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The Anxiety Sensitivity Profile revisited: factor structure and psychometric properties in two nonclinical samples

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Abstract

Anxiety sensitivity (AS) refers to the fear of anxiety-related symptoms based upon the belief that the sensations have harmful consequences. Although the most popular existing measure is the Anxiety Sensitivity Index (ASI), the Anxiety Sensitivity Profile (ASP) was developed as an alternative and theoretically improved assessment of the multifaceted nature of the AS construct. Nevertheless, there has been a paucity of research on this measure. We evaluated the psychometric properties and factor structure of the ASP in two large, geographically diverse undergraduate samples who completed the ASP and measures of anxiety and depression. Exploratory factor analysis revealed four lower order ASP factors in both samples: (1) fear of arousal-related symptoms, (2) fear of cognitive dyscontrol and dissociation, (3) fear of gastrointestinal symptoms, and (4) fear of cardiac symptoms. The fear of cardiac symptoms factor was relatively unstable in both studies. Correlations between the ASP factors and related variables were consistent with AS theory.

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The strengths and limitations of the ASP are offered as well as the implications of our findings for the nature and assessment of AS.

Keywords: Anxiety sensitivity; Factor analysis; Measurement; Anxiety

1. Introduction

Anxiety sensitivity (AS) is defined as the fear of anxiety-related bodily sensations derived from beliefs that these symptoms have harmful physical, psychological, or social consequences (Reiss & McNally, 1985). For example, an individual who experiences heart palpitations may erroneously attribute them to an imminent heart attack and consequently experience an increase in symptoms of anxiety. The manifestation of AS is proposed to arise from the combination of genetic predispositions (Stein, Jang, & Livesley, 1999) and learning experiences that result in the acquisition of beliefs about potential harmful effects of autonomic arousal (e.g., Stewart et al., 2001). The literature suggests that AS may amplify fearful reactions, thereby placing individuals at risk for the development of anxiety-related conditions, especially panic disorder (e.g., Reiss, 1991). Studies have consistently demonstrated a strong, positive relationship between AS and panic disorder (e.g., Apfledorf, Shear, Leon, & Portera, 1994; McNally & Lorenz, 1987). In addition, AS has been shown to predict fearful responding to panic-related symptoms (Rapee, Brown, Antony, & Barlow, 1992) and prospectively in the development of panic attacks (Schmidt, Lerew, & Jackson, 1997).

Although the predictive utility of AS has been well established, the factor structure of AS has been controversial (Lilienfeld, 1996b; Taylor & Cox, 1998a). It has been argued that the factor structure of AS is unidimensional, consisting of a single factor (McNally, 1996), whereas others argued that the factor structure of AS is multidimensional, consisting of separate and distinct factors (e.g., Lilienfeld, 1996a; Lilienfeld, Turner, & Jacob, 1993). The factor structure of AS may have important implications for our understanding of anxiety-related psychopathology if distinct AS factors correspond to distinct etiology and maintenance mechanisms (e.g., Cattell, 1978; Deacon, Abramowitz, Woods, & Tolin, 2003). For example, as a result of observing a family member die of a heart attack, an individual may develop a fear of cardiac sensations that could trigger a panic attack when that individual experiences heart palpitations (Cox, 1996). Furthermore, if AS represents a multidimensional construct, relationships between global measures of AS and measures of psychopathology may be misleading. For example, the relation between AS and response to CO_2 challenge may be less pronounced than the relation between the proposed AS dimension 'suffocation fear' and fearful responses to CO_2 (Van der Does, Eurelings-Bontekoe, Verschuur, & Spinhoven, 2003).

Current interpretations of the factor structure of AS are based almost exclusively on factor analytic studies of the 16-item Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). Studies using the ASI have reported evidence that AS consists of three lower order factors: fear of (1) somatic sensations, (2) cognitive dyscontrol, and (3) publicly observable anxiety symptoms. These lower order factors are hierarchically arranged beneath a single higher order factor (Lilienfeld et al., 1993; Zinbarg, Barlow, & Brown, 1997). Studies examining correlates of ASI factors have provided support for multidimensional conceptualization of AS. For instance, the fear of somatic sensations factor has been found to be the strongest predictor of fearful responding to panic provocation procedures (Zinbarg, Brown, Barlow, & Rapee, 2001). The fear of cognitive dyscontrol factor appears primarily related to depression and less related to panic disorder (Taylor, Koch, Woody, & McLean, 1996). The third factor of ASI, fear of publicly observable anxiety symptoms, appears to be associated primarily with social fears (McWilliams, Stewart, & MacPherson, 2000; Zinbarg et al., 1997).

Although a hierarchical model seems to resolve the debate as to the structure of AS, many psychometric concerns about factor analytic studies of the ASI have been noted (e.g., Taylor & Cox, 1998b). For instance, factors derived from the ASI may be a methodological artifact of the measure because the ASI was not designed on an a priori basis to measure multiple factors. Another concern is that the ASI contains an insufficient number of items to adequately capture the AS factors. For example, the ASI has too few items to ascertain whether the ''fear of somatic sensations'' factor actually consists of several factors, such as fears of cardiac symptoms and fears of gastrointestinal symptoms (Taylor & Cox, 1998a). Furthermore, the wording of several ASI items is ambiguous. Consider item 14, ''unusual body sensations scare me.'' The word ''unusual'' could be in reference to a number of things. Other ASI items appear to assess constructs other than AS. For instance, item 5, ''it is important for me to stay in control of my emotions'' appears to be assessing the fear of limited control over experiencing emotions rather than the fear of actually experiencing emotions. As a result of these limitations, researchers have been advised to develop alternatives to the ASI (e.g., Deacon et al., 2003).

More recently, the Anxiety Sensitivity Index—Revised (ASI-R; Taylor & Cox, 1998b) was developed to more comprehensively assess the AS construct. The 36-item ASI-R contains 10 of the original ASI items. However, six items from the original ASI with problematic content were eliminated (items 5, 7, 13, 14, 15, and 16). Although, the ASI-R may be better suited than the ASI in factor-analytic investigations, this measure is not without its own limitations. For instance, the ASI-R was designed on an a priori basis to measure six factors. However, Taylor and Cox's (1998b) factor analysis of the ASI-R yielded only a four-factor solution and subsequent studies have been unable to replicate these four factors (e.g., Deacon et al., 2003). In addition, the ASI-R contains a mixture of items that assess both affect (i.e., fear of sensations) and cognition (i.e., beliefs that sensations lead

to catastrophe). As a result, the ASI-R's factor structure may obfuscate attempts to determine the extent to which AS consists of fears, beliefs, or fears based on beliefs (Deacon et al., 2003).

In an attempt to provide content coverage of additional AS dimensions (cardiovascular, respiratory, gastrointestinal, publicly observable, dissociative and neurological, and cognitive dyscontrol anxiety symptoms), Taylor and Cox (1998a) developed the 60-item Anxiety Sensitivity Profile (ASP). However, Taylor and Cox's (1998a) psychometric study yielded a hierarchical solution with only four lower order factors: fear of (1) respiratory symptoms, (2) cognitive dyscontrol, (3) gastrointestinal symptoms, and (4) cardiac symptoms. Similar to the ASI, these lower order factors also loaded onto a higher order factor. Since the initial published report of the ASP (Taylor & Cox, 1998a), to our knowledge no study has further examined the psychometric properties of this measure. Only one study has since evaluated the factor structure of the ASP (Van der Does et al., 2003), with confirmatory factor analysis yielding support for Taylor and Cox's (1998a) original six-dimensional solution.

