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The Anxiety Sensitivity Index - Revised: psychometric properties and factor structure in two nonclinical samples

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Abstract

Anxiety sensitivity (AS) is the fear of anxiety-related sensations based on beliefs about their harmful consequences. Despite its status as the most popular measure of AS, the anxiety sensitivity index is too abbreviated to adequately measure the somatic, cognitive, and social facets of the construct. The Anxiety Sensitivity Index - Revised (ASI-R) is a revised and expanded version of the ASI that was developed to improve the assessment of AS and its dimensions. The present study was conducted to examine the psychometric properties and factor structure of the ASI-R. Two large undergraduate samples completed a psychometric assessment package that included the ASI-R and measures of anxiety, depression, and related constructs. Exploratory factor analysis revealed four lower-order ASI-R factors: (1) beliefs about the harmful consequences of somatic sensations; (2) fear of publicly observable anxiety reactions; (3) fear of cognitive dyscontrol; and (4) fear of somatic sensations without explicit consequences. These factors loaded on a single, higher-order factor. Correlations between the ASI-R factors and related variables were consistent with AS theory. Results across both samples in the present study were highly similar. The strengths and limitations of the ASI-R are discussed, and the implications of our findings for the nature and measurement of AS are considered.

Keywords: Anxiety sensitivity; Factor analysis; Measurement; Anxiety

1. Introduction

Anxiety sensitivity (AS) refers to the fear of anxiety-related sensations, which is thought to arise from beliefs that these symptoms have harmful physical, psychological, or social conse-

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quences (Reiss & McNally, 1985). AS is considered a dispositional trait that amplifies fear and other anxiety reactions and places individuals at risk for the development of anxiety-related conditions, particularly panic disorder (Reiss, 1991). AS is distinct from trait anxiety (i.e. the tendency to respond with fear to a wide range of stressors) and describes a more specific tendency to fearfully respond to one's own anxiety symptoms. The construct validity of AS is supported by an impressive body of research (summarized in Taylor, 1999) that documents the role of AS in anxiety and panic. For example, research has reliably demonstrated that AS distinguishes panic disorder from other anxiety disorders (Apfledorf, Shear, Leon, & Portera, 1994), predicts fearful responding to panic symptom provocation procedures (e.g. Rapee, Brown, Antony, & Barlow, 1992), and predicts prospective development of panic attacks (e.g. Schmidt, Lerew, & Jackson, 1997).

The factor structure of AS has important implications for the nature of AS and its role in anxiety-related psychopathology. Factor analysis allows researchers to study the basic mechanisms of AS (Taylor & Cox, 1998a), because distinct factors may correspond to distinct mechanisms (Cattell, 1978). Different AS mechanisms may have distinct causes (e.g. learning experiences) that may lead to specific anxiety reactions. For example, as a result of observing a family member die of a heart attack, an individual might develop a fear of cardiac sensations that could trigger a panic attack when that individual experiences heart palpitations (Cox, 1996). There is converging evidence from recent factor analytic studies that the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986), the most commonly used measure of AS, measures three replicable, lower-order factors: (1) fear of somatic sensations, (2) fear of cognitive dyscontrol, and (3) fear of publicly observable anxiety symptoms (see Zinbarg, Mohlman and Hong, 1999, for a review). These lower-order factors appear to be hierarchically arranged beneath a single higher-order factor (i.e. general AS). Studies examining the correlates of ASI factors have confirmed the importance of a multidimensional perspective of AS. The ASI fear of somatic sensations factor is most strongly associated with a diagnosis of panic disorder (Zinbarg, Barlow, & Brown, 1997; Taylor, Koch, Woody, & McLean, 1996) and is the strongest predictor of fearful responding to panic symptom provocation procedures (Zinbarg, Brown, Barlow, & Rapee, 2001). The AS fear of cognitive dyscontrol factor appears less specific to panic disorder and more sensitive to depression (Blais et al., 2001; Taylor, Koch, Woody & McLean, 1996). The third factor from the ASI, fear of publicly observable anxiety symptoms, appears to be associated with negative evaluation sensitivity and a diagnosis of social phobia (McWilliams, Stewart, & MacPherson, 2000; Zinbarg, Barlow & Brown, 1997). Knowledge about AS has been significantly enhanced by studies on the association between AS factors and various types of psychopathology, and important theories about the role of AS dimensions in the development of panic (e.g. Cox, 1996) await empirical validation.

Current conceptualizations of the factor structure of AS (e.g. Zinbarg, Mohlman & Hong, 1999) are based almost exclusively on factor analytic studies of the ASI. The ASI is a 16-item self-report scale that was constructed to measure what was originally conceptualized as a unitary construct (Reiss, Peterson, Gursky & McNally, 1986). Because the ASI contains a relatively small number of items, most of which measure fears of somatic sensations (e.g. Stewart, Taylor, & Baker, 1997), the scale is too abbreviated to adequately measure the major AS factors. For example, the ASI has too few items to ascertain whether the 'fear of somatic sensations' factor may actually consist of several factors, such as fears of cardiac symptoms and fears of gastrointes-

tinal symptoms (Taylor & Cox, 1998a). Further, the 'social concerns' factor of the ASI reliably consists of only two items (e.g. Deacon & Valentiner, 2001), both of which have questionable face validity for the AS construct (e.g. 'It's important for me not to appear nervous'). The wording of several ASI items is also problematic; some items are ambiguous (e.g. 'Unusual body sensations scare me'), whereas some items seem to assess constructs other than AS (e.g. 'It is important for me to stay in control of my emotions'). In support of these criticisms, a recent study by Blais et al. (2001) showed that five particularly problematic ASI items (31% of the scale) could be deleted without reducing the scale's construct validity. Taken together, the numerous limitations of the ASI caution against reliance on this instrument for making theoretical claims about the AS construct. Clearly, researchers interested in measuring AS factors would be well advised to look for alternatives to the ASI.

The Anxiety Sensitivity Index - Revised (ASI-R; Taylor & Cox, 1998b) was developed to more comprehensively measure the lower-order factors of AS. The 36-item ASI-R retains the same instructions and response format as the ASI, and contains 10 of the ASI's original 16 items. Six items from the original ASI with problematic content were eliminated, including three of the five psychometrically deficient items identified by Blais et al. (2001). Drawing on domains identified in the ASI factor analytic literature, the authors constructed the ASI-R to measure fears of cardiovascular, respiratory, gastrointestinal, publicly observable, dissociative and neurological, and cognitive dyscontrol anxiety symptoms. In a sample of 155 psychiatric outpatients, Taylor & Cox, 1998b) found that the ASI-R measured four lower-order AS factors (in addition to a higher-order, general AS factor): (1) fear of respiratory symptoms, (2) fear of publicly observable anxiety reactions, (3) fear of cardiovascular symptoms, and (4) fear of cognitive dyscontrol. The lower-order ASI-R factors demonstrated theoretically consistent relationships with criterion variables such as measures of anxiety and depression and psychiatric diagnosis. The ASI-R higher-order factor was correlated with the ASI at $r = 0.94$, indicating that both indices measure the same construct. The results of Taylor & Cox, 1998b) suggest that the ASI-R is a promising instrument for measuring AS. It is also possible that given its superior content validity, the ASI-R is better suited than the ASI for use in studies of AS factors.

