater reliabilities ranging from kappas of .89–1.0 (Sheehan et al., 1998). The MINI was administered by doctoral practicum students and interns in clinical psychology who received weekly supervision by a postdoctoral fellow. Training included reviewing administration manuals and completing mock interviews. All clinicians were required to pass a final training interview with their supervisor before administering MINIs. Reliability ratings yielded near perfect agreement (Cohen's Kappa = .911) on diagnoses. The Anxiety Sensitivity Index (ASI-3; Taylor et al., 2007) is a 18-item measure assessing fear beliefs about potential consequences of anxious arousal. The Center for the Epidemiological Studies of Depression-10 (CES-D-10; Andresen, Malmgren, Carter, & Patrick, 1994) is a widely used, brief instrument for measuring symptoms of depression. The 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) is a self-report questionnaire assessing frequency of general anxiety symptoms. The GAD-7 has demonstrated good reliability and construct validity (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007; Löwe et al., 2008; Spitzer et al., 2006), including as a measure of general anxiety in a partial hospital sample (Beard & Björgvinsson, 2014). The Behavior and Symptom Identification Scale (BASIS-24; Cameron et al., 2007) is a 24-item measure assessing symptoms over the last week with good psychometric properties. We utilized the Self-Harm and Psychosis subscales.

2.2. Procedure

Patients completed computerized questionnaires at admission and discharge (ASI-3, GAD-7, CESD-10, BASIS-24). Patients typically completed the MINI on their second day in the program. Only patients who provided informed written consent are included in the current report. The local Institutional Review Board approved all study procedures. Study data were collected and managed using REDCap electronic data capture tools (Harris et al., 2009), hosted at McLean Hospital.

2.3. Analyses

SPSS version 21.0 and MPlus version 6.12 were used. Internal consistency was estimated using Cronbach's alpha. To examine convergent and divergent validity, we examined correlations with theoretically associated constructs (general anxiety, depression) and less associated constructs (self-harm, psychosis). To examine sensitivity to change, we compared ASI scores at admission and discharge to the partial hospital. To examine factor structure, we conducted confirmatory factor analyses based on previous psychometric studies of the ASI-3 (e.g., Ebesutani et al., 2014; Farris et al., 2015; Kemper et al., 2011; Taylor et al., 2007; Wheaton et al., 2012). Specifically, we compared a three-factor model (Farris et al., 2015) to a bi-factor model (Ebesutani et al., 2014), with items constrained to load onto their originally specified factors. To assess the fit of the measurement and structural models, the comparative fit index (CFI) and root mean square error of approximation (RMSEA) were utilized. Model fit standards indicating near model-to-data fit require a CFI greater than .90 and RMSEA values less than .10 (Quintana & Maxwell, 1999). Following Wheaton et al. (2012) we also compared ASI scores among diagnostic groups. We conducted separate ANOVAs for each ASI subscale to compare six groups: (1) PD only, (2) SAD only, (3) GAD only, (4) PTSD only, (5) more than one anxiety disorder, and (6) no anxiety disorder.

3. Results

ASI-3 total scores ranged from 0 to 72, reflecting the entire range of the scale. Women scored 1.5 points higher than men on the physical concerns subscale, $t(380) = 2.594, p = .01$. ASI-3 scores were not associated with any other demographic characteristics. Internal consistency was excellent for the total scale ($\alpha = .91$) and subscales (physical: $\alpha = .869$, cognitive: $\alpha = .895$, social: $\alpha = .830$). Higher scores on the ASI-3 were associated with greater lev-

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