Studies suggest that the ASP may be a better instrument for assessing the factor structure of AS given its broader content sampling of relevant domains (Taylor & Cox, 1998a). Another advantage of the ASP is that, unlike the ASI and ASI-R, the ASP does not confound affect with cognition (see Lilienfeld et al., 1993), but rather assesses the presumed "dangerousness" of anxiety-related sensations. Despite its appeal as a psychometrically and theoretically superior measure of AS, there is a paucity of psychometric studies on the ASP. To address this concern, we examined the factor structure and psychometric properties of the ASP in two large, geographically independent nonclinical samples. Our study also provides the first item-level analysis of the ASP. Consistent with the results of Taylor and Cox (1998a), we predicted that the ASP would yield four replicable lower order factors assessing fears of respiratory symptoms, cognitive dyscontrol, gastrointestinal symptoms, and cardiac symptoms. We also predicted that these lower order factors would load on a single higher order factor. Finally, we hypothesized that the ASP and its lower order factors would demonstrate a pattern of theoretically consistent relationships with an alternative measure of AS in Study 1 and symptoms of anxiety and depression in Study 2.

2. Study 1

2.1. Method

2.1.1. Participants

The sample consisted of 620 participants recruited from a large Southern University in the United States. Seventeen participants did not report gender. Of the remaining participants, 57.1% were female with a mean age of 21.17 (S.D. = 5.57). Four hundred and eighty-seven participants (78.5%) identified

themselves as Caucasian, followed by 30 African Americans (4.8%), 20 Asian (3.2%), 16 Native American (2.6%), 12 Hispanic (1.9%), and 55 participants (8.9%) of unreported ethnicities.

2.1.2. Measures

The Anxiety Sensitivity Profile (Taylor & Cox, 1998a) is a 60-item, 7-point Likert scale (1 = ''Not at all likely'' to 7 = ''Extremely likely'') assessing the fear of anxiety-related symptoms across six domains: (1) cardiovascular, (2) respiratory, (3) gastrointestinal, (4) publicly observable anxiety reactions, (5) dissociative and neurological symptoms, and (6) cognitive dysfunction. The alpha coefficients for the six proposed domains were, .92, .93, .88, .89, .89, and .94, respectively (Taylor & Cox, 1998a). However, in a sample of university students, Taylor and Cox (1998a) found a four-factor solution: (1) cardiovascular, (2) respiratory, (3) gastrointestinal, and (4) cognitive dyscontrol.

The Anxiety Sensitivity Index (Reiss et al., 1986) is a 16-item, 5-point Likert scale (0 = ''Very little'' to 4 = ''Very much'') assessing the fear of fear-related symptoms. The ASI had good internal consistency in the present study (alpha coefficient = .86).

2.1.3. Procedure

Questionnaire packages including the above measures were distributed to student volunteers in groups of 10–50, and were completed for research credit.

2.2. Results

2.2.1. Reliability and item-level analyses

The mean ASP total score was 181.38 (S.D. = 61.78). ASP total scores for women (M = 184.00, S.D. = 63.99) were higher than those for men (M = 177.73, S.D. = 59.09) although not significantly so, $t(601) = 1.22$, $P = .12$ (Cohen's $d = 0.10$). Given that the scale consisted of 60 items, these mean ASP total scores indicate that participants tended to indicate between ''Not at all likely'' or ''Somewhat likely'' agreement with the scale items. Means and standard deviations for the ASP items are presented in Table 1. Mean scores on 58 out of 60 items were below 4.0 (i.e., ''Somewhat likely'' agreement with the item), suggesting that the content of most ASP items was generally outside of the experience of most participants. The ASP demonstrated excellent internal consistency ($\alpha = .98$). Based on the criterion of .30 as an acceptable corrected item-total correlation (Nunnally & Bernstein, 1994), all 60 items performed adequately (range = .50–.76).

2.2.2. Factor structure of the ASP

To our knowledge, only two published studies have reported on the factor structure of the ASP with one study providing support for a four-factor solution (Taylor & Cox, 1998b) and the other providing support for a six-factor solution (Van der Does et al., 2003). Due to this inconsistency, we elected to use

Table 1
Anxiety Sensitivity Profile (ASP): item means and standard deviations, obliquely rotated factor loadings, and communalities for the four-factor solution from Study 1

ASP item	*M*	S.D.	ASP factor				h^2
			I	II	III	IV	
30. You feel like you're choking	4.11	1.66	**.89 (.89)**	−.11 (−.11)	.03 (.03)	−.12 (−.12)	.70 (.68)
15. You feel like you're suffocating	4.16	1.66	**.81 (.80)**	−.06 (−.06)	.01 (.01)	.09 (.08)	.68 (.67)
47. You feel like you're not getting enough air	3.90	1.66	**.79 (.79)**	.04 (.04)	.06 (.05)	−.06 (−.06)	.70 (.69)
59. You feel like you can't breathe properly	3.87	1.64	**.79 (.78)**	.10 (.09)	.02 (.02)	−.03 (−.03)	.71 (.70)
6. You have pain in your chest	3.81	1.48	**.78 (.75)**	−.16 (−.14)	−.04 (−.03)	.15 (.14)	.57 (.54)
55. Your chest feels tight	3.45	1.59	**.75 (.74)**	−.02 (−.02)	.05 (.04)	.06 (.06)	.62 (.60)
52. Your face feels numb	3.27	1.62	**.73 (.72)**	.12 (.11)	.01 (.01)	−.09 (−.06)	.62 (.59)
17. You feel numb all over	3.75	1.68	**.69 (.67)**	.08 (.07)	−.02 (−.01)	.02 (.03)	.54 (.51)
19. You feel out of breath even though you haven't been exerting yourself	3.69	1.57	**.68 (.66)**	.06 (.06)	.04 (.04)	.08 (.08)	.60 (.58)
60. You feel like things are spinning around you (vertigo)	3.88	1.75	**.67 (.66)**	.22 (.21)	.07 (.07)	−.16 (−.14)	.64 (.62)
43. You have tingling sensations in your lips	2.90	1.49	**.64 (.62)**	.16 (.15)	.03 (.04)	.01 (.02)	.58 (.56)
42. Your heart beats erratically	3.71	1.65	**.63 (.61)**	.01 (.01)	−.03 (−.03)	**.33 (.32)**	.63 (.60)
3. You feel like you can't take a deep breath	3.64	1.44	**.59 (.57)**	.09 (.09)	−.06 (−.05)	.22 (.19)	.51 (.48)
26. You have difficulty swallowing	3.24	1.52	**.56 (.55)**	.07 (.07)	.21 (.20)	−.01 (−.00)	.54 (.52)
28. You have burning sensations in your chest (heartburn)	3.07	1.59	**.53 (.52)**	−.03 (−.02)	.27 (.25)	.09 (.09)	.54 (.52)
34. Your heart starts beating slower	2.75	1.55	**.53 (.51)**	.07 (.07)	.09 (.09)	.01 (.03)	.41 (.38)
20. Your heart pounds in your ears	3.17	1.64	**.53 (.51)**	−.04 (−.05)	.08 (.08)	**.48 (.47)**	.71 (.69)
51. Your heart skips a beat	3.34	1.75	**.50 (.48)**	.04 (.05)	.07 (.07)	.24 (.22)	.47 (.45)
31. You feel your heartbeat pulsing in your neck	3.02	1.63	**.49 (.47)**	−.04 (−.04)	.14 (.14)	**.44 (.42)**	.66 (.64)
45. Your throat feels tight	3.03	1.53	**.49 (.48)**	.18 (.17)	.23 (.23)	.00 (.01)	.58 (.57)
23. Your face sweats even though you're not hot	3.37	1.57	**.48 (.46)**	.02 (.02)	**.30 (.29)**	.06 (.07)	.52 (.51)
9. You feel like you're in a fog	3.24	1.58	**.47 (.46)**	.24 (.23)	.03 (.04)	.10 (.09)	.48 (.47)
29. Familiar surroundings seem strange or unreal to you	3.13	1.53	**.46 (.44)**	**.43 (.39)**	−.04 (−.02)	−.09 (−.06)	.51 (.47)
10. Hot flushes sweep over you	3.41	1.55	**.45 (.44)**	.09 (.09)	.20 (.20)	.20 (.18)	.54 (.53)
21. You feel like something is stuck in your throat	3.28	1.62	**.43 (.42)**	.02 (.03)	**.32 (.30)**	.06 (.06)	.49 (.47)
53. The muscles in your face twitch	2.60	1.48	**.36 (.35)**	**.33 (.31)**	.17 (.17)	−.08 (−.04)	.48 (.45)
57. You have to urinate more frequently than usual	2.54	1.46	**.35 (.34)**	.24 (.22)	.23 (.22)	−.12 (−.07)	.41 (.39)
35. You shiver even though you're not cold	2.86	1.54	**.34 (.33)**	.29 (.28)	.25 (.24)	−.03 (−.01)	.51 (.50)
5. You have tingling sensations in your hands	2.66	1.39	**.32 (.31)**	.23 (.22)	.02 (.04)	.23 (.19)	.38 (.36)
56. You have difficulty concentrating	2.37	1.40	−.04 (−.04)	**.91 (.90)**	−.04 (−.04)	−.03 (−.02)	.75 (.72)
36. You have trouble thinking clearly	2.48	1.34	−.04 (−.04)	**.88 (.87)**	.00 (.00)	.00 (.00)	.75 (.73)

Table 1 (*Continued*)

ASP item	*M*	S.D.	ASP factor				h^2
			I	II	III	IV	
54. You are easily distracted	2.24	1.37	−.07 (−.07)	**.83 (.81)**	.11 (.11)	−.05 (−.04)	.72 (.69)
41. You have trouble remembering things	2.83	1.53	.14 (.15)	**.79 (.77)**	−.02 (−.02)	−.11 (−.10)	.69 (.66)
25. You can't keep your mind on a task	2.53	1.48	−.10 (−.10)	**.79 (.77)**	.12 (.12)	.11 (.11)	.73 (.72)
46. You feel "spacey" or spaced out	2.66	1.46	.18 (.18)	**.78 (.76)**	−.07 (−.06)	−.04 (−.03)	.70 (.67)
44. Your mind goes blank	2.77	1.60	.17 (.17)	**.75 (.72)**	−.05 (−.05)	−.07 (−.05)	.63 (.60)
7. You thoughts seem jumbled	2.77	1.41	.07 (.08)	**.67 (.64)**	−.00 (.00)	.16 (.15)	.61 (.59)
2. Your thoughts seem slower than usual	2.65	1.30	.06 (.07)	**.66 (.62)**	−.06 (−.04)	.13 (.12)	.51 (.47)
13. You keep getting distracted by unwanted thoughts	2.54	1.50	−.21 (−.21)	**.64 (.62)**	.24 (.24)	.26 (.25)	.68 (.65)
18. Thoughts seem to race through your mind	2.54	1.48	−.08 (.07)	**.56 (.53)**	.18 (.18)	**.31** (.29)	.63 (.59)
39. You're awake but you feel like you're in a daze	2.83	1.45	.27 (.27)	**.54 (.52)**	.18 (.18)	−.11 (−.09)	.65 (.63)
22. Your body feels strange or different in some way	3.03	1.42	.22 (.22)	**.44 (.42)**	.15 (.16)	.11 (.11)	.55 (.53)
58. Your hands are trembling	3.87	1.64	.29 (.29)	**.38 (.36)**	.15 (.16)	.09 (.09)	.53 (.52)
24. Your voice quavers (trembles or sounds shaky)	2.91	1.53	.11 (.11)	**.34 (.33)**	**.34 (.33)**	.16 (.15)	.56 (.54)
40. Your stomach is upset	2.66	1.49	−.03 (−.05)	.01 (.00)	**.86 (.87)**	.05 (.05)	.75 (.74)
50. You feel sick in your stomach	3.07	1.64	.07 (.06)	−.01 (−.03)	**.83 (.83)**	−.02 (−.02)	.73 (.71)
11. You have diarrhea	2.69	1.63	.07 (.08)	−.12 (−.10)	**.79 (.72)**	−.07 (−.05)	.56 (.49)
27. Your stomach aches	2.70	1.43	.05 (.04)	−.03 (−.03)	**.78 (.76)**	.10 (.09)	.68 (.65)
32. You are constipated	2.20	1.31	.08 (.09)	−.05 (−.03)	**.74 (.68)**	−.11 (−.08)	.55 (.47)
49. You feel bloated (gassy)	2.28	1.33	.03 (.03)	.18 (.17)	**.67 (.64)**	−.07 (−.06)	.61 (.57)
38. You feel like you're about to vomit	3.65	1.68	**.34 (.34)**	.08 (.08)	**.55 (.54)**	−.18 (−.16)	.64 (.61)
16. You have a knot in your stomach	2.65	1.45	−.08 (−.07)	.24 (.23)	**.51 (.49)**	**.32** (.29)	.63 (.59)
4. Your stomach is making loud noises	2.03	1.22	−.16 (−.13)	.18 (.19)	**.50 (.45)**	.23 (.18)	.42 (.36)
12. You are "jumpy" or easily startled	2.63	1.41	−.10 (−.09)	**.35 (.34)**	**.40 (.39)**	.29 (.26)	.58 (.54)
33. You feel faint or lightheaded	3.38	1.55	**.39 (.38)**	.10 (.10)	**.39 (.38)**	.03 (.04)	.57 (.56)
48. Your face blushes red	2.44	1.46	.16 (.16)	.22 (.21)	**.38 (.36)**	.12 (.12)	.48 (.46)
37. You feel that there's a lump in your throat	2.55	1.35	.23 (.22)	.27 (.26)	**.31 (.30)**	.11 (.11)	.51 (.50)
1. Your heart is pounding	2.74	1.34	.15 (.14)	.18 (.17)	−.03 (−.02)	**.69 (.64)**	.69 (.62)
14. Your heart beats rapidly	3.04	1.56	.24 (.22)	.10 (.08)	.10 (.10)	**.65 (.65)**	.76 (.74)
8. Your heart is beating so loud you can hear it	3.40	1.70	**.49 (.47)**	.02 (.02)	−.08 (−.08)	**.56 (.54)**	.69 (.65)
% Variance of rotated factors			45.65 (44.95)	7.09 (6.47)	4.19 (3.54)	3.29 (2.68)	

Note. Factor loadings outside of parenthesis pertain to PCA; those inside parentheses pertain to PAF. Factor loadings $\geq|.30|$ are listed in boldface type. The first eight eigenvalues were 27.39, 4.25, 2.51, 1.97, 1.39, 1.15, 1.08, and 1.04.

exploratory factor analysis in the first study. We chose principal components analysis (PCA) as the primary method 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 similar results using both PCA and PAF (Taylor & Cox, 1998a). In the present study, we conducted factor analysis of the ASP 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 (Horn, 1965), 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). In accordance with Longman, Cota, Holden, and Fekken (1989), parallel analyses were conducted twice, once using the mean eigenvalues and once using the 95th percentile eigenvalues.