Despite its appeal as a potentially improved measure of AS and its dimensions, the ASI-R's psychometric properties have not been adequately evaluated. At the time of this writing, no follow-up study to Taylor & Cox, 1998b) has appeared in the literature. Taylor and Cox's factor analytic results need to be replicated, particularly given that the four-factor structure they obtained did not correspond to the six factors the scale was designed to measure. Further, the psychometric properties of the ASI-R have not been evaluated in a nonclinical population. Although research on the original ASI suggests that the dimensional structure of AS is invariant across clinical, nonclinical populations, and community samples (Zinbarg, Mohlman & Hong, 1999; Schmidt & Joiner, 2002), the extent to which this is holds true for the ASI-R is unknown. Given the potential for research on nonclinical samples to provide key insights about the role of AS in the development of anxiety and panic (e.g. Schmidt, Lerew & Trakowski, 1997), the establishment of an improved measure of AS would be an important development for research efforts in this area. To address these concerns, the present study examined the psychometric properties and construct validity of the ASI-R in a nonclinical, undergraduate sample. We hypothesized that, consistent with the results of Taylor & Cox, 1998b), the ASI-R would consist of four replicable lower-order factors assessing fears of respiratory, cardiovascular, publicly observable, and cognitive dyscontrol

anxiety symptoms. We further predicted that these lower-order factors would load on to a single higher-order factor, thus supporting the hierarchical structure of AS. Finally, we hypothesized that the ASI-R and its lower-order factors would demonstrate a pattern of theoretically consistent relationships with related variables (e.g. agoraphobic cognitions, fear of negative evaluation).

2. Study 1: Method

2.1. Participants

The sample consisted of 558 college students recruited from introductory psychology courses at University of North Carolina at Chapel Hill. The sample was 75.1% female with a mean age of 19.0. Four hundred and twenty participants (75.3%) identified themselves as White/Caucasian, followed by 82 Black/African Americans (14.7%), 32 Asians or Pacific Islanders (5.7%), and 24 participants (5.2%) of other, multiple, or unreported ethnicities.

2.2. Measures

2.2.1. Anxiety Sensitivity Index - Revised (ASI-R)

The ASI-R (Taylor & Cox, 1998b) is a 36-item, expanded version of the original ASI (Reiss, Peterson, Gursky & McNally, 1986). Respondents indicated their agreement with each item on a scale ranging from 'very little' (coded as 0) to 'very much' (coded as 4). Total scores range from 0 to 144. We obtained the ASI-R from the recently published *Practitioners Guide to Empirically Based Measures of Anxiety* (Antony, Orsillo, & Roemer, 2001). Subsequent to data collection, we discovered that item 29 ('When I feel dizzy, I worry there is something wrong with me') contained an omission. As reported in the original scale published by Taylor & Cox, 1998b), this item should read, 'When I feel dizzy, I worry there is something wrong *with my brain*.'

2.2.2. Self-rating anxiety scale (SAS)

The SAS (Zung, 1971) is a 20-item measure developed to assess the frequency of anxiety symptoms. The scale consists primarily of somatic symptoms and has demonstrated adequate internal consistency and test-retest reliability (Jegede, 1977; Michelson & Mavissakalian, 1983).

2.2.3. Center for Epidemiological Studies, depression scale (CES-D)

The CES-D (Radloff, 1977) is a 20-item measure that assesses the frequency of depressive symptoms experienced during the past week. The CES-D has demonstrated good internal consistency in both general and clinical populations (αs = 0.85 and 0.90, respectively; Radloff, 1977) and correlates strongly with the Beck Depression Inventory (r = 0.87; Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995).

2.2.4. Fear of negative evaluation scale (FNE)

The FNE (Watson & Friend, 1969) was used to measure participants' social anxiety. The FNE is a 30-item true/false scale that assesses expectation and distress related to negative evaluation

from others. The scale has demonstrated good internal consistency and test-retest reliability (Oei, Kenna, & Evans, 1991; Watson & Friend, 1969).

2.2.5. Agoraphobic cognitions questionnaire (ACQ)

The ACQ (Chambless, Caputo, Bright, & Gallagher, 1984) measures the frequency of 14 different fearful cognitions associated with panic attacks and agoraphobia. Constructed to measure the cognitive aspect of 'fear of fear,' the ACQ is generally considered a measure of AS. Chambless, Caputo, Bright and Gallagher (1984) reported that the ACQ has adequate test-retest reliability ($r = 0.86$) and internal consistency ($\alpha = 0.80$).

2.2.6. Body vigilance scale (BVS)

The BVS (Schmidt, Lerew, & Trakowski, 1997) measures the tendency to attend to panic-related body sensations. The BVS has demonstrated good internal consistency and adequate test-retest reliability (Schmidt, Lerew & Trakowski, 1997). Schmidt et al. conceptualized body vigilance as a natural consequence of learning to fear body sensations through the experience of unexpected panic attacks. Consistent with this view, AS was found to be significantly related to BVS scores and predicted changes in body vigilance in panic disorder patients throughout cognitive–behavioral treatment.

2.3. Procedure

Participants completed the psychometric assessment on a website created for the study and received course credit for their participation. Informed consent was obtained electronically via clicking a web link as proxy for signature. After completing the measures, participants' data were submitted electronically to a database that was read into a statistical software package (SPSS) for data analysis. Participants were informed that their responses would be kept confidential and that they were free to withdraw from the study at any time.

3. Results

3.1. Reliability and item-level analyses

The mean ASI-R total score was 25.7 (S.D.=19.6). ASI-R total scores for women (M = 26.7, S.D. = 19.5) were significantly higher than those for men (M = 22.1, S.D. = 19.4), $t(556) = -2.51$, $P < 0.05$. Given that the scale consisted of 36 items, these mean ASI-R total scores indicate that participants tended to indicate either 'very little' or 'a little' agreement with the scale items. Means and standard deviations for the ASI-R items are presented in Table 1. Mean scores on 25 out of 36 items were below 1.0 (i.e. 'a little' agreement with the item), suggesting that the content of most ASI-R items was outside of the experience of most participants. The ASI-R demonstrated excellent internal consistency ($\alpha = 0.95$). Based on the criterion of 0.30 as an acceptable corrected item-total correlation, (Nunnally & Bernstein, 1994), all 36 items performed adequately (M = 0.58, range = 0.40 to 0.71).

Table 1
Anxiety Sensitivity Index - Revised (ASI-R): Item means and standard deviations, obliquely-rotated factor loadings, and communalities for the four-factor solution from study 1

ASI-R item	M	S.D.	ASI-R factor				
			I	II	III	IV	h^2
19. When I feel pain in my chest, I worry that I'm having a heart attack.	0.34	0.77	**0.76** (**0.74**)	−0.01 (−0.01)	−0.04 (−0.16)	−0.13 (−0.10)	0.63 (0.60)
11. When my head is pounding, I worry that I could have a stroke.	0.13	0.49	**0.76** (**0.71**)	−0.20 (−0.20)	0.11 (0.11)	0.01 (0.00)	0.58 (0.52)
7. When I notice my heart is beating rapidly, I worry that I might have a heart attack.	0.27	0.73	**0.74** (**0.72**)	−0.11 (-0.09)	−0.09 (−0.08)	−0.22 (−0.18)	0.61 (0.56)
33. When my face feels numb, I worry that I might be having a stroke.	0.17	0.51	**0.72** (**0.63**)	0.05 (0.02)	0.03 (0.05)	0.13 (0.09)	0.49 (0.40)
27. When I notice my heart skipping a beat, I worry that there is something seriously wrong with me.	0.43	0.85	**0.62** (**0.58**)	0.09 (0.10)	−0.05 (−0.03)	−0.14 (−0.11)	0.50 (0.45)
25. When I feel strong pain in my stomach, I worry that it could be cancer.	0.16	0.55	**0.57** (**0.52**)	−0.04 (0.22)	0.25 (0.23)	0.06 (0.04)	0.46 (0.40)
26. When I have trouble swallowing, I worry that I could choke.	0.36	0.75	**0.57** (**0.52**)	0.25 (0.22)	0.18 (0.18)	0.12 (0.10)	0.54 (0.49)

(*continued on next page*)

Table 1 (*continued*)

ASI-R item	M	S.D.	ASI-R factor				
			I	II	III	IV	h^2
16. When my breathing becomes irregular, I fear that something bad will happen.	0.58	0.87	**0.55** (**0.55**)	0.13 (0.17)	0.00 (−0.02)	−**0.32** (−0.25)	0.64 (0.62)
13. When I feel like I'm not getting enough air, I get scared that I might suffocate.	0.52	0.91	**0.54** (**0.51**)	0.26 (0.27)	0.08 (0.08)	−0.02 (0.00)	0.53 (0.49)
32. When my throat feels tight, I worry that I could choke to death.	0.21	0.62	**0.53** (**0.49**)	0.10 (0.09)	**0.39** (**0.36**)	0.13 (0.11)	0.59 (0.55)
15. When my chest feels tight, I get scared that I won't be able to breathe properly.	0.72	0.91	**0.51** (**0.51**)	0.20 (0.23)	−0.03 (−0.04)	−0.24 (−0.17)	0.55 (0.52)
28. It scares me when I feel tingling or pricking sensations in my hands	0.45	0.79	**0.43** (**0.39**)	0.19 (0.18)	0.12 (0.12)	−0.12 (−0.10)	0.43 (0.40)
9. When my stomach is upset, I worry that I might be seriously ill.	0.33	0.68	**0.37** (**0.36**)	−0.05 (−0.01)	0.14 (0.13)	−**0.37** (−**0.31**)	0.46 (0.41)
14. When I get diarrhea, I worry that I might have something wrong with me.	0.46	0.81	0.28 (0.26)	0.11 (0.13)	0.17 (0.15)	−0.17 (−0.13)	0.29 (0.27)

Table 1 (*continued*)

ASI-R item	M	S.D.	ASI-R factor				
			I	II	III	IV	h^2
20. I believe it would be awful to vomit in public.	2.04	1.37	0.00 (0.00)	**0.77** (**0.69**)	−0.20 (−0.16)	−0.06 (−0.04)	0.56 (0.44)
35. I think it would be horrible for me to faint in public.	1.24	1.21	0.06 (0.04)	**0.64** (**0.53**)	−0.11 (−0.06)	−0.06 (−0.07)	0.43 (0.32)
1. It is important to me not to appear nervous.	1.99	1.13	−0.07 (−0.06)	**0.60** (**0.50**)	0.05 (0.06)	0.00 (−0.02)	0.37 (0.27)
18. Smothering sensations scare me.	1.22	1.22	0.24 (0.22)	**0.58** (**0.54**)	−0.05 (−0.04)	−0.04 (−0.01)	0.47 (0.41)
12. When I tremble in the presence of others, I fear what people might think of me.	1.02	1.09	0.04 (0.05)	**0.57** (**0.53**)	0.16 (0.14)	−0.08 (−0.06)	0.49 (0.44)
30. When I begin to sweat in social situations, I fear people will think negatively of me.	1.02	1.08	−0.06 (−0.04)	**0.53** (**0.49**)	0.25 (0.21)	−0.05 (−0.05)	0.45 (0.38)
22. I worry that other people will notice my anxiety.	1.08	1.12	−0.10 (−0.09)	**0.52** (**0.55**)	**0.32** (0.28)	−0.25 (−0.19)	0.66 (0.65)
24. It scares me when I blush in front of people.	0.54	0.98	0.06 (0.06)	**0.51** (**0.45**)	**0.33** (0.28)	0.15 (0.10)	0.45 (0.36)

Table 1 (*continued*)

ASI-R item	M	S.D.	ASI-R factor				
			I	II	III	IV	h^2
21. It scares me when my body feels strange or different in some way	1.18	1.00	0.08 (0.09)	**0.40** (**0.42**)	0.10 (0.08)	**−0.38** (**−0.30**)	0.56 (0.53)
17. It frightens me when my surroundings seem strange or unreal.	1.03	1.02	0.01 (0.03)	**0.39** (**0.40**)	0.15 (0.13)	**−0.33** (−0.25)	0.48 (0.44)
2. When I cannot keep my mind on a task, I worry that I might be going crazy.	0.39	0.76	0.04 (0.04)	−0.06 (−0.05)	**0.80** (**0.73**)	−0.01 (−0.02)	0.63 (0.55)
34. When I have trouble thinking clearly, I worry that there is something wrong with me.	0.50	0.85	0.05 (0.02)	0.10 (0.09)	**0.76** (**0.76**)	−0.10 (−010)	0.75 (0.74)
31. When my thoughts seem to speed up, I worry that I might be going crazy.	0.30	0.69	0.10 (0.10)	0.02 (0.02)	**0.73** (**0.68**)	−0.01 (−0.02)	0.63 (0.57)
23. When I feel ‘spacey’ or spaced out, I worry that I may be mentally ill.	0.29	0.70	0.17 (0.17)	−0.04 (−0.03)	**0.68** (**0.64**)	−0.06 (−0.06)	0.61 (0.56)
10. It scares me when I am unable to keep my mind on a task.	0.71	0.90	−0.11 (−0.07)	0.06 (0.09)	**0.67** (**0.58**)	−0.22 (−0.20)	0.55 (0.47)

Table 1 (*continued*)

ASI-R item	M	S.D.	ASI-R factor				
			I	II	III	IV	h^2
36. When my mind goes blank, I worry that there is something terribly wrong with me.	0.39	0.82	0.16 (0.16)	0.06 (0.08)	**0.63** (**0.58**)	−0.07 (−0.05)	0.60 (0.55)
4. It scares me when I feel faint.	1.20	1.11	−0.06 (−0.06)	0.06 (0.04)	0.07 (0.08)	**−0.81** (**−0.79**)	0.70 (0.67)
5. It scares me when my heart beats rapidly.	0.97	1.50	0.17 (0.18)	−0.05 (−0.05)	−0.01 (−0.16)	**−0.79** (**−0.76**)	0.71 (0.67)
6. It scares me when I am nauseous.	0.90	1.02	−0.05 (−0.03)	0.05 (−0.09)	0.05 (−0.08)	**−0.79** (**−0.73**)	0.66 (0.60)
3. It scares me when I feel 'shaky' (trembling).	1.04	0.95	−0.02 (−0.01)	0.06 (0.06)	0.17 (0.16)	**−0.71** (**−0.66**)	0.64 (0.59)
8. It scares me when I become short of breath.	0.86	0.97	**0.31** (**0.33**)	0.16 (0.19)	−0.14 (−0.14)	**−0.56** (**−0.48**)	0.61 (0.57)
29. When I feel dizzy, I worry there is something wrong with me.	0.62	0.82	0.10 (0.11)	0.10 (0.14)	0.14 (0.13)	**−0.55** (**−0.47**)	0.52 (0.47)
% Variance of rotated factors			37.82 (36.48)	7.46 (6.08)	5.96 (4.73)	3.82 (2.45)	

Factor loadings outside of parenthesis pertain to PCA; those inside parentheses pertain to PAF. Factor loadings ≥|0.30| are listed in boldface type. The first seven eigenvalues were 13.62, 2.68, 2.15, 1.38, 1.13, 1.09, and 0.97.

