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ANXIETY SENSITIVITY, ANXIETY FREQUENCY AND THE PREDICTION OF FEARFULNESS

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Summary—A distinction is proposed between anxiety (frequency of symptom occurrence) and anxiety sensitivity (beliefs that anxiety experiences have negative implications). In Study 1, a newly-constructed Anxiety Sensitivity Index (ASI) was shown to have sound psychometric properties for each of two samples of college students. The important finding was that people who tend to endorse one negative implication for anxiety also tend to endorse other negative implications. In Study 2, the ASI was found to be especially associated with agoraphobia and generally associated with anxiety disorders. In Study 3, the ASI explained variance on the Fear Survey Schedule—II that was not explained by either the Taylor Manifest Anxiety Scale or a reliable Anxiety Frequency Checklist. In predicting the development of fears, and possibly other anxiety disorders, it may be more important to know what the person thinks will happen as a result of becoming anxious than how often the person actually experiences anxiety. Implications are discussed for competing views of the 'fear of fear'.

INTRODUCTION

Case examples of the fear of fear have been reported by many clinicians representing a wide range of theoretical orientations, including psychoanalysis, behaviorism and cognitive theory. For example, Freud (1924) reported that some people with phobias are afraid of recurrent panic experiences. Fenichel (1945, p. 210) observed that some people with anxiety disorders "develop a 'fear of anxiety' and simultaneously a readiness to become frightened very easily . . .." Evans (1972) reported the case history of a woman who feared recurrent panic attacks whenever she had to eat in the presence of others. Beck and Emery (1979, p. 5) observed that, "as anxiety attacks recur, the victim begins to dread the unpleasant symptoms of anxiety almost as much as the precipitating causes . . .." Moreover, both Rachman (1978, pp. 261–262) and Reiss (1980) have suggested that the fear of fear may be important for understanding certain placebo effects.

Despite an apparent consensus among clinical observers on the importance of the fear of fear, this concept has been all but ignored by most theoreticians and researchers. For example, the fear of fear is not included in Mowrer's (1947) influential model of avoidance learning, Bandura's (1977) influential theory of self-efficacy and Watson and Rayner's (1920) influential theory of fear conditioning. Moreover, it is very difficult to find an empirical research study in which the fear of fear was investigated, although some have finally begun to appear (e.g. McNally and Steketee, 1985). If the numerous clinical reports are valid, systematic research on the fear of fear may advance our understanding of anxiety disorders.

Alternative concepts of the fear of fear have been proposed by Goldstein and Chambless (1978) and by Reiss and McNally (1985). In the Goldstein and Chambless view, a person with a history of panic attacks learns to anticipate with dread the possibility of additional panic experiences. This learning is regarded as an example of interoceptive, Pavlovian conditioning. Moreover, the occurrence of panic experiences, and the subsequent development of the fear of fear, is held to be especially associated with agoraphobia. For example, Chambless, Caputo, Gallagher and Bright's (1984) recent effort to develop scales for measuring the fear of fear essentially is an effort to identify agoraphobia, as if agoraphobia and the fear of fear were one and the same.

In contrast with these views, Reiss and McNally (1985) have analyzed the fear of fear into two component processes called *anxiety expectancy* and *anxiety sensitivity*. Anxiety expectancy is primarily an associative learning process in which the individual has learned that a given stimulus arouses anxiety/fear. Anxiety sensitivity is an individual difference variable consisting of beliefs that

the experience of anxiety/fear causes illness, embarrassment or additional anxiety. For example, the person may believe that a pounding heart is a sign of an impending heart attack, or that it can be terribly embarrassing to have a growling stomach. Anxiety sensitivity should increase alertness to stimuli signaling the possibility of becoming anxious, increase worry about the possibility of becoming anxious, and increase motivation to avoid anxiety-provoking stimuli.