Although eight factors had eigenvalues greater than 1.0, parallel analysis of the present data 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 similar factor structures. The four-factor solution accounted for 60.2% of the ASP item variance in PCA, and 57.6% 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 ASP item scores (45.6% in PCA), whereas the remaining three factors explained smaller portions of the item variance (between 7.0 and 3.2% each).

Factor I had 32 items with salient ($\geq$.30) loadings and assessed beliefs regarding the catastrophic consequences of physical and respiratory sensations. Most items on this factor address beliefs about the occurrence of a nonspecific feared consequence resulting from experiencing a specific respiratory (e.g., ''You feel like you can't breathe properly'') or physical (e.g., ''You have burning sensations in your chest'') sensation. Accordingly, this factor was labeled ''fear of arousal-related symptoms.'' Factor II had 18 items with salient loadings and was labeled ''fear of cognitive dyscontrol and dissociation.'' Factor III contained 16 items with salient loadings (15 items in PAF) and was labeled ''fear of gastrointestinal symptoms.'' The fourth factor consisted of 8 items with salient loadings (six items in PAF). However, only three items had their highest loading on this factor. Most items on Factor IV pertained to the heart (e.g., ''Your heart is pounding''). Accordingly, Factor IV was labeled ''fear of cardiac symptoms.'' Inspection of the factor loadings in Table 1 indicates that Factors I, III, and IV assess fears of bodily concerns. However, Factor I appears to be broader.

The validity of the four-factor solution was examined 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 = 8–32). However, PCA resulted in an unsatisfactory total of 14 complex items (i.e., items with salient loadings, $\leq$.30, on more than one factor). The four-factor ASP solution reported by Taylor and Cox (1998a) also contained an undesirable number of complex items (15 in PCA). However, for each complex item's second highest loading in the present study, only four were higher than .40 (e.g., .43 to .49), suggesting that no items were salient markers for more than one factor. Guadagnoli and Velicer (1988) recommended that to be considered stable, factors should have (a) four or more loadings above .60, (b) 10 or more items with loadings above .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, Factors I, II and III appear to be stable. However, Factor IV may be lacking in satisfactory stability because only two of its items load above .60. Finally, to determine each factor's internal consistency, subscales were created by assigning items to subscales based on their highest salient factor loading. Two items (''Your voice quavers''; ''You feel faint or light-headed'') were excluded as they loaded equally onto two factors. Each subscale showed adequate internal consistency (α's for Factors I–IV = .97, .95, .93, and .84, respectively).

To examine the replicability of the four-factor ASP solution, coefficients of congruence (Gorsuch, 1983) were computed between the factor loadings from PCA in the present study and those reported by Taylor and Cox (1998a). These data are presented in Table 2. The first factor from the present study, labeled ''fear of arousal-related symptoms,'' was highly comparable with the ''fear of respiratory symptoms'' factor from Taylor and Cox (coefficient of congruence = .84). The second factor from the present study, labeled ''fear of cognitive dyscontrol and

Table 2
Coefficients of congruence between Anxiety Sensitivity Profile (ASP) factors from Study 1 and Study 2 and those reported in Taylor and Cox (1998a)

Factors extracted from Taylor and Cox (1998a)	Factors extracted from Study 1/Study 2							
	Factor I		Factor II		Factor III		Factor IV	
Factor I	.84	.82	.23	.18	.30	.32	.27	.18
Factor II	.37	.44	.68	.62	.25	.32	.24	.13
Factor III	.30	.31	.41	.53	.57	.40	.25	.36
Factor IV	.30	.31	.36	.30	.53	.65	.40	.39

Note. Coefficients of congruence (Gorsuch, 1983) were derived using loadings from the factor pattern matrix. ASP factor labels assigned by Taylor and Cox (1998a): Factor I: fear of respiratory symptoms, Factor II: fear of cognitive dyscontrol, Factor III: fear of gastrointestinal symptoms, Factor IV: fear of cardiac symptoms. ASP factor labels assigned in the present study: Factor I: fear of arousal-related symptoms, Factor II: fear of cognitive dyscontrol and dissociation, Factor III: fear of gastrointestinal symptoms, Factor IV: fear of cardiac symptoms.

dissociation," was most similar to the "fear of cognitive dyscontrol" factor from Taylor and Cox (coefficient of congruence = .68). The third factor from the present study, labeled "fear of gastrointestinal symptoms," was most similar to the "fear of gastrointestinal symptoms" factor from Taylor and Cox (coefficient of congruence = .57). The fourth factor from the present study, labeled "fear of cardiac symptoms," was more similar to the "fear of gastrointestinal symptoms" factor from Taylor and Cox (coefficient of congruence = .53) than their "fear of cardiac symptoms" factor (coefficient of congruence = .40).

Finally, following Taylor and Cox (1998a), the higher order factor structure of the ASP was examined by conducting a PCA on the obliquely rotated factor scores obtained from PCA, and by conducting a PAF on the factor scores obtained from PAF. For PCA, the eigenvalues were 2.22, 0.78, 0.53, and 0.46, and thus a single higher order factor was extracted. The higher order factor accounted for 55.6% of the variance, and each lower order factor loaded greater than .58 on this factor. For PAF, the eigenvalues were 2.44, 0.69, 0.48, and 0.38, and the single higher order factor explained 61.0% of the variance, and each lower order factor loaded greater than .51 on this factor. Thus, the results supported a hierarchical solution for the ASP in which the four lower order factors load on a single higher order factor. This finding of a hierarchical solution for the ASP supports the notion that AS is largely the product of an overarching trait with contributions from specific lower order traits (Taylor & Cox, 1998b).

2.2.3. *Convergence of ASP factors and ASI dimensions*

Table 3 presents correlations between the ASP, the lower order ASP factors, and the dimensions of the ASI. Following the factor analytic results of Zinbarg et al. (1997), we used the following lower order factors of the ASI: Physical Concerns (items 3, 4, 6, 8, 9, 10, 11, and 14), Mental Incapacitation (items 2, 12, 15, and 16), and Social Concerns (items 1, 5, 7, and 13). ASP total scores were strongly associated with the ASI ($r = .62$). Consistent with theoretical

Table 3
Pearson correlations between the Anxiety Sensitivity Profile (ASP) factors and dimensions of the Anxiety Sensitivity Index (ASI) in Study 1

Scale	ASP total score	ASP factor scores			
		I	II	III	IV
ASP total score	–				
ASP Factor I	.95	–			
ASP Factor II	.86	.70	–		
ASP Factor III	.86	.72	.72	–	
ASP Factor IV	.74	.76	.59	.55	–
ASI total score	.62	.71	.59	.52	.51
ASI physical concerns	.62	.61	.50	.49	.54
ASI mental incapacitation	.41	.29	.54	.37	.27
ASI social concerns	.36	.30	.36	.35	.29

Note. All r's significant at $P < .01$.

expectations, related ASP factors and ASI dimensions demonstrated stronger associations. Specifically, the ASP ''fear of arousal-related symptoms,'' was most strongly associated with the physical concerns dimension of the ASI ($r = .61$, $P < .001$). The ASP ''fear of cognitive dyscontrol and dissociation'' factor, on the other hand, was most related to the ASI mental incapacitation concerns dimension of the ASI ($r = .54$, $P < .001$), when calculating the difference between independent correlation coefficients. However, examination of individual items suggests that the specific relations between the ''fear of arousal-related symptoms'' factor of the ASP (''You feel like you're not getting enough air'') and the physical concerns dimension of the ASI (''It scares me when I become short of breath'') and the ''fear of cognitive dyscontrol and dissociation'' factor of the ASP (''You can't keep your mind on a task'') and the mental incapacitation concerns dimension of the ASI (''It scares me when I am unable to keep my mind on a task'') may be partially attributable to item-content overlap.