3.2. Factor structure of the ASI-R

Given that only one published study at the time of this writing has reported a factor analysis on the ASI-R (Taylor & Cox, 1998b), we elected to use an exploratory rather than confirmatory factor analytic approach. We chose principal components analysis (PCA) as the primary method of factor analysis because factor scores from principal-axis factor analysis (PAF) are indeterminate (Schönemann & Wang, 1972). Experts have debated the merits of PCA versus PAF, and there are reasons to recommend both approaches to factor extraction (Gorsuch, 1983; Velicer & Jackson, 1990). Although most studies in the AS factor analytic literature have used PCA, recent studies have obtained very similar results using both PCA and PAF (Taylor & Cox, 1998a, 1998b). In the present study, we conducted factor analysis of the ASI-R twice, once using PCA and once using PAF. Factors were rotated using an oblique (Oblimin) transformation in both cases. The number of factors to retain was determined by parallel analysis, a statistical procedure for determining the break in the scree plot. This method is one of the most accurate techniques for determining the number of factors to retain across varying sample conditions (Zwick & Velicer, 1986). Based on the recommendations of Longman, Cota, Holden and Fekken (1989), parallel analyses were conducted twice, once using the mean eigenvalues and once using the 95th percentile eigenvalues.

Although six factors had eigenvalues greater than 1.0, parallel analysis indicated a four-factor solution for both the mean and 95th percentile eigenvalues. Accordingly, four factors were extracted for both PCA and PAF. Table 1 displays the eigenvalues, pattern matrices (loadings), communalities, and percentage of variance for the four rotated factors. The pattern of salient loadings was very similar across PCA and PAF, indicating that both methods produced essentially the same factor structure. The four-factor solution accounted for 55.1% of the ASI-R item variance in PCA, and 49.7% of the item variance in PAF. The magnitude of the communalities suggests that the factors accounted for a moderately large portion of the variance in most items. Table 1 also shows that the first factor accounted for a substantial portion of the variance in ASI-R item scores (37.8% in PCA), whereas the remaining three factors explained smaller portions of the item variance (between 7.5 and 2.5% each).

Factor I had 14 items with salient ($\geq$0.30) loadings and assessed beliefs about the catastrophic consequences of somatic sensations. Most items on this factor address beliefs about the occurrence of a specific, feared consequence resulting from experiencing a specific body sensation (e.g. ‘When I notice my heart is beating rapidly, I worry I might have a heart attack’). Accordingly, this factor was labeled as ‘beliefs about the harmful consequences of somatic sensations.’ Factor II had 10 items with salient loadings and was labeled ‘fear of publicly observable anxiety reactions.’ Factor III contained nine items with salient loadings (seven items in PAF) and was labeled ‘fear of cognitive dyscontrol.’ The fourth factor consisted of 10 items with salient loadings (eight items in PAF) and also assessed fear of somatic sensations. Most items on factor IV begin with the stem ‘It scares me when…’ and do not assess beliefs about explicit consequences of somatic symptoms (e.g. ‘It scares me when my heart beats rapidly’). Factor IV was labeled ‘fear of somatic sensations without explicit consequences.’ Inspection of the factor loadings in Table 1 indicates that factors I and IV assess fears of several identical somatic symptoms (e.g. heart palpitations, dyspnea) and differ primarily according to whether the items refer to simply being ‘scared’ of a

symptom (i.e. anxious affect) or believing that a symptom results in a harmful consequence (i.e. anxious cognition).

The adequacy of the four-factor solution was evaluated through consideration of simple structure (Thurstone, 1947), the criteria for stability suggested by Guadagnoli and Velicer (1988), and by examining the internal consistency of each factor. As shown by the pattern matrices in Table 1, the four-factor solution appears to have somewhat mixed simple structure. Each factor consisted of an adequate number of items with salient loadings (range in PCA = 9–14), and only one item failed to load on any factor ('When I get diarrhea, I worry that I might have something wrong with me'). However, PCA resulted in an unsatisfactory total of eight complex items (i.e. items with salient loadings on more than one factor). The four-factor ASI-R solution reported by Taylor & Cox, 1998b) also contained an undesirable number of complex items (10 in PCA). It should be noted, though, that in both studies each complex item's second highest loading was less than 0.40, indicating that no items were markers (e.g. $\geq$0.60) for more than one factor. Guadagnoli and Velicer (1988) recommended that in order to be considered stable, factors should have (a) four or more loadings above 0.60, (b) 10 or more items with loadings above 0.40 and a sample size greater than 150, or (c) a sample size of greater than 300 for factors with only a few loadings. Based on these criteria, each factor in the present study appears satisfactorily stable. Finally, to determine each factor's internal consistency, subscales were created by assigning items to subscales based on their highest salient factor loading. Each subscale showed adequate internal consistency (αs for factors I–IV = 0.91, 0.86, 0.89, and 0.89, respectively).

In order to examine the replicability of the four-factor ASI-R solution, coefficients of congruence (Gorsuch, 1983) were computed between the factor loadings from PCA in the present study and those reported by Taylor & Cox, 1998b). These data are presented in Table 2. The 'fear of cognitive dyscontrol' and 'fear of publicly observable anxiety reactions' factors from both studies were highly similar (coefficients of congruence = 0.89 and 0.91, respectively). The first factor

Table 2
Coefficients of congruence between Anxiety Sensitivity Index - Revised (ASI-R) factors from study 1 and from Taylor & Cox (1998b)

Factor from Taylor & Cox (1998b)	Factor from the present study			
	I	II	III	IV
I	0.54	0.37	0.16	0.62
II	0.00	0.89	0.22	0.30
III	0.81	0.06	0.21	0.41
IV	0.23	0.25	0.91	0.23

Correlations between ASI-R factor IV from study 1 and other variables, although negative in sign, reflect positive relationships; these are reported here as positive correlations for ease of interpretability. Coefficients of congruence (Gorsuch, 1983) were derived using loadings from the factor pattern matrix. ASI-R factor labels assigned by Taylor & Cox, 1998b): factor I, fear of respiratory symptoms; factor II, fear of publicly observable anxiety reactions; factor III, fear of cardiovascular symptoms; factor IV, fear of cognitive dyscontrol. ASI-R factor labels assigned in the present study: factor I, beliefs about the harmful consequences of somatic sensations; factor II, fear of publicly observable anxiety reactions; factor III, fear of cognitive dyscontrol; factor IV, fear of somatic sensations without explicit consequences.

from the present study, labeled 'beliefs about the harmful consequences of somatic sensations,' was highly comparable to the 'fear of cardiovascular symptoms' factor from Taylor and Cox (coefficient of congruence = 0.81) and moderately comparable to their 'fear of respiratory symptoms' factor (coefficient of congruence = 0.54). The fourth factor from the present study, labeled 'fear of somatic sensations without explicit consequences,' was moderately similar to the 'fear of respiratory symptoms' factor from Taylor and Cox (coefficient of congruence = 0.62) and was less strongly associated with their 'fear of cardiovascular symptoms' factor (coefficient of congruence = 0.41). Thus, while the social and cognitive AS factors were highly replicable across studies, the two somatic factors from the present study showed less convergence with those reported by Taylor and Cox.

