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Cognitive Mechanisms in Claustrophobia: An Examination of Reiss and McNally's Expectancy Model and Bandura's Self-Efficacy Theory

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This paper reports on two studies that examined predictions derived from Reiss and McNally's (1985) expectancy model of fear behavior and Bandura's (1988) self-efficacy theory. In Study 1 of 138 participants displaying marked claustrophobic fears, scales were developed to measure Suffocation Concerns, Entrapment Concerns, and Coping Self-Efficacy. In Study 2 of 202 participants displaying marked claustrophobic fears, confirmatory factor and reliability analyses showed that these scales reliably tapped relatively discrete constructs. Predictions derived from the Reiss and McNally expectancy model and Bandura's self-efficacy theory were examined using behavioral, subjective, and physiological measures taken during a claustrophobic Behavioral Approach Test (BAT). Coping Self-Efficacy accounted for unique variance in subjective fear and heart-rate reactivity, but did not produce significantly better classification of participants' behavior beyond the expectancy model variable set. The expectancy model variable set meaningfully predicted behavioral approach, with the interaction between Expected Anxiety and Anxiety Sensitivity adding significantly to the classification beyond all other variables. These findings suggest that the expectancy model and self-efficacy theory provide meaningful and nonredundant accounts of phobic reactions.

KEY WORDS: self-efficacy; expectancy; anxiety sensitivity; phobia.

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Early attempts to understand phobias focused on the association between a relatively harmless stimulus and a highly aversive one (e.g., Rescorla & Wagner, 1972). Reiss (1980), noting that many phobic reactions do not take place in the presence of highly aversive stimuli, suggested that fear behavior is due to an association between a relatively harmless stimulus and highly aversive expectancies. Bandura (1988) has also offered a theoretical account of phobic reactions. This paper reports on a comparison of the expectancy model (Reiss & McNally, 1985) and self-efficacy theory (Bandura, 1988).

Reiss and McNally (1985) expressed the expectancy model in terms of the following formula:

$$Fb = Ed + (Ea \times Sa)$$

This model posits that fear behavior (Fb), i.e., the tendency to avoid a feared stimulus, is a function of two components: a danger component and an anxiety component. The contribution of the danger component is represented through the linear contribution of expectancies of danger (Ed) associated with a specific external situation or object. Thus, Reiss and McNally suggested that phobic behavior is partly due to expectations of harm and danger (cf. Reiss, 1991). The contribution of the anxiety component is represented as the product of expectancies of anxiety associated with the situation or object (Ea) and anxiety sensitivity (Sa). Anxiety sensitivity is construed as "the reinforcing effectiveness of the sensations of anxiety" (Reiss, 1991, p. 142). Thus, Reiss and McNally suggested that phobic behavior is partly due to the joint contribution of expectations of anxiety and the aversiveness that anxiety has for the individual.

In an earlier study (Valentiner, Telch, Ilai, & Hehmsoth, 1993), we reported results consistent with the model's prediction that the interaction between expected anxiety and anxiety sensitivity accounted for unique variance in fear behavior. This model, however, did not meaningfully predict claustrophobic reactions in the subjective or physiological domains.

One limitation of that study was that danger expectancies were measured using a general overall rating (Valentiner et al., 1993); participants were asked to rate the degree of "danger" they expected upon entering a claustrophobic chamber. Gursky and Reiss (1987) have suggested that specific types of danger expectancies are associated with each domain. For example, "falling" has been identified as a danger expectancy specific to fears of heights. Measures of claustrophobia-specific danger expectancies would allow for a more powerful test of the expectancy model.

Bandura (1988) has also proposed a cognitive theory of phobic reactions. He maintained that fear is dependent not only upon potentially threatening aspects of the environment, but also upon one's perceived capacity to cope with those threats. Coping self-efficacy was proposed as a higher-order cognition that incorporates lower-order variables, such as the situation-specific threat appraisals and individual difference variables that comprise the expectancy model.

Studies of self-efficacy as applied to pathological fear typically ask individuals to make appraisals about their capacity to approach the feared situation. These studies have frequently found that such appraisals predict both anxious arousal and avoidant behavior (e.g., Bandura, Reese, & Adams, 1982; Williams, Kinney, & Falbo, 1989; Williams & Watson, 1985). Kirsch (1982), however, has questioned the construct validity of these scales. By showing that individuals change their performance predictions when incentives are offered, Kirsch has argued that performance predictions reflect individuals' willingness to approach a feared stimulus, rather than their perceived ability to do so.

Alternative strategies for self-efficacy assessment have appeared in the anxiety disorders literature, i.e., scales that attempt to capture individuals' beliefs concerning their capacity to manage the perceived threats associated with approaching feared stimuli. For instance, Telch, Brouilard, Telch, and Agras (1989) assessed perceived panic coping self-efficacy in individuals with panic disorder by asking them to rate their confidence in executing specific coping behaviors such as breathing control, controlling catastrophic thinking, etc. Ozer and Bandura (1990) operationalized self-efficacy in the context of coping with sexual assault by using scales that measured individuals' perceived coping in several relevant domains including the ability to control negative thoughts. One aim of the current research was to develop a coping self-efficacy scale that would assess individuals' beliefs in their ability to control anxious affect, catastrophic cognitions, and fear behavior in the context of a claustrophobic challenge.

Although expectancies play a central role in both the Reiss and McNally (1985) and the Bandura (1988) formulations, the theