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Anxiety Sensitivity: Unitary Personality Trait or Domain-Specific Appraisals?

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Abstract—We tested the hypothesis that the Anxiety Sensitivity Index (ASI) measures a unitary personality variable. College students (N = 840) were administered the ASI along with a questionnaire assessing panic and anxiety symptomatology. The ASI demonstrated adequate internal reliability (α = .82) and showed modest discrimination on two of three anxiety disorder indices (i.e., anxiety medication usage and panic history). Results of a principal components analysis with varimax rotation revealed a four-factor solution which explained 53.5% of the total variance. Our findings seriously challenge previous claims that the ASI measures a single factor. Rather, our data suggest that the ASI measures several loosely-related cognitive appraisal domains concerned with the anticipated negative consequences of anxiety. The four factors that emerged from our analysis were (a) concern about physical sensations, (b) concern about mental/cognitive incapacitation, (c) concern about loss of control, and (d) concern about heart/lung failure. It is concluded that the ASI is a convenient and reliable instrument for assessing perceived physical consequences of anxiety but that the instrument is lacking in its coverage of anxiety consequences related to social concerns. Implications of the findings for treatment are discussed.

The past decade has seen a proliferation of research on anxiety disorders from both biological and psychological perspectives. While biological investigators continue to search for possible genetic and biochemical causes of anxiety disorders, psychologists have turned to the study of cognitive mechanisms. Bandura's self-efficacy theory (Bandura, 1977; 1988), Lang's emotional processing theory (Lang, 1985), and Beck's cognitive theory (Beck & Emery, 1985) illustrate the increasing emphasis on cognitive mechanisms in anxiety disorders.

For the most part, personality variables have been ignored in cognitive formulations of anxiety disorders. One exception is the expectancy model of anxiety (Reiss & McNally, 1985), which posits that the tendency to avoid a feared stimulus is a function of two major motivational pro-

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The present study had two aims: to investigate the factor structure of the Anxiety Sensitivity Index using a much larger sample and to examine the relationship of the ASI to other anxiety-relevant indices.

METHOD

Subjects

Subjects were 401 males (47.7%) and 439 females (52.3%) enrolled in the spring semester of introductory psychology classes at a large university in the southwest United States. Subjects ranged in age from 18 to 55, with a mean of 19.2 years (SD = 2.6). The large majority (94.4%) of the subjects were white. Subjects' participation in the study was in partial fulfillment of a course requirement.

Measures

All subjects completed a 32-item anxiety questionnaire designed to assess the prevalence and frequency of panic attacks, panic symptoms, and phobias according to DSM-III-R criteria in addition to relevant demographic information. The ASI (see introduction) was included as the first section of this questionnaire.

Classification of subjects' panic status

Subjects were classified as "DSM-III-R Panicker" if they (a) responded affirmatively to the question "Have you ever had an unexpected attack of extreme anxiety or panic where you suddenly felt frightened, anxious or extremely uncomfortable?"; (b) listed four or more of the 13 DSM-III-R panic symptoms during a typical attack; (c) reported that their panic attacks did not occur *only* during times of physical illness or drug/medication taking; and (d) reported four or more attacks within a four-week period, or a period of at least one month of persistent worry about having an attack.

Subjects were classified as an "infrequent panicker" if they met criteria 1–3 above but failed to meet criteria 4 (frequency or worry).

All other subjects were classified as nonpanickers.

Procedure

The subjects completed the anxiety questionnaire in large group testing sessions during which other scales were administered. The order of presentation of the various scales was randomly distributed across subjects. Subjects completed all the scales at one 45-min sitting.

RESULTS

Two separate factor analyses of the ASI data were conducted. First, in order to establish the unidimensional nature of the ASI, an iterated principal axis factor analysis (Gorsuch, 1983) was performed. This algorithm used varimax rotation with the squared multiple correlations as initial communality estimates and Kaiser's criterion (eigenvalue ≥ 1) as the factor extraction rule. The iterated principal axis approach tends to yield fewer factors at the sacrifice of variance explanation. The analysis resulted in a one factor solution which explained 25% of the total variance (eigenvalue = 3.99). With the exception of items 1, 5, and 7, all other items appear to be related to the principal factor. Alpha was computed to be .82 for the sixteen ASI items.

Because the proportion of variance explained by the principal axis analysis was relatively low, a method of factor analysis designed to maximize explained variance was applied (Hotelling, 1933). A principal components analysis followed by a varimax rotation was performed on the data. As before, Kaiser's criterion was used for the extraction rule. Table 1 shows the results of this analysis.