The Reiss and McNally position builds upon the prior Goldstein and Chambless position and yet departs from it. One difference concerns the role of panic experiences in the fear of fear. Goldstein and Chambless regard the fear of fear as a consequence of panic experiences, whereas Reiss and McNally regard the fear of fear as a consequence of several factors, including panic experiences, biological constitution and personality needs to avoid embarrassment, to avoid illness or to maintain control. A history of panic attacks may strengthen anxiety sensitivity by providing examples of frightening anxiety experiences. However, a history of panic experiences is not necessary for the acquisition of negative beliefs about the effects of anxiety. For example, when a physician tells a patient to avoid excitement in order to minimize the risk of a fatal heart attack, the advice should increase the patient's motivation to avoid any stimulus expected to evoke anxious arousal. When a parent teaches a child to be especially concerned about appearance, the teaching may increase the child's motivation to avoid stimuli expected to evoke anxious perspiration. Thus, a history of panic attacks is only one of several plausible ways in which negative beliefs about anxiety can be learned and strengthened.

Another issue is the possibility that anxiety sensitivity is causally related to the development of anxiety disorders. Anxiety sensitivity should increase the negative valence (aversiveness) of anxiety experiences. For example, anxiety should be more likely to grow in magnitude for an individual who believes that anxiety causes heart attacks than for someone who does not share this belief. The individual should worry much more about the possibility of becoming anxious, and the opportunity for anxiety/fear conditioning should be enhanced. Either or both of these factors might help cause the development of an anxiety disorder.

The investigation reported here was designed to validate the concept of anxiety sensitivity. A three-step process was followed. First, we developed a measure of anxiety sensitivity and evaluated its psychometric properties. Second, we evaluated the relevance of the measure for psychopathological conditions such as agoraphobia and other anxiety disorders. Third, we evaluated the relationship between anxiety (frequency of symptom occurrence) and anxiety sensitivity (beliefs that anxiety symptoms have negative effects). An effort was made to demonstrate that the measure of anxiety sensitivity is not just another measure of anxiety but actually predicts an important outcome (fearfulness) that cannot be predicted as well by anxiety scales.

The need to show that anxiety sensitivity and fear of fear scales are not just additional measures of anxiety is evident in the prior work of Chambless *et al.* (1984). These investigators developed a scale intended to measure the fear of fear and showed that agoraphobics scored higher on the scale than normals and that agoraphobics showed decreases in scale scores from pretherapy and posttherapy periods. The results are preliminary because they are open to the alternative interpretation that the scales are measures of anxiety and not measures of the fear of fear. For example, if the scales were measures of anxiety, agoraphobics might score high on the scales because agoraphobia is associated with a high level of anxiety. Moreover, the pre/posttherapy decrease in scale scores could be interpreted as reflecting a decrease in anxiety. Thus, Chambless *et al.* (1984) have not provided convincing evidence that their scales are valid measures of the fear of fear. In order to do so, they need to show that their scales can predict an important outcome that cannot be predicted as well by scales measuring anxiety.

As far as we could determine, Epstein (1982) is the only prior investigator who has attempted to show that measures of anxiety sensitivity are not measures of anxiety. She found that college students who scored high on an anxiety sensitivity scale reported having more fear when discussing the symptoms of anxiety than college students who scored low on the scale. Since the two groups had been equated for scores on the Taylor Manifest Anxiety Scale, the results of the study provided some preliminary evidence that the anxiety sensitivity scale predicted something (anxiety incubation) that was not predicted by an anxiety scale. The scale that is evaluated in this research is a modified version of the Epstein scale.

STUDY 1

The purpose of Study 1 was to evaluate the psychometric properties of the Anxiety Sensitivity Index (ASI). This scale has 16 items specifying a possible negative consequence to the experience of anxiety. These consequences include additional anxiety or fear, illness, embarrassment and loss of control. Although it was expected that the scale would have adequate test/retest reliability, no prediction was made regarding the underlying factor structure.