2.3. Discussion

The findings from Study 1 are generally consistent with Taylor and Cox (1998a). The ASP was composed of lower order factors assessing fear of arousal-related symptoms, fear of cognitive dyscontrol and dissociation, fear of gastrointestinal symptoms, and fear of cardiac symptoms. These factors were generally stable, and demonstrated theoretically consistent relationships with related variables. The ASP cardiac symptoms factor, however, was less stable than the other factors and diverged from the results reported by Taylor and Cox (1998a). Given the limited stability of the cardiac symptoms factor of the ASP and the lack of convergence of the cardiac symptoms factor with that reported by Taylor and Cox (1998a), we elected to repeat our examination of the ASP in a second, geographically distinct sample of college students.

3. Study 2

3.1. Method

3.1.1. Participants

The sample consisted of 424 participants recruited from a large Midwestern University in the United States. Fifty-two percent were female with a mean age of 19.61 (S.D. = 1.18). Two hundred and sixty-five participants (62.5%) identified themselves as Caucasian, followed by 88 African Americans (20.8%), 37 Asian (8.7%), 19 Hispanic (4.5%), and 15 participants (3.5%) of other ethnicities.

3.1.2. Measures

The Anxiety Sensitivity Profile (Taylor & Cox, 1998) was described in Study 1.

The State-Trait Anxiety Inventory-Trait Version Form Y2 (STAI-T; Spielberger, 1983) is a 20-item trait measure of anxiety-related symptoms. Respondents indicate how much anxiety statement reflects how they generally feel on 4-point Likert-type scales from ''almost never'' to ''almost always.'' Anxiety-absent items are reverse-scored. The alpha coefficient for the STAI-T was .77 in the present study.

The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) consists of 21 items that assess the severity of anxious symptoms in clinical and nonclinical populations. Respondents report how much they have been bothered by anxiety symptoms on a 4-point Likert-type scale from ''not at all'' to ''severely: I could barely stand it.'' The alpha coefficient for the BAI was 0.89 in the present study.

The Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) includes 21 items that assess the presence and severity of cognitive, motivational, affective, and somatic symptoms of depression. Respondents report how much they have been bothered by depressive symptoms on a 4-point Likert-type scale. The alpha coefficient for the BDI was .86 in the present study.

3.1.3. Procedure

Questionnaire packages including the aforementioned measures were distributed to student volunteers in groups of 10–50, and were completed for research credit.

3.2. Results

3.2.1. Reliability and item-level analyses

The mean ASP total score was 162.65 (S.D. = 61.96). ASP total scores for men ($M = 163.50$, S.D. = 65.27) and women ($M = 161.87$, S.D. = 58.86) were not significantly different, $t(422) = .26$, $P = .78$ (Cohen's $d = 0.03$). Given that the scale consisted of 60 items, these mean ASP total scores indicate that participants tended to indicate ''Not at all likely'' agreement with the scale items. Means and standard deviations for the ASP items are presented in Table 4. Mean scores on all 60 items were below 4.0 (i.e., ''Somewhat likely'' agreement with the item), suggesting that the content of most ASP items was generally outside of the experience of most participants. The ASP again demonstrated excellent internal consistency ($\alpha = .98$). Based on the criterion of .30 as an acceptable item-total correlation (Nunnally & Bernstein, 1994), all 60 items performed adequately (range = .43–.76).

3.2.2. Factor structure of the ASP

Exploratory factor analysis was again used to re-examine the ASP'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, only our Study 1 and two prior

Table 4
Anxiety Sensitivity Profile (ASP): item means and standard deviations, obliquely rotated factor loadings, and communalities for the four-factor solution from Study 2

ASP item	*M*	S.D.	ASP factor				h^2
			I	II	III	IV	
30. You feel like you're choking	3.27	1.73	**.89 (.89)**	−.12 (−.12)	−.06 (.01)	.10 (−.16)	.71 (.70)
15. You feel like you're suffocating	3.58	1.75	**.88 (.88)**	−.12 (−.12)	.03 (−.07)	−.18 (.10)	.70 (.67)
47. You feel like you're not getting enough air	3.26	1.60	**.81 (.81)**	.03 (.01)	.01 (.00)	−.11 (−.09)	.68 (.66)
17. You feel numb all over	3.29	1.73	**.81 (.80)**	−.04 (−.04)	.02 (.01)	−.01 (−.00)	.64 (.63)
59. You feel like you can't breathe properly	3.43	1.74	**.77 (.77)**	−.01 (−.01)	.14 (.13)	−.04 (−.04)	.71 (.70)
42. Your heart beats erratically	3.26	1.73	**.75 (.73)**	.02 (.00)	−.02 (−.01)	.15 (.16)	.62 (.60)
19. You feel out of breath even though you haven't been exerting yourself	3.29	1.61	**.70 (.69)**	.00 (.00)	.09 (.09)	.03 (.04)	.60 (.58)
3. You feel like you can't take a deep breath	3.16	1.48	**.70 (.67)**	−.00 (.01)	−.07 (−.06)	.26 (.22)	.56 (.52)
60. You feel like things are spinning around you (vertigo)	3.47	1.83	**.69 (.69)**	.17 (.16)	.02 (.01)	−.12 (−.11)	.61 (.60)
6. You have pain in your chest	3.32	1.60	**.68 (.66)**	−.18 (−.16)	.21 (.20)	.19 (.17)	.63 (.60)
21. You feel like something is stuck in your throat	2.89	1.55	**.68 (.67)**	.05 (.04)	.10 (.10)	.00 (.01)	.59 (.58)
9. You feel like you're in a fog	2.76	1.52	**.68 (.66)**	.14 (.14)	−.08 (−.06)	.03 (.03)	.52 (.50)
20. Your heart pounds in your ears	2.98	1.69	**.67 (.65)**	.14 (.13)	.07 (−.06)	**.30 (.30)**	.69 (.67)
31. You feel your heartbeat pulsing in your neck	2.88	1.65	**.64 (.62)**	.03 (.01)	.08 (.09)	.23 (.24)	.62 (.61)
26. You have difficulty swallowing	2.86	1.52	**.64 (.64)**	.21 (.20)	.08 (.07)	−.11 (−.10)	.64 (.63)
10. Hot flushes sweep over you	2.83	1.53	**.62 (.59)**	−.03 (.01)	.09 (.09)	.18 (.15)	.51 (.48)
8. Your heart is beating so loud you can hear it	3.08	1.74	**.61 (.58)**	.13 (.12)	−.14 (−.13)	**.42 (.40)**	.65 (.62)
52. Your face feels numb	2.79	1.60	**.61 (.61)**	.08 (.08)	.18 (.16)	−.08 (−.07)	.58 (.57)
45. Your throat feels tight	2.71	1.50	**.61 (.62)**	.29 (.25)	.07 (.06)	−.25 (−.22)	.66 (.63)
34. Your heart starts beating slower	2.55	1.54	**.60 (.58)**	.02 (.02)	.10 (.09)	−.00 (.01)	.45 (.44)
55. Your chest feels tight	3.02	1.62	**.59 (.59)**	−.03 (−.03)	**.32 (.30)**	−.03 (−.02)	.63 (.61)
51. Your heart skips a beat	2.97	1.74	**.57 (.56)**	.00 (.00)	.21 (.20)	.03 (.04)	.52 (.50)
43. You have tingling sensations in your lips	2.46	1.47	**.57 (.57)**	.22 (.20)	.06 (.06)	−.12 (−.09)	.53 (.50)
28. You have burning sensations in your chest (heartburn)	2.82	1.62	**.57 (.56)**	−.14 (−.13)	**.37 (.35)**	.07 (.07)	.61 (.59)
29. Familiar surroundings seem strange or unreal to you	2.91	1.55	**.55 (.55)**	**.35 (.31)**	−.05 (−.03)	−.13 (−.09)	.53 (.49)
23. Your face sweats even though you're not hot	2.88	1.54	**.51 (.50)**	.09 (.10)	.14 (.13)	.06 (.05)	.45 (.44)