Finally, following Taylor & Cox (1998b), the higher-order factor structure of the ASI-R was examined by conducting a PCA on the obliquely-rotated factor scores obtained via PCA, and by conducting a PAF on the factor scores obtained via PAF. For PCA, the eigenvalues were 2.16, 0.75, 0.63, and 0.46, and thus a single higher-order factor was extracted. The higher-order factor accounted for 54.0% of the variance, and each lower-order factor loaded at greater than 0.70 on this factor. For PAF, the eigenvalues were 2.54, 0.68, 0.51, and 0.27, and the single higher-order factor explained 63.5% of the variance. Thus, the results supported a hierarchical solution for the ASI-R in which the four lower-order factors loaded on a single higher-order factor.

3.3. Correlates of the ASI-R and its factors

Table 3 presents correlations between the ASI-R, the lower-order ASI-R factors, and the ACQ, SAS, BVS, FNE, and CES-D. The ASI-R lower-order factors were strongly correlated with ASI-R total scores (range = 0.68 to 0.76). The two somatic ASI-R factors were strongly correlated ($r = 0.76$), while other comparisons between ASI-R factors yielded mild-to-moderate correlations. ASI-R total scores were moderately correlated with measures of anxiety, depression, body vigilance, and negative evaluation sensitivity (range = 0.36 to 0.45). ASI-R total scores were most strongly associated with a different measure of the same construct, the ACQ ($r = 0.56$). The four ASI-R factors demonstrated the same pattern of correlations with the ACQ. Consistent with theoretical expectations, the ASI-R 'fear of publicly observable anxiety reactions' factor was more strongly associated with negative evaluation sensitivity (FNE) than the other factors, while the ASI-R 'fear of cognitive dyscontrol' factor was more related to depression (CES-D) than the other factors. ASI-R factor IV was consistently more related with criterion measures than factor I. This was particularly the case with respect to anxiety symptoms, as factor IV was correlated with the SAS at $r = 0.33$ compared to a correlation of 0.13 for factor I.

4. Discussion

Findings from study 1 generally replicated those reported by Taylor & Cox (1998b). The ASI-R was composed of lower-order factors assessing fears of somatic, publicly observable, and cognitive dyscontrol anxiety symptoms. These factors were statistically reliable and demonstrated theoretically consistent relationships with related variables. The two ASI-R somatic factors, however, were less replicable than the other factors and diverged from the results reported by Taylor &

Table 3
Pearson correlations between Anxiety Sensitivity Index - Revised (ASI-R) factors and related measures from study 1

Scale	ASI-R total score	ASI-R factor scores			
		I	II	III	IV
ASI-R total score					
ASI-R factor I	0.73				
ASI-R factor II	0.76	0.31			
ASI-R factor III	0.68	0.44	0.38		
ASI-R factor IV	0.76	0.76	0.41	0.47	
ACQ	0.56	0.33	0.42	0.49	0.40
SAS	0.36	0.13	0.26	0.35	0.33
BVS	0.45	0.31	0.34	0.36	0.31
FNE	0.39	0.10	0.42	0.36	0.26
CES-D	0.40	0.17	0.35	0.40	0.27

All $rs \geq 0.14$ are significant, $P < 0.001$. Correlations between ASI-R factor IV and other variables from study 1, although negative in sign, reflect positive relationships; these are reported as positive correlations for ease of interpretability. ACQ, agoraphobic cognitions questionnaire; SAS, self-rating anxiety scale; BVS, body vigilance scale; FNE, fear of negative evaluation scale; CES-D, Center for Epidemiological Studies, depression scale.

Cox (1998b) in an interpretable manner. The ASI-R factor structure obtained in study 1 has important implications for the validity and utility of the ASI-R in nonclinical samples. However, given the unexpected nature of our factor analytic results with respect to the somatic factors, replication of these findings in an independent sample would bolster confidence in their reliability. Accordingly, we elected to repeat our examination of the ASI-R in a second sample of college students.

5. Study 2: Method

The study questionnaires were administered to a second sample of undergraduate students recruited from introductory psychology courses at University of North Carolina at Chapel Hill. This sample consisted of 444 participants, including 332 women (74.8%), with a mean age of 19.0. The sample was 77% White/Caucasian ($n = 342$), followed by 56 Black/African Americans, 21 Asians or Pacific islanders (4.7%), and 25 participants (5.6%) of other, multiple, or unreported ethnicities. The measures and procedures were identical to those used in study 1.

6. Results

6.1. Reliability and item-level analyses

Mean ASI-R total scores were 25.4 (S.D. = 18.7), and were marginally higher for women (M = 26.3, S.D. = 19.9) than for men (M = 22.7, S.D. = 14.4), t (442) = 1.77, $P < 0.10$. The

scale demonstrated excellent internal consistency ($\alpha = 0.94$). Each item had an adequate corrected item-total correlation (M = 0.55, range = 0.30 to 0.68).

6.2. Factor structure of the ASI-R

Exploratory factor analysis was used to examine the ASI-R's factor structure. Although confirmatory factor analysis (CFA) is sometimes used in similar situations, at least three caveats indicate that an exploratory approach is a more appropriate analytic strategy. First, to date, our study 1 and Taylor & Cox, 1998b) constitute the only investigations of the ASI-R's factor structure. Second, our results in study 1 failed to replicate those reported by Taylor & Cox, 1998b). Third, factor solutions from both studies included numerous items with complex loadings and loadings on theoretically unexpected factors. These circumstances suggest that more exploratory research on the ASI-R's factor structure is needed before researchers attempt to confirm the latent structure of this measure.

The lower-order factor structure of the ASI-R was examined through PCA and PAF with Oblimin rotation. Parallel analysis indicated a four-factor solution for both the mean and 95th percentile eigenvalues; accordingly, four factors were extracted. Table 4 displays the item means and standard deviations, factor loadings, and communalities for the four-factor ASI-R solution. As can be seen, these results are highly comparable to those from study 1 (see Table 1). The solution accounted for 53.6% of the ASI-R item variance in PCA and 48.2% in PAF. The pattern of loadings in Table 4 suggests the following factor labels: 'beliefs about the harmful consequences of somatic sensations' (factor I), 'fear of publicly observable anxiety reactions' (factor II), 'fear of cognitive dyscontrol' (factor III), and 'fear of somatic sensations without explicit consequences' (factor IV). Note that these labels correspond to labels assigned to factors in study 1. Subscales computed from each factor demonstrated adequate internal consistency (αs for factors I–IV = 0.89, 0.80, 0.87, and 0.91, respectively).