Methods

Subjects

Two independent samples of college students were studied. Sample 1 consisted of 49 college students (18 men and 31 women) enrolled in the winter semester of Introductory Psychology at an urban university, and Sample 2 consisted of 98 college students (49 men and 49 women) enrolled in the spring semester offering of the same course. The *S*s were recruited for a study on fear and participated voluntarily as one of several ways to fulfill a course requirement.

Measure

The ASI is presented in Table 1. The *S* is required to rate each item by selecting one of five phrases. The phrases are *very little* (scored as 0 points), *a little* (1 point), *some* (2 points), *much* (3 points) and *very much* (4 points). An individual's Anxiety Sensitivity score is the sum of the scores on the 16 items.

Procedure

The *S*s completed the ASI in a group testing session during which other scales were administered. The order of presentation of the various scales was varied randomly across *S*s. In order to assess test/retest reliabilities, a second testing session was held 2 weeks after the first. For Sample 1, 45 of the 49 *S*s returned for retesting; for Sample 2, the comparable numbers were 82 of 98.

Results

The mean and standard deviations of the Anxiety Sensitivity scores are presented in Table 2. These data reveal higher scores for women than men [F (1, 146) = 9.88, $P < 0.01$].

The test/retest reliability of the ASI was computed for the combined sample of *S*s. The Pearson product–moment correlations were as follows: 0.71 (for 54 men), 0.74 (for 73 women) and 0.75 (for 127 *S*s). These findings reveal that the ASI has adequate test/retest reliability.

Table 1. Reiss–Epstein–Gursky ASI

Item	Loadings on Factor 1	
	Sample 1 ($n = 49$)	Sample 2 ($n = 98$)
It is important to me not to appear nervous	0.54	0.20
When I cannot keep my mind on a task, I worry that I might be going crazy	0.57	0.59
It scares me when I feel 'shaky' (trembling)	0.75	0.56
It scares me when I feel faint	0.73	0.61
It is important to me to stay in control of my emotions	0.37	0.03
It scares me when my heart beats rapidly	0.71	0.61
It embarrasses me when my stomach growls	0.22	0.58
It scares me when I am nauseous	0.59	0.56
When I notice that my heart is beating rapidly, I worry that I might have a heart attack	0.63	0.66
It scares me when I become short of breath	0.57	0.69
When my stomach is upset, I worry that I might be seriously ill	0.29	0.69
It scares we when I am unable to keep my mind on a task	0.59	0.56
Other people notice when I feel shaky	0.59	0.56
Unusual body sensations scare me	0.42	0.68
When I am nervous, I worry that I might be mentally ill	0.66	0.69
It scares me when I am nervous	0.71	0.70

Table 2. Mean Anxiety Sensitivity scores

Ss	Sample 1 ($n = 49$)	Sample 2 ($n = 98$)	Combined sample ($n = 147$)
Females	21.8	19.8	20.5
	(10.7)	(10.2)	(10.2)
Males	15.3	15.5	15.4
	(8.3)	(8.1)	(8.1)

Numbers in parentheses are standard deviations.

As shown in Table 1, a principal component factor analysis performed on Sample 1 revealed a single factor structure in which 13 of the 16 items had a loading of 0.4 or more on the first factor. Essentially the same results were obtained from a factor analysis of the Sample 2 data. Moreover, 41.7% of the interitem correlations for Sample 1, and 73.3% of those for Sample 2, were statistically significant. The mean statistically significant interitem correlations were 0.42 (SD = 0.14) for Sample 1 and 0.35 (SD = 0.09) for Sample 2.

The findings provide evidence of the psychometric properties of the scale. The scale items are interrelated to a fairly high degree. This implies that people who believe that anxiety has one negative effect (e.g. causes illness) tend to believe that anxiety also has other negative effects (e.g. leads to embarrassment). The findings provide replicated evidence that the ASI reliably measures a coherent factor.