Table 4 (*Continued*)

ASP item	*M*	S.D.	ASP factor				h^2
			I	II	III	IV	
38. You feel like you're about to vomit	3.15	1.68	**.47** (**.48**)	.05 (.04)	**.37** (**.34**)	−.14 (−.12)	.58 (.56)
37. You feel that there's a lump in your throat	2.56	1.52	**.45** (**.46**)	**.31** (.28)	.17 (.16)	−.15 (−.11)	.56 (.53)
33. You feel faint or lightheaded	3.07	1.61	**.37** (**.37**)	.15 (.14)	.30 (.28)	.02 (.02)	.49 (.48)
35. You shiver even though you're not cold	2.63	1.54	**.37** (**.37**)	.28 (.26)	.17 (.16)	.01 (.02)	.47 (.45)
36. You have trouble thinking clearly	2.50	1.42	.02 (.03)	**.86** (**.85**)	−.05 (−.05)	.00 (−.00)	.72 (.70)
25. You can't keep your mind on a task	2.41	1.41	−.07 (−.06)	**.81** (**.81**)	.09 (.08)	.11 (.09)	.76 (.75)
56. You have difficulty concentrating	2.35	1.42	−.07 (−.06)	**.77** (**.76**)	.18 (.17)	.03 (.01)	.73 (.71)
54. You are easily distracted	2.09	1.33	−.12 (−.10)	**.75** (**.74**)	.19 (.18)	.01 (.00)	.67 (.64)
13. You keep getting distracted by unwanted thoughts	2.44	1.49	−.12 (−.10)	**.73** (**.71**)	.07 (.07)	.10 (.08)	.58 (.55)
7. You thoughts seem jumbled	2.37	1.37	−.01 (−.00)	**.72** (**.71**)	.02 (.02)	.16 (.13)	.64 (.61)
44. Your mind goes blank	2.51	1.49	.17 (.19)	**.71** (**.65**)	.03 (.03)	−.17 (−.14)	.61 (.56)
46. You feel ''spacey'' or spaced out	2.22	1.34	.12 (.13)	**.70** (**.65**)	.08 (.08)	−.07 (−.05)	.63 (.59)
41. You have trouble remembering things	2.54	1.47	**.30** (**.32**)	**.69** (**.65**)	−.10 (−.09)	−.14 (−.11)	.62 (.58)
18. Thoughts seem to race through your mind	2.41	1.48	−.12 (−.13)	**.64** (**.63**)	.10 (.10)	**.33** (**.30**)	.66 (.63)
2. Your thoughts seem slower than usual	2.33	1.29	.15 (.15)	**.53** (**.51**)	−.06 (−.04)	.21 (.16)	.46 (.42)
39. You're awake but you feel like you're in a daze	2.62	1.48	.26 (.26)	**.52** (**.48**)	.12 (.13)	−.01 (.00)	.58 (.56)
24. Your voice quavers (trembles or sounds shaky)	2.64	1.61	.21 (.20)	**.45** (**.43**)	.04 (.05)	.26 (.23)	.54 (.51)
22. Your body feels strange or different in some way	2.86	1.45	**.31** (**.31**)	**.42** (**.39**)	.11 (.12)	.02 (.04)	.52 (.51)
48. Your face blushes red	2.15	1.38	.14 (.16)	**.35** (**.33**)	**.30** (**.29**)	.02 (.04)	.46 (.44)
58. Your hands are trembling	2.78	1.62	.23 (.23)	**.31** (**.31**)	.23 (.22)	.26 (.24)	.59 (.57)
40. Your stomach is upset	2.30	1.43	−.03 (−.04)	.12 (.10)	**.79** (**.79**)	.02 (.02)	.72 (.70)
50. You feel sick in your stomach	2.73	1.59	.07 (.07)	.03 (.01)	**.77** (**.77**)	.00 (.01)	.70 (.68)
49. You feel bloated (gassy)	2.00	1.26	.01 (.02)	.10 (.09)	**.75** (**.72**)	−.05 (−.03)	.66 (.61)
27. Your stomach aches	2.46	1.42	.04 (.04)	.09 (.08)	**.74** (**.72**)	.02 (.02)	.68 (.65)
32. You are constipated	1.94	1.24	.14 (.17)	−.03 (−.00)	**.68** (**.60**)	−.06 (−.06)	.55 (.49)
11. You have diarrhea	2.07	1.36	.12 (.15)	−.09 (−.05)	**.68** (**.58**)	−.02 (−.02)	.50 (.42)
16. You have a knot in your stomach	2.51	1.51	.12 (.11)	.17 (.17)	**.43** (**.41**)	**.31** (**.27**)	.58 (.55)

4. Your stomach is making loud noises	1.89	1.23	−.20 (−.16)	.25 (.29)	**.40 (.33)**	.29 (.20)	.40 (.33)
57. You have to urinate more frequently than usual	2.54	1.57	.22 (.23)	.10 (.12)	**.39 (.34)**	.12 (.09)	.43 (.40)
53. The muscles in your face twitch	2.41	1.54	.25 (.26)	.21 (.21)	**.32** (.28)	.04 (.04)	.44 (.42)
1. Your heart is pounding	2.57	1.46	.14 (.11)	.25 (.26)	.03 (.04)	**.65 (.59)**	.70 (.64)
14. Your heart beats rapidly	2.80	1.55	**.37 (.34)**	.24 (.22)	.02 (.03)	**.55 (.56)**	.76 (.76)
5. You have tingling sensations in your hands	2.29	1.33	.25 (.24)	.14 (.18)	.14 (.12)	**.38 (.28)**	.43 (.37)
12. You are "jumpy" or easily startled	2.48	1.48	.01 (.00)	**.37 (.37)**	.25 (.24)	**.38 (.33)**	.58 (.54)
% Variance of rotated factors			45.47 (44.77)	7.92 (7.28)	3.63 (2.97)	2.77 (2.11)	

Note. Factor loadings outside of parenthesis pertain to PCA; those inside parentheses pertain to PAF. Factor loadings $\geq|.30|$ are listed in boldface type. The first eight eigenvalues were 27.28, 4.75, 2.18, 1.66, 1.35, 1.21, 1.04, and 0.99.

studies have investigated the ASP's factor structure, and the findings of these studies have been inconsistent. Second, our results in Study 1 yielded more unstable factors than those reported by Taylor and Cox (1998a). Third, factor solutions from Study 1 and Taylor and Cox (1998a) included numerous items with complex loadings and loadings on theoretically unexpected factors. These circumstances suggest that additional exploratory research on the ASP's factor structure is needed before researchers attempt to confirm its latent structure (see Deacon et al., 2003, for a similar discussion).