Coefficients of congruence (Gorsuch, 1983) were computed to determine the degree of convergence between the four-factor solution from study 2 and results from study 1 and Taylor & Cox, 1998b). Congruence coefficients between corresponding factors from studies 1 and 2 were 0.96, 0.98, 0.95, and 0.94 for factors I to IV, respectively. These data indicate that the factor solutions obtained in studies 1 and 2 were essentially identical. Table 5 presents coefficients of congruence comparing results from study 2 and those reported by Taylor and Cox. As expected, these data replicated those from study 1 (see Table 2). Factors assessing fear of cognitive dyscontrol and publicly observable anxiety symptoms were highly replicable across studies. The two somatic factors from study 2 were less replicable and appeared to represent a blend of the two somatic factors reported by Taylor and Cox.

To examine the hierarchical structure of the ASI-R, scores on the four lower-order factors obtained via PCA and PAF were factor analyzed using PCA and PAF, respectively. A single factor was extracted in PCA (eigenvalues = 1.97, 0.84, 0.71, 0.48) that accounted for 49.2% of the variance. Likewise, PAF revealed a single higher-order factor (eigenvalues = 2.28, 0.76, 0.61, 0.34) that explained 57.1% of the variance. Thus, replicating study 1, the four lower-order ASI-R factors loaded on a single higher-order factor.

Table 4
Anxiety Sensitivity Index - Revised (ASI-R): item means and standard deviations, obliquely rotated factor loadings, and communalities for the four-factor solution from study 2

ASI-R item	M	S.D.	ASI-R factor h^2				
			I	II	III	IV	
32	0.23	0.62	**0.75** (**0.71**)	0.01 (0.08)	−0.10 (−0.11)	0.10 (0.11)	0.59 (0.52)
33	0.20	0.61	**0.71** (**0.65**)	0.02 (0.00)	−0.01(−0.04)	0.03 (0.04)	0.50 (0.42)
11	0.15	0.59	**0.71** (**0.63**)	−0.12 (−0.13)	−0.15 (−0.16)	0.06 (0.04)	0.52 (0.43)
19	0.35	0.78	**0.69** (**0.71**)	−0.07 (−0.08)	0.07 (0.05)	−0.12 (−0.14)	0.62 (0.58)
26	0.39	0.74	**0.66** (**0.60**)	0.15 (0.13)	−0.07 (−0.08)	0.05 (0.05)	0.50 (0.43)
13	0.57	0.96	**0.58** (**0.61**)	0.19 (0.18)	0.16 (0.14)	−0.23 (−0.14)	0.56 (0.52)
25	0.18	0.62	**0.51**(**0.46**)	−0.12 (−0.10)	−0.21 (−0.19)	−0.07 (−0.08)	0.40 (0.34)
16	0.67	0.95	**0.50** (**0.57**)	0.15 (0.17)	0.14 (0.14)	−**0.39** (−0.26)	0.61 (0.59)
7	0.32	0.78	**0.49** (**0.51**)	−0.20 (−0.21)	−0.03 (−0.04)	−**0.44** (−**0.38**)	0.61 (0.58)
15	0.76	0.99	**0.48 (0.54)**	0.16 (0.17)	0.13 (0.12)	−**0.35** (−0.23)	0.55 (0.52)
9	0.30	0.75	**0.43** (**0.44**)	−0.03 (−0.02)	−**0.33** (−**0.31**)	−0.23 (−0.19)	0.57 (0.54)
14	0.43	0.80	**0.32** (0.28)	0.11 (0.10)	−0.23 (−0.20)	−0.03 (−0.04)	0.26 (0.23)
20	2.09	1.38	−0.01 (−0.01)	**0.78 (0.68)**	0.21 (0.16)	−0.01 (0.00)	0.55 (0.41)
35	1.24	1.28	0.08 (0.07)	**0.68** (**0.56**)	0.26 (0.18)	−0.03 (−0.03)	0.46 (0.30)
30	0.93	1.04	−0.13 (−0.09)	**0.59** (**0.55**)	−0.18 (−0.15)	−0.13 (−0.10)	0.47 (0.40)
22	0.96	1.06	0.01 (0.03)	**0.58** (**0.58**)	−**0.32** (−0.29)	−0.08 (−0.05)	0.60 (0.57)
1	1.95	1.16	−0.01 (−0.02)	**0.55** (**0.44**)	−0.07 (0.09)	0.06 (0.02)	0.31 (0.22)
12	0.93	1.07	0.03 (0.04)	**0.53** (**0.48**)	−0.21 (−0.19)	−0.13 (−0.12)	0.48 (0.42)
24	0.42	0.76	−0.02 (−0.03)	**0.45** (**0.39**)	−**0.33** (−0.27)	0.12 (0.07)	0.35 (0.26)
17	1.04	0.96	0.13 (0.14)	**0.42** (**0.40**)	−0.22 (−0.19)	−0.15 (−0.12)	0.43 (0.40)
18	1.32	1.23	0.19 (0.20)	**0.39** (**0.35**)	−0.08 (−0.08)	−0.13 (−0.09)	0.32 (0.29)
2	0.32	0.71	0.05 (0.04)	−0.12 (−0.11)	−**0.75**(−**0.73**)	−0.20 (−0.20)	0.68 (0.65)
23	0.26	0.69	0.21 (0.19)	0.00 (0.01)	−**0.71** (−**0.67**)	0.02 (0.02)	0.63 (0.58)
34	0.45	0.77	0.03 (0.04)	0.10 (0.12)	−**0.68** (−**0.62**)	−0.11 (−0.09)	0.59 (0.53)
31	0.28	0.69	0.19 (0.18)	−0.01(0.01)	−**0.66** (−**0.61**)	−0.03 (−0.03)	0.57 (0.51)
10	0.66	0.94	−0.13 (−0.09)	0.12 (0.15)	−**0.65** (−**0.58**)	−0.21 (−0.19)	0.55 (0.47)
36	0.27	0.67	0.22 (0.20)	0.19 (0.20)	−**0.61** (−**0.56**)	0.08 (0.07)	0.58 (0.53)
5	1.02	1.09	−0.01 (0.03)	−0.04 (−0.03)	−0.01 (0.00)	−**0.89** (−**0.87**)	0.77 (0.76)
4	1.15	1.09	0.01 (0.06)	0.03 (0.04)	0.04 (0.05)	−**0.85** (−**0.81**)	0.73 (0.70)
3	1.05	1.07	−0.22 (−0.18)	0.06 (0.07)	−0.20 (−0.19)	−**0.82** (−**0.79**)	0.69 (0.65)
6	0.84	0.96	0.03 (0.09)	0.05 (0.07)	−0.10 (−0.09)	−**0.69** (**0.59**)	0.57 (0.51)
8	0.86	1.07	0.25 (**0.33**)	0.06 (0.08)	0.04 (0.04)	−**0.64** (−**0.52**)	0.64 (0.60)
27	0.52	0.92	**0.36** (**0.41**)	−0.04 (−0.02)	0.06 (0.04)	−**0.51** (−**0.41**)	0.54 (0.49)
29	0.71	0.90	0.20 (0.26)	0.07 (0.09)	−0.12 (−0.11)	−**0.50** (−**0.39**)	0.48 (0.44)
21	1.14	0.97	0.01 (0.08)	**0.31**(**0.32**)	−0.20 (−0.18)	−**0.46** (−**0.37**)	0.53 (0.50)
28	0.45	0.80	**0.31** (**0.33**)	0.12 (0.13)	−0.23 (−0.21)	−**0.33** (−0.27)	0.52 (0.49)
% Variance of rotated factors			35.00 (33.65)	8.24 (6.78)	5.97 (4.59)	4.43 (3.16)	

Factor loadings outside of parenthesis pertain to PCA; those inside parentheses pertain to PAF. Factor loadings ≥|0.30| are listed in boldface type. The first eight eigenvalues were 12.60, 2.97, 2.15, 1.59, 1.26, 1.13, 1.09, and 0.99.