STUDY 2

Having demonstrated that the ASI has sound psychometric properties, we evaluated the criterion validity of the scale by testing for relevance to psychopathology. One prediction was that Anxiety Sensitivity scores should be higher for agoraphobia than patients with anxiety disorders other than agoraphobia. This prediction was based on numerous clinical observations that agoraphobia is especially associated with the fear of fear (e.g. Goldstein and Chambless, 1978; Mathews, Gelder and Johnston, 1981), and the assumption that anxiety sensitivity is one of two components of the fear of fear. The other prediction was that Anxiety Sensitivity scores should be higher for patients with anxiety disorders other than agoraphobia than for college students. This prediction was based on the assumption that anxiety sensitivity can be a predisposing factor in the occurrence of anxiety disorders and can be strengthened by the occurrence of anxiety experiences and/or panic attacks.

Methods

Subjects

The *S*s were 31 men and 32 women who were patients of either the Behavior Therapy Unit at Temple University or a Kaiser-Permanente clinic in Los Angeles. The DSM-III diagnoses were agoraphobia (2 men, 9 women), obsessive–compulsive disorders (16 men, 9 women), social phobia (8 men, 6 women), simple phobia (4 men, 6 women) and psychophysiological disorder (1 man, 2 women). The mean age for the *S*s with a diagnosis of agoraphobia was 39 yr (range 26–58). The mean age of the *S*s with a diagnosis of anxiety disorder other than agoraphobia was 34.9 yr (range 20–71).

A preliminary inspection of the data revealed approximately equivalent mean scores for the *S*s with a diagnosis of an obsessive–compulsive disorder, simple phobia and social phobia. Since no differences among these *S*s had been predicted, the anxiety *S*s were assigned to one of two groups for the purposes of data analyses. These groups were agoraphobia (2 men, 9 women) and anxiety disorders other than agoraphobia (29 men, 23 women). Additionally, the data obtained from the 147 college students in Study 1 were used for purposes of comparison with the clinical groups.

Procedure

The therapists asked the patients to complete the ASI as part of a research study on anxiety and fear.

Results and Discussion

In preliminary analyses intended to evaluate whether or not Anxiety Sensitivity scores were related to *S* age, we studied the entire sample of clinical *S*s. The correlation coefficients were 0.00 for men and 0.13 for women. These findings reduce concern about the mean differences in age among the various *S*s groups.

As shown in Table 3, the agoraphobics had higher scores than the patients with other anxiety disorders, and the patients with other anxiety disorders had higher scores than the college students. The prediction that anxiety sensitivity is associated more with agoraphobia than with other anxiety disorders was tested for women only because of the small number of male *S*s with agoraphobia. The one-way ANOVA had three groups: college students, patients with agoraphobia and patients with other anxiety disorders [F (2, 109) = 25.4, $P < 0.001$]. Using the Newmann–Keuls procedure, the difference in anxiety sensitivity between the agoraphobic group and each of the other two groups was found to statistically significant at the 0.001 level. These findings support the prediction that anxiety sensitivity is especially associated with agoraphobia.

Table 3. Mean Anxiety Sensitivity scores

	Group		
*S*s	College students	Anxiety disorders	Agoraphobia
Females	20.4	23.9	38.2
	($n = 80$)	($n = 23$)	($n = 9$)
Males	15.4	25.8	—
	($n = 67$)	($n = 29$)	($n = 2$)

The prediction that anxiety sensitivity is associated with anxiety disorders other than agoraphobia also was evaluated. Compared with the college students, the patients with anxiety disorders other than agoraphobia had much higher average scores [F (1, 197) = 23.94, $P < 0.001$]. This finding did not differ significantly as a function of the sex of the *S*. The finding supports the prediction that anxiety patients have higher Anxiety Sensitivity scores than college students.