The principal components analysis resulted in a four factor solution which explained 53.5% of the total variance. Factor loadings on the four factors for the ASI items are given in Table 2.

The varimax rotation redistributes the variance explained by the significant factors. After rotation, Factor 1 explained 16% of the total variance, Factor 2 explained 17.5% of the total variance, Factor 3 explained 8% of the total variance, and Factor 4 explained 12% of the total variance.

The items that loaded primarily on Factor 1 included (a) It scares me when I feel "shaky," (b) It scares me when I feel faint, (c) It scares me when I am nauseous, (d) It embarrasses me when my stomach growls, and (e) When my stomach is upset, I worry that I might be seriously ill. These items tend to center on concerns of physical sensations, specifically those of nausea or fainting. A subscale alpha was computed for this factor of .68.

The items with primary loadings on Factor 2 included (a) When I cannot keep my mind on a task, I worry that I might be going crazy, (b) It

TABLE 1
PROPORTION OF TOTAL VARIANCE FROM A PRINCIPAL COMPONENTS ANALYSIS BEFORE AND AFTER VARIMAX ROTATION

Factor	Eigenvalue	Variance Proportion (Before Rotation)	Variance Proportion (After Rotation)
1	4.63	.29	.16
2	1.54	.10	.17
3	1.29	.08	.08
4	1.08	.07	.12

TABLE 2
FACTOR LOADINGS FOR THE FOUR FACTORS OBTAINED FROM A PRINCIPAL COMPONENTS ANALYSIS WITH VARIMAX ROTATION

ASI Item No.	Factor 1	Factor 2	Factor 3	Factor 4
1	.13	.01	**.79**	−.05
2	.00	**.76**	.05	.10
3	**.64**	.26	.09	.12
4	**.76**	.11	.09	.09
5	−.01	.08	**.79**	.11
6	.36	.17	.09	**.69**
7	**.46**	.02	.03	.25
8	**.74**	.14	.01	.11
9	.02	.20	−.03	**.87**
10	**.41**	.11	.07	**.65**
11	**.37**	.36	−.05	.17
12	.22	**.66**	.09	.11
13	.26	**.44**	−.08	.12
14	**.36**	**.42**	−.02	.24
15	−.07	**.80**	.00	.13
16	**.34**	**.66**	.15	−.01

Note: Items which load greater than .40 on the factor are bold.

scares me when I am unable to keep my mind on a task, (c) Other people notice when I feel shaky, (d) Unusual body sensations scare me, (e) When I am nervous, I worry that I might be mentally ill, and (f) It scares me when I am nervous. These items centered on concerns of mental/cognitive incapacitation. A subscale alpha was computed for this factor of .74. Two of the above items that loaded highly on this factor also loaded moderately on Factor 1 (loadings of .36 and .34).

Factor 3 consisted of the following dyad: (a) It is important to me *not* to appear nervous, (b) It is important to me to stay in control of my emotions. These items tend to group around concerns of control. A subscale alpha was computed for this factor of .45.

Finally, the items with primary loadings on Factor 4 included (a) It scares me when my heart beats rapidly, (b) When I notice that my heart is beating rapidly, I worry that I might have a heart attack, (c) It scares me when I am short of breath. These items tend to center around specific concerns of heart/lung failure. A subscale alpha was computed for this factor of .72. Two of the items that loaded highly on Factor 4 also loaded moderately on Factor 1 (loadings of .36 and .41) (see Table 2).

Relationship of ASI to panic and other anxiety-relevant indices

To examine the relationship between ASI scores and panic attack status, subjects were classified into one of the following three groups based on the presence and severity of reported panic attacks: (a) DSM-

III-R panicker (n = 20), (b) infrequent panicker (N = 77), and (c) nonpanicker (N = 745). ASI means and standard deviations for the three groups were DSM-III-R panicker: M = 27.50, SD = 11.33; infrequent panicker: M = 20.39, SD = 9.09; and nonpanicker: M = 18.53, SD = 8.71. A one-way ANOVA revealed a significant main effect of panic status on ASI scores [$F(2,839) = 11.29$, $p < .0001$]. Post hoc comparisons of group means using Scheffé's procedure revealed significantly higher ASI scores for DSM-III-R panickers than for infrequent panickers or nonpanickers. ASI scores did not discriminate infrequent panickers from nonpanickers.

To further examine anxiety sensitivity and its relationship to other anxiety-relevant indices, subjects were classified into high (highest quartile) and low (lowest quartile) anxiety sensitivity groups based on their ASI scores. Table 3 presents data on the lifetime prevalence of anxiety medication usage, counseling/therapy for an anxiety problem, and panic attacks broken down by high and low anxiety sensitivity. Comparisons between the high and low ASI groups revealed that compared to the low ASI group, high ASI subjects were more likely to have taken anxiety medication (p = .02) and were more likely to have experienced at least one panic attack (p = .01).