Table 5
Coefficients of congruence between Anxiety Sensitivity Index - Revised (ASI-R) factors from study 2 and from Taylor & Cox (1998b)

Factor from Taylor & Cox (1998b)	Factor from the present study			
	I	II	III	IV
I	0.58	0.31	0.09	0.77
II	0.01	0.92	0.23	0.22
III	0.76	0.01	0.22	0.50
IV	0.24	0.26	0.89	0.27

Correlations between ASI-R factors III and IV and other variables, although negative in sign, reflect positive relationships; these are reported here as positive correlations for ease of interpretability.

6.3. *Correlates of the ASI-R and its factors*

Zero-order correlations were computed to determine relationships between the ASI-R, its lower-order factors, and measures of anxiety and related constructs. These results, reproduced in Table 6, closely resemble those obtained in study 1 (see Table 3). Correlations between ASI-R scores and other measures were generally moderate. Total ASI-R scores were most strongly related to the ACQ ($r = 0.56$), followed by the SAS ($r = 0.52$) and BVS ($r = 0.52$). Similar to study 1, ASI-R factor IV was more strongly associated with each criterion measure than factor I. Results from study 2 also indicated that fear of cognitive dyscontrol was more strongly correlated with the ACQ, SAS, and CES-D than the other ASI-R factors.

Table 6
Pearson correlations between Anxiety Sensitivity Index - Revised (ASI-R) factors and related measures from study 2

Scale	ASI-R total score	ASI-R factor scores			
		I	II	III	IV
ASI-R total score					
ASI-R factor I	0.73	–			
ASI-R factor II	0.64	0.20	–		
ASI-R factor III	0.61	0.31	0.29	–	
ASI-R factor IV	0.80	0.50	0.30	0.31	–
ACQ	0.57	0.36	0.33	0.50	0.45
SAS	0.52	0.29	0.26	0.54	0.42
BVS	0.52	0.42	0.21	0.39	0.44
FNE	0.32	0.10	0.36	0.27	0.21
CES-D	0.45	0.20	0.31	0.54	0.32

All *r*s are significant, $P < 0.001$. Correlations between ASI-R factors III and IV and other variables from study 2, although negative in sign, reflect positive relationships; these are reported as positive correlations for ease of interpretability.

7. Discussion

The present study evaluated the psychometric properties, factor structure, and construct validity of the ASI-R (Taylor & Cox, 1998b) in two samples with a combined total of 1002 participants. Our findings indicate that the ASI-R is highly internally consistent with all items correlating sufficiently with the total scale. These results stand in contrast to research indicating that the original ASI (Reiss, Peterson, Gursky & McNally, 1986) contains numerous items with unacceptable psychometric properties (Blais et al., 2001). Taken together with the results of Blais et al. (2001), our results suggest that the revised and expanded ASI-R is a reliable and psychometrically sound measure that may improve upon the psychometric limitations of the ASI.

Participants tended to endorse either 'little' or 'very little' agreement with the vast majority of ASI-R items. Mean ASI-R total scores from study 1 (M = 25.7, S.D. = 19.6) and study 2 (M = 25.4, S.D. = 18.7) underscore this point. These findings suggest that the content of most ASI-R items is relatively far removed from the experience of most undergraduates. This issue appears to be less of a problem with the original ASI. Normative data from the ASI manual (Peterson & Reiss, 1992), obtained from 4517 participants across 12 studies, indicated a mean score of 19.0 (S.D. = 9.1) on this 16-item measure. What might account for the apparent tendency of nonclinical participants to more readily endorse items on the ASI than on the ASI-R? A likely explanation can be found in the content of the ASI-R items. When Taylor & Cox (1998b) expanded the ASI item pool, they increased the proportion of items that assess beliefs about the occurrence of catastrophic consequences resulting from anxiety-related sensations (e.g. 'When my head is pounding, I worry that I could have a stroke'). The ASI contains four such items (25% of the scale), whereas 21 of the ASI-R's 36 items (58.3%) share this format. Results from studies 1 and 2 indicate that these items tend to have the lowest mean scores. More subjectively, many of these items appear to assess beliefs that are simply not applicable to most nonclinical respondents. Overall, these findings suggest that the ASI-R's greater coverage of catastrophic anxiety-related beliefs may come at the expense of the scale's utility in nonclinical populations.

Results from a series of exploratory factor analyses indicate that AS is multidimensional and structured in a hierarchical manner. The ASI-R was found to consist of four lower-order factors, all of which loaded on to a single higher-order factor. These lower order factors were assigned the following labels: (1) 'beliefs about the harmful consequences of somatic sensations,' (2) 'fear of publicly observable anxiety reactions,' (3) 'fear of cognitive dyscontrol,' and (4) 'fear of somatic sensations without explicit consequences.' Coefficients of congruence (Gorsuch, 1983) indicated that the four-factor ASI-R solutions from studies 1 and 2 were essentially identical. Each of the four lower-order factors demonstrated adequate internal consistency and had a substantial number of items with salient factor loadings. These findings are consistent with research indicating that AS consists of lower-order domains pertaining to fears of somatic, cognitive, and social anxiety symptoms (Zinbarg, Mohlman & Hong, 1999). The improved content validity and internal consistency of each factor suggests that the ASI-R more adequately assesses the lower-order facets of AS than does the original ASI.

An important goal of the present study was to attempt to replicate the ASI-R factor structure obtained by Taylor & Cox (1998b). Coefficients of congruence indicated that the ASI-R 'fear of cognitive dyscontrol' and 'fear of publicly observable anxiety reactions' factors were highly replicable across studies. Given that these factors were internally consistent and composed of an

adequate number of items, the ASI-R appears to more adequately assess these domains than the ASI. There was less convergence between the somatic factors in the present study and those reported by Taylor and Cox. The 'beliefs about the harmful consequences of somatic sensations' factor from the present study most closely resembled Taylor and Cox's fear of cardiovascular symptoms factor; these factors each assessed sensitivity to cardiovascular symptoms as well as fears of a variety of other somatic phenomena (e.g. stroke). The 'fear of somatic sensations without explicit consequences' factor from the current study was most strongly related to Taylor and Cox's fear of respiratory symptoms factor. The two somatic factors obtained in studies 1 and 2 appear to reflect a blend of the somatic factors reported by Taylor and Cox. Overall, the ASI-R factor solution obtained in the present study generally resembled the results of Taylor and Cox. The present study's results diverged from theirs, however, in a manner that bears closer examination.