Overall, the results of the study provide evidence for the criterion validity of the ASI. Both predictions were supported. Despite a high level of statistical significance, the finding that anxiety sensitivity is especially associated with agoraphobia should be regarded as preliminary because of the small number of agoraphobic patients in the study. The finding that anxiety sensitivity is generally associated with anxiety disorders is more convincing. This finding was obtained with meaningful sample sizes (52 anxiety patients and 147 college students), and it occurred at a very high level of statistical significance. Although the anxiety patients were older than the college students, age was not correlated with anxiety sensitivity, suggesting that age alone did not account for the group differences.

STUDY 3

The results of Studies 1 and 2 indicate that the ASI consistently identified some factor that is associated with anxiety disorders. Although we have assumed that anxiety sensitivity is the factor that is identified by the scale, the data are subject to alternative interpretation. For example, one could argue that our scale is a measure of anxiety rather than anxiety sensitivity. The scale probably is correlated with most anxiety scales, and it is possible that the agoraphobics scored high on the scale because of a high level of anxiety.

These considerations indicate that additional data are needed to demonstrate that our scale is a measure of anxiety sensitivity and not just another measure of anxiety. In other words, we need to validate the distinction between anxiety sensitivity (beliefs that anxiety symptoms have negative effects) and anxiety (the frequency of occurrence of anxiety symptoms). This would be accomplished if we could show that the ASI explains variance on a meaningful outcome measure that is not explained by anxiety scales.

In order to validate the distinction between anxiety sensitivity and anxiety, we tested the prediction of an especially strong relationship between the ASI and the Fear Survey Schedule—II (FSS-II; Geer, 1965). The rationale for this prediction was as follows. Anxiety sensitivity should

increase the negative valence, or reinforcing effectiveness, of anxiety experiences. For example, anxiety should have a more negative valence for a person who believes that anxiety leads to mental illness than for someone who does not. A more negative valence means a higher magnitude anxiety reaction, and since anxiety reactions can function as unconditioned responses for fear conditioning, factors that increase the magnitude of the anxiety reaction should facilitate fear conditioning, eventually leading to an increase in the number of different stimulus objects for which the person experiences fear. The FSS-II is a conventionally accepted measure of fear to a large number of specific stimulus situations. Thus, we attempted to validate the distinction between anxiety sensitivity and anxiety by showing that the ASI explains variance on the FSS-II that is not explained by anxiety scales.

Methods

Subjects

The *S*s who participated in Study 3 are the same as those who participated in Study 1.

Measures

In addition to the ASI, the test battery included two measures of anxiety, the Taylor Manifest Anxiety Scale (TMAS; Taylor, 1953) and an Anxiety Frequency Checklist (AFC). The AFC was constructed for use in this study as a measure of the frequency of occurrence of anxiety symptoms. The reason we decided to construct our own scale, as opposed to using only conventionally-accepted scales such as the TMAS, is that the conventionally-accepted scales include items that seem to measure factors other than frequency of occurrence of anxiety symptoms. By constructing our own scale, moreover, we could evaluate the frequency of occurrence of the exact symptoms included in the ASI.

The symptoms represented in the AFC were rapid (pounding) heart beat, trembling, nervousness, feeling faint, nausea, shortness of breath, unusual body sensations, inability to keep mind on task and diarrhea. The *S*s rated how often they experienced each symptom. The ratings were *seldom* (0 points), *sometimes* (1 point), *often* (3 points) and *don't know* (0 points). As part of this study, the test/retest reliability of the scale with a college student population was assessed over a 2-week period [r (44) = 0.77].

The FSS-II served as the measure of fearfulness. This scale required the *S* to rate the amount of fear to each of 51 stimuli.

Results

The intercorrelations among the measures used in this study are presented in Table 4. As expected, all of the measures were positively correlated with one another in both Samples 1 and 2. The correlation between anxiety sensitivity and fearfulness was much larger than that between anxiety frequency and fearfulness. This finding provides evidence for the distinction between anxiety sensitivity and anxiety.