As in Study 1, the lower order factor structure of the ASP was examined using 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 ASP solution. As can be seen, these results are highly comparable with those from Study 1 (see Table 1). The solution accounted for 59.8% of the ASP item variance in PCA and 57.1% in PAF. Consistent with Study 1, the pattern of loadings in Table 4 suggests the following factor labels: ''fear of arousal-related symptoms'' (Factor I, 30 items), ''fear of cognitive dyscontrol and dissociation'' (Factor II, 16 items), ''fear of gastrointestinal symptoms'' (Factor III, 10 items), and ''fear of cardiac symptoms'' (Factor IV, 4 items). Subscales computed from each factor demonstrated adequate internal consistency (α's for Factors I–IV = .97, .95, .90, and .83, 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 and Cox (1998a). Congruence coefficients between corresponding factors from Study 1 and Study 2 were .95, .88, .83, and .48 for Factors I through IV, respectively. These data indicate that Factors I, II, and III obtained in Study 1 and Study 2 were essentially identical. However, Factor IV from Study 1 was only moderately similar to Factor IV from Study 2. Table 2

Table 5
Pearson correlations between the Anxiety Sensitivity Profile (ASP) factors and measures of anxiety and depression in Study 2

Scale	ASP total score	ASP factor scores			
		I	II	III	IV
ASP total score	–				
ASP Factor I	.95	–			
ASP Factor II	.86	.69	–		
ASP Factor III	.85	.73	.74	–	
ASP Factor IV	.78	.64	.77	.66	–
STAI-T	.29	.25	.31	.23	.26
BAI	.34	.27	.36	.34	.31
BDI	.19	.14	.24	.16	.19

Note. Trait Anxiety (STAI-T), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), all r's significant at $P < .01$.

presents coefficients of congruence comparing results from Study 2 and those reported by Taylor and Cox (1998a). These data generally replicated those from Study 1 (see Table 2). The ''fear of arousal-related symptoms'' from Study 2 was highly comparable with the ''fear of respiratory symptoms'' of Taylor and Cox (1998a). However, the fear of gastrointestinal symptoms and fear of cardiac symptoms from Study 2 were less replicable than those reported by Taylor and Cox (1998a).

To examine the hierarchical structure of the ASP factor scores on the four lower order factors obtained in the initial analysis were factor analyzed using PCA and PAF. A single factor was extracted in PCA (eigenvalues = 2.14, 0.89, 0.50, and 0.45) that accounted for 53.6% of the variance. Likewise, PAF revealed a single higher order factor (eigenvalues = 2.35, 0.84, 0.45, and 0.34) that explained 47% of the variance. Thus, replicating Study 1, the four lower order ASP factors loaded on a single higher order factor.

3.2.3. Convergence of the ASP with anxiety and depression

Table 5 presents correlations between the ASP, the lower order ASP factors, and the STAI-T (trait anxiety), BAI, and BDI. Consistent with Study 1, the ASP lower order factors were highly correlated with ASP total scores (range = .78–.95). As would be expected, ASP total scores were mild to moderately correlated with measures of anxiety (range of r's = .29–.34) and mildly correlated with depression (r = .19), lending support to convergent and divergent validity, respectively. The four ASP factors demonstrated the same pattern of correlations. Factors I, II, III, and IV were mildly to moderately associated with measures of anxiety (range of r's = .23–.36) and mildly associated with depression (range of r's = .14–.24).

3.3. Discussion

The present study evaluated the factor structure and psychometric properties of the ASP (Taylor & Cox, 1998a) in two large, independent nonclinical samples. Studies 1 and 2 converge in indicating that the ASP is highly internally consistent with all items correlating moderately to highly with the total score. Prior psychometric evaluations of other measures of AS, such as the ASI, have found multiple items with unacceptable psychometric properties (e.g., Blais et al., 2001). Our results suggest that the ASP may be a more reliable and psychometrically sound measure of AS that has improved on the psychometric limitations of its predecessors (Van der Does et al., 2003). Consistent with prior findings (e.g., Deacon et al., 2003), no significant gender differences were detected in either study on ASP total scores.

Item analysis revealed that participants tended to endorse either ''Not at all likely'' or ''Somewhat likely'' agreement with the vast majority of ASP items. These findings suggest that the AS construct as assessed by the ASP items is relatively far removed from the experience of most nonclinical participants,

which appears to be inconsistent with other measures of AS (ASI; Peterson & Reiss, 1992). Thus, it is possible that the ASP is not an optimal measure of AS in nonclinical populations. On this latter point, Deacon et al. (2003) found that ASI-R items assessing the belief that anxiety-related sensations lead to catastrophic consequences were endorsed much less highly than items that assessed the fear of anxiety-related sensations. ASP items all assess the belief that anxiety-related sensations lead to adverse consequences. Perhaps this phenomenon provides evidence that items assessing feared catastrophic consequences reflect a form of AS that is less normative and more specific to anxiety-related psychopathology. Thus, one apparent virtue of the ASI over the ASP is its capacity to detect concerns about anxiety-related sensations that precede the occurrence of clinical panic. However, research examining the distributional properties of the ASP in clinical samples is needed to address this issue.

Results from a series of exploratory factor analyses supports the contention that AS is multidimensional and hierarchically organized. The ASP was found to consist of four lower order factors, all of which loaded on a single higher order factor. These lower order factors were assigned the following labels: (1) ''fear of arousal-related symptoms,'' (2) ''fear of cognitive dyscontrol and dissociation,'' (3) ''fear of gastrointestinal symptoms,'' and (4) ''fear of cardiac symptoms.'' Coefficients of congruence (Gorsuch, 1983) indicated that the four-factor ASP solutions from Study 1 and Study 2 were essentially identical, with the exception of Factor IV (fear of cardiac symptoms), which was only moderately replicable across studies.

Each of the four lower order factors demonstrated adequate internal consistency. However, factor analysis yielded numerous complex items (i.e., items with salient loadings on more than one factor) in both studies. The number of complex items found in the present studies is comparable with that reported by Taylor and Cox (1998a). In addition, we found multiple instances in which items had primary loadings on different factors in Studies 1 and 2. For example, in Study 1, item 53 (''The muscles in your face twitch'') loaded primarily on the fear of arousal-related symptoms factor (Factor I), whereas it loaded primarily on the fear of gastrointestinal symptoms (Factor III) in Study 2. The number of complex items in the present study as well as the inconsistency of the primary loadings of some items argues for revision of certain ASP items. Indeed, some of the controversy and confusion regarding the factor structure of the AS construct may be attributable to the inclusion of inadequate items (e.g., Blais et al., 2001). In a recent study, Van der Does et al. (2003) created a 24-item ASP by taking the first four items of each subscale of the ASP (items 1–19, 21–24, and 27) and found that each of the condensed subscales had high correlations with its full length version (range = .92–.95). The internal consistencies of the shortened subscales were also adequate (range = .79–.88). Taken together with the results of Van der Does et al. (2003), our findings suggests that more careful consideration needs to be given to item refinement of the ASP by eliminating inadequate items and condensing the measure to include only those items that do not detract from its reliability, validity, and the stability of its factor structure.