Taylor and Cox's (1998b) clinical sample appeared to endorse ASI-R items according to their domain (e.g. fear of somatic, cognitive, or social anxiety symptoms). Accordingly, items assessing respiratory concerns loaded on the same factor regardless of whether they explicitly assessed affect (e.g. 'Smothering sensations scare me') or cognition ('When I feel like I'm not getting enough air I get scared that I might suffocate'). This observation is consistent with a key assumption of the definition of AS, namely, that individuals fear anxiety-related sensations *based on* beliefs that these sensations have harmful consequences. Unfortunately, researchers and theorists have paid little explicit attention to this assumption, and as a result have often referred to AS as reflecting fears of anxiety symptoms, beliefs about the harmfulness of anxiety symptoms, or fears based on beliefs (Lilienfeld, Jacob, & Turner, 1989; McNally, 1999). As McNally (1999) noted, 'AS researchers implicitly assumed that statements like "It scares me when my heart beats rapidly" imply beliefs about the negative consequences of rapid heart rate. Whether this assumption is warranted remains an empirical question' (p. 10). The present study's results appear to diverge from those of Taylor & Cox (1998b) on their degree of support for this assumption.

The nonclinical samples in studies 1 and 2 appeared to endorse the somatically related ASI-R items not according to their domain, but according to whether they assess affect or cognition. In contrast to Taylor & Cox (1998b), items with the same domain in the current study (e.g. 'It scares me when my heart beats rapidly' and 'When I notice my heart is beating rapidly, I worry that I might have a heart attack') loaded on to separate factors. These two somatic factors differed primarily in whether they assessed simply being scared of a somatic symptom or alternatively worrying that a somatic symptom portends some catastrophic consequence. As shown in Tables 1 and 4, mean scores on the items comprising these two factors varied considerably. Participants in both samples were much more likely to endorse being scared of somatic sensations than they were to endorse worrying about the catastrophic consequences of somatic sensations. These results have several important implications.

First, the ASI-R items that assess catastrophic anxiety-related beliefs may not be applicable to the experience of most nonclinical respondents. Thus, it is possible that the ASI-R is not an optimal measure of AS in normative populations. It should be emphasized that our results do not address the ASI-R's utility in clinical populations. On the contrary, it is quite possible that the ASI-R's high internal consistency, exclusion of psychometrically inadequate items from the original ASI, and good content validity make it a useful measure for the multidimensional assessment of AS among clinical respondents.

A second implication of our findings is that fears of somatic sensations may not necessarily be based on beliefs about their harmful consequences. AS researchers assume that being 'scared' of a given anxiety-related sensation is equivalent to having beliefs about that sensation's harmful consequences. Our results suggest that, at least among nonclinical respondents, fears and beliefs constitute distinct phenomena. Clinical experience suggests that panic disorder patients who fear specific somatic sensations (e.g. dyspnea) often have explicit beliefs about the harmful consequences associated with them (e.g. suffocation). In contrast, it is possible that individuals without clinically significant anxiety symptoms may have difficulty identifying specific feared consequences of somatic sensations, even when these sensations are feared. The issue of the whether fears and beliefs constitute distinct phenomena remains an empirical question that deserves further attention.

A third implication of our results is that the distinction between the affective and cognitive aspects of AS may be important in understanding the relationship between AS and psychopathology. In both studies 1 and 2, the ASI-R factor assessing somatic fears was more strongly associated with other types of psychological symptoms (e.g. anxiety, depression) than the ASI-R factor assessing somatic beliefs. Our results suggest that, at least among nonclinical participants, fear of somatic sensations is more strongly related to anxiety-related symptomatology than beliefs about the harmful consequences of somatic sensations. Findings from studies using the ASI in clinical samples are consistent with this proposition. For example, Apfledorf, Shear, Leon and Portera (1994) and Taylor, Koch and Crockett (1991) reported that the ASI items that explicitly assess affect (e.g. 'It scares me when my heart beats rapidly') were the most effective items at discriminating panic disorder from other anxiety disorders. Both of these studies were able to correctly classify panic disorder patients with approximately 75% accuracy simply by summing scores on between three and four ASI items, each of which explicitly assessed fears of somatic sensations. The idea that the affective component of AS is more strongly implicated in the development of anxious psychopathology is at odds with the tendency of AS researchers to emphasize the cognitive aspects of AS (e.g. Reiss & McNally, 1985). Researchers who wish to avoid confounding the affective and cognitive components of AS might elect to use alternate measures of the construct, such as the ACQ, body sensations questionnaire (Chambless et al., 1984), or the more recently developed anxiety sensitivity profile (Taylor & Cox, 1998a).

In the present study, the ASI-R and its factors were correlated with anxiety and depression symptoms. Fear of cognitive dyscontrol was more highly correlated with anxiety, depression, and agoraphobic cognitions than the other ASI-R factors. This pattern of results is consistent with Taylor & Cox (1998b) and adds to the growing body of research on the importance of this facet of AS (e.g. Schmidt, Lerew, & Jackson, 1999). As expected, the FNE was most strongly correlated with the ASI-R fear of publicly observable anxiety reactions factor. Unexpectedly, the ASI-R somatic factors were not more strongly correlated with body vigilance than the other ASI-R factors. This result is inconsistent with a recent study by Zvolensky and Forsyth (2002) in which the ASI physical concerns factor was more strongly associated with the BVS than the social and cognitive ASI factors. Our results suggest that the tendency to attend to panic-related body sensations occurs in near-equal measure regardless of whether one fears that these sensations will result in harmful somatic, social, or cognitive consequences.

A potential limitation of the present research was that our use of an undergraduate sample, while convenient, might have implications for the generalizability of our findings. The extent to

which the factor structure of the ASI-R is invariant across undergraduate and non-clinical community samples has not been assessed. However, recent research on the original ASI indicates that highly replicable factor solutions are obtained in diverse samples of undergraduates, community adults, and patients with anxiety disorders (e.g. Deacon & Valentiner, 2001; Schmidt & Joiner, 2002; Zinbarg, Barlow & Brown, 1997). Moreover, the large sample sizes and the consistency of findings across studies 1 and 2 lend preliminary support for the reliability of our findings. Future research on the ASI-R in diverse samples is warranted. An additional limitation of this study concerns the fact that only self-report data were included, and thus relationships between study variables may have been inflated as a result of questionnaire-specific method variance.

Overall, the present study provides mixed support for the utility of the ASI-R in nonclinical populations. The ASI-R was found to be highly internally consistent and composed of psychometrically acceptable items. It appears to reliably measure four lower-order factors assessing fears of somatic, social, and cognitive anxiety symptoms. However, we failed to replicate the somatic factors reported by Taylor & Cox (1998b). In the present study, the two somatic factors were distinguished not according to the type of sensations they assessed (e.g. respiratory vs. cardiovascular) but according to whether they assessed fears or beliefs about somatic sensations. Participants were more likely to endorse fearing a somatic sensation than believing that a somatic sensation portends a catastrophic consequence, and fears were more closely related with anxiety-related psychological symptoms. Our results suggest that the ASI-R is superior to the original ASI with respect to its content validity and breadth. However, future studies will need to clarify whether the problems we identified with the ASI-R preclude it from being the measure of choice in the assessment of AS and its dimensions.

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