The data were submitted to a stepwise regression analysis in which the FSS-II scores served as the dependent measure. The scores on the TMAS and the AFC were entered first, so that an assessment could be made of the *additional* variance explained by the ASI. For Sample 1, the ASI explained an additional 17.3% of the FSS-II variance [F (1, 47) = 13.8, $P < 0.001$]. For Sample 2, the ASI explained an additional 23.7% of the FSS-II variance [F (1, 97) = 53.0, $P < 0.001$]. These results provided replicated evidence for the validity of the distinction between anxiety sensitivity and anxiety. Moreover, the results did not vary significantly as a function of the sex of the *S*.

Table 4. Intercorrelations among measures in Study 3

	Measure		
Measure	ASI	TMAS	AFC
Fear Survey Schedule (FSS)	0.59/0.71	0.45/0.57	0.37/0.44
Anxiety Sensitivity Index (ASI)		0.43/0.50	0.36/0.32
Taylor Manifest Anxiety (TMAS)			0.56/0.51
Anxiety Frequency Checklist (AFC)			

The first number in each cell is the correlation obtained for Sample 1 (n = 49) and the second number is the correlation obtained for Sample 2 (n = 98).

GENERAL DISCUSSION

This investigation has provided evidence for: (1) the reliability and validity of the ASI; (2) a special relationship between anxiety sensitivity and fearfulness; and (3) against the hypothesis of a unique association between the fear of fear and agoraphobia.

1. The results provided replicated evidence that the ASI has sound psychometric properties. The scale has an adequate degree of test/retest reliability, a single factor structure and a high degree of interitem relatedness. These findings were obtained for each of two independent samples of college students. Moreover, the scale discriminated between female agoraphobics and female patients with other anxiety disorders, and between patients with other anxiety disorders and college students. The scale explained variance on the FSS-II that was not explained by the TMAS or by the AFC. Although additional research evaluating behavioral validity is indicated, the evidence reported here represents a significant step toward the development of a new measure.

The ASI is similar to the 'fear of fear' scales reported by Heide and Borkovec (1984) and Chambless *et al.* (1984). However, these previous scales have not been shown to measure something different from that measured by conventional anxiety scales. The significance of this research, therefore, is that, for the first time, evidence is provided validating the distinction between anxiety and anxiety sensitivity. Without this evidence, all three 'fear of fear' scales could be reinterpreted as unnecessary, additional measures of anxiety. With these findings, our scale is shown to measure something other than anxiety frequency, and since the 'fear of fear' scales are similar to our scale, we have reason to expect that all three scales probably measure something other than anxiety frequency.

2. One interesting theoretical explanation for the finding of a special relationship between anxiety sensitivity and fearfulness is that anxiety sensitivity may be a predisposing factor in the development of fears and other anxiety disorders. According to this view, people who believe that anxiety has few or no negative effects may be able to cope with a relatively high level of exposure to anxiety-provoking stimuli. In contrast, people who believe that anxiety has terrible effects, such as heart attacks and mental illnesses, may tend to have anxiety reactions that grow in anticipation of severe consequences. Anxiety sensitivity implies a tendency to show exaggerated and prolonged reactions to anxiety-provoking stimuli.

At this point, the possibility that anxiety sensitivity is a predisposing factor in the development of anxiety disorders should be regarded as theoretical speculation. The findings of Study 3 are correlational in nature and do not provide evidence of causal directions. Additional research is needed to test for causality and for the possibility of a predisposing factor.

3. The findings provide mixed support for Goldstein and Chambless' (1978) hypothesis of a special relationship between agoraphobia and the fear of fear. On the one hand, the findings support the view that anxiety sensitivity (a component of the fear of fear) is more strongly associated with agoraphobia than with the other anxiety disorders. On the other hand, the findings contradict the view of a unique association, because anxiety sensitivity was evident in patients with anxiety disorders other than agoraphobia. Anxiety sensitivity appears to be an individual difference variable that is especially associated with agoraphobia and generally associated with other anxiety problems.

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