It has been argued that current measures of the AS construct (i.e., ASI) may be limited in that AS may consist of multiple content domains that are not adequately captured by existing measures (Lilienfeld, 1996b). In response to this criticism, the ASP was developed to measure six theoretical dimensions of AS consisting of cardiovascular, respiratory, gastrointestinal, publicly observable, dissociative and neurological, and cognitive dyscontrol anxiety symptoms. Although one study has reported psychometric support for the six proposed dimensions of the ASP (Van der Does et al., 2003), in the initial descriptive report of the ASP, Taylor and Cox (1998a) found support for a hierarchical solution with only four lower order factors: fear of (1) respiratory symptoms, (2) cognitive dyscontrol, (3) gastrointestinal symptoms, and (4) cardiac symptoms. An important goal of the present study was to attempt to replicate the ASP factor structure reported by Taylor and Cox (1998a). We were able to partially replicate the four lower order factors obtained by Taylor and Cox (1998a). Coefficients of congruence indicated that the ASP ''fear of respiratory symptoms'' reported by Taylor and Cox was replicable across both studies (''fear of arousal-related symptoms''). Coefficients of congruence indicated that the ASP ''fear of cognitive dyscontrol'' reported by Taylor and Cox was moderately replicable across both studies (''fear of cognitive dyscontrol and dissociation''). The ''fear of gastrointestinal symptoms'' factor in both studies also displayed moderate congruence with that of Taylor and Cox (1998a).

There was less convergence between the ''fear of cardiac symptoms'' factors in the present two studies and those reported by Taylor and Cox. In both studies, the ''fear of cardiac symptoms'' factor did not meet the recommended criterion of at least four-item loadings above .60 (Guadagnoli & Velicer, 1988). This is in contrast to Taylor and Cox (1998a), who obtained five items with loadings above .60. Furthermore, direct comparisons revealed that many items (e.g., ''Your heart pounds in your ears,'' ''You feel your heartbeat pulsing in your neck'') that exhibited primary loadings on the ''fear of cardiac symptoms'' factor in the Taylor and Cox (1998a) study had primary loadings on the ''fear of arousal-related symptoms'' factor in the present studies. Consistent with Taylor and Cox (1998a), multiple items in Study 2 that bore no face valid relation with cardiac concerns (i.e., ''You have tingling sensations in your hand,'' ''You are jumpy or easily startled'') displayed primary loadings on Factor IV. Future research with the ASP will be necessary to determine the distinctiveness of items relating to the specific fear of cardiac symptoms as opposed to those relating to the generalized fear of arousal-related symptoms.

Although the factors obtained in the present study are broadly similar to those obtained in factor analyses of the ASI and ASI-R, two differences should be highlighted. First, the present study suggests that fear of somatic sensations may compose of separate factors, fear of arousal-related symptoms, fear of gastrointestinal symptoms, and to a lesser degree, fear of cardiac symptoms (e.g., Taylor & Cox, 1998a). The distinctiveness of these factors would support Cox's (1996) interactional model that suggests that specific fears (or factors) may

function as risk factors for different anxiety reactions. This observation also raises the possibility that, for example, respiratory and cardiac concerns operate as a potential diathesis for panic disorder, or that fear of gastrointestinal symptoms is predictive of irritable bowel syndrome. The second difference from previous factor analytic studies is that our study did not reveal a fear of publicly observable symptoms factor. Consistent with the findings of Taylor and Cox (1998a), our findings did not identify such a factor even though the ASP consists of more items designed to assess such fears than previous AS measures (i.e., ASP consists of 10 items assessing fear of publicly observable symptoms whereas the ASI contains only four such items). The finding that items assessing fear of publicly observable symptoms were absorbed by other factors may indicate that concerns regarding publicly observable symptoms do not compose a distinct factor. However, the inability to identify a publicly observable symptoms factor on the ASP could be a product of how items are worded on this measure as opposed to on the ASI and ASI-R. In these latter scales, most of the ''social'' items assess beliefs about explicit social consequences (i.e., embracement). In the ASP, the ''social'' items do not mention the potential social consequences of anxiety-related sensations.

In the present study, the ASP demonstrated good convergent and discriminant validity. Consistent with the findings of Taylor and Cox (1998a), the ASP and its factors were highly correlated with the ASI, an alternative measure of AS. The ASP and its factors also demonstrated theoretically consistent relations with the ASI dimensions. Specifically, the ''fear of arousal-related symptoms'' factor of the ASP was more highly correlated with the physical concerns dimension of the ASI and the ''fear of cognitive dyscontrol and dissociation'' factor of the ASP was more highly correlated with the mental incapacitation dimension of the ASI. In Study 2, the ASP and its factors displayed statistically significant, though moderate, correlations with trait anxiety. This finding is consistent with previous reports (e.g., Taylor & Cox, 1998a; Taylor et al., 1996) and supports the notion that AS and trait anxiety are related but distinguishable constructs (McNally, 1996). The ASP and its factors also displayed statistically significant, though weak correlations with depression. Consistent with the findings of Taylor and Cox (1998b), the ''fear of cognitive dyscontrol and dissociation'' factor was the most highly correlated with depression. The relation between the ''fear of cognitive dyscontrol and dissociation'' factor and depression may be expected given that cognitive features (i.e., concentration and attentional deficits, difficulty with decision making) are often key features of depression (Taylor & Cox, 1998b).

Our findings suggest that the ASP may be superior to other measures of AS with respect to its breadth. However, future studies dedicated to the refinement of the ASP items will be necessary. Specifically, the logistics of a more intensive assessment of AS must demonstrate incremental utility over the more condensed 16-item ASI. Future research is also needed to examine whether its factor structure varies across and within (i.e., gender differences) samples. Indeed, a limitation of the present research was our use of an undergraduate sample. Although convenient, undergraduate samples may constrain the generalizability

of our findings. Extensive research has examined the factor structure of other measures of the AS construct in diverse community and clinical samples (e.g., Deacon & Valentiner, 2001; Schmidt & Joiner, 2002; Zinbarg et al., 1997). Similar research with the ASP may provide useful information on its generalizability as well as reconcile some inconsistencies in previous findings. For instance, clinical samples may be more likely to reveal distinct somatic factors as opposed to the heterogeneous somatic factors revealed in the present study (i.e., cardiac sensations may form their own reliable and homogeneous factor in panic patients). Similarly, the ASP may have incremental utility as an outcome indicator in the treatment of specific anxiety-related disorders. With the hierarchical scaling of the measure, perhaps different domains will be more "reactive" to the treatment outcome of related disorders (e.g., fear of anxiety-arousal symptoms and panic; fear of cognitive dyscontrol and depression; fear of gastrointestinal symptoms and irritable bowel syndrome). However, before confident inferences can be drawn regarding the causes and consequences of AS, as assessed by the ASP, future researchers will need to examine the factor structure and construct validity of this measure across diverse samples.

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