DISCUSSION

Results of the present study provide further support for the use of the ASI in anxiety-related work. Using a much larger sample, the scale demonstrated adequate internal reliability and showed modest discrimination on two of three anxiety indices (i.e., anxiety medication usage, panic history). These findings are consistent with results from previous studies suggesting that the ASI discriminates between agoraphobics and other anxiety disorder groups as well as between anxiety patients and college students (Reiss et al., 1986).

Does the ASI measure a single factor? It should be reiterated that the evidence supporting a single factor structure was based on factor anal-

TABLE 3

LIFETIME PREVALENCE OF ANXIETY MEDICATION USAGE, COUNSELING/THERAPY FOR AN ANXIETY PROBLEM, AND PANIC ATTACKS BROKEN DOWN BY SUBJECTS' ASI STATUS (UPPER QUARTILE VERSUS LOWER QUARTILE)

Measure	ASI Score		Phi Coefficient
	Low ASI (%)	High ASI (%)	
Medication for Anxiety Problem	5.76 (11)	10.94 (29)*	.09
Counseling/Therapy for Anxiety Problem	13.09 (25)	15.73 (42)	.04
Report of at Least One Panic Attack	7.33 (14)	14.61 (39)**	.12

* $p < .05$; ** $p < .01$ using chi square with 1 degree of freedom. Numbers in parentheses refer to Ns.

yses conducted on two small samples. It is unclear as to why Reiss et al. (1986) chose to combine the two samples for purposes of reliability but not for factorial validity. Results of our factor analysis yielded a four factor solution that accounted for over twice the variance (52%) when compared to our one factor solution. Findings from a separate factor analytic investigation (Peterson & Heilbronner, 1987) using a slightly larger sample (N = 122) than Reiss et al. (1986) lend further support for the multifactor structure of the ASI. Consistent with the present study, Peterson and Heilbronner (1987) generated a four factor structure using an oblique rotation. Taken together, these findings seriously challenge the claim made by Reiss et al. (1986) that the ASI measures a single factor. Rather, our data suggest that the ASI measures several loosely related cognitive appraisal domains concerned with the anticipated negative consequences of anxiety. These include (a) concern about physical sensations, (b) concern about mental/cognitive incapacitation, (c) concern about loss of control, and (d) concern about heart/lung failure.

The multifactorial structure of the ASI is consistent with data on similar instruments designed to measure perceived negative consequences associated with anxiety. The Agoraphobic Cognitions Questionnaire (ACQ) developed by Chambless and her colleagues has been shown to possess two primary factors: physical consequences, and behavioral/social (Chambless, Caputo, Bright, & Gallagher, 1984). Despite its name, the ACQ can be used to assess the perceived negative consequences of anxiety. The Panic Appraisal Inventory (Telch, 1985) includes a 15-item subscale for assessing perceived negative consequences of panic attacks. Factor analytic studies on this instrument have yielded three major factors: physical concerns, loss of control concerns, and social concerns (Telch, Brouillard, Telch, Agras, & Taylor, in press). Unlike the ASI or the ACQ, the Panic Appraisal Inventory is specific to panic and hence is appropriate only for those populations who have experienced panic attacks.

Both research and clinical experience using the ASI, ACQ, and Panic Appraisal Inventory suggest that college students as well as clinical populations of panic patients with or without agoraphobia display marked individual differences in the nature of their concerns about anxiety/panic. For instance, some show extreme hypersensitivity to physical concerns but remain relatively unconcerned about loss of control or social consequences. Others show an opposite profile of concerns. One shortcoming of the ASI in its present form is the lack of items addressing the perceived negative social consequences of anxiety. Only one item ("Other people notice when I feel shaky") directly addresses social concerns.

Conceptualizing anxiety sensitivity as a set of domain-specific concerns rather than a unitary personality variable has implications for treatment. Identification of patient subgroups who load highly on a particular domain of concerns provides a heuristic for tailoring treatment strategies. For example, patients who load heavily on cardiac concerns can be provided specific information about heart attacks and corrective experiences

to alter beliefs that palpitations or heart rate acceleration will result in a potentially fatal heart attack. Similarly, alternative strategies may be indicated for patients who fear that high anxiety is the first step leading to insanity. Instruments such as the ASI provide a convenient and reliable method for assessing appraisals of anxiety consequences. Assessing the impact of various treatment strategies on patients' beliefs about anxiety and its effects remains an important area for future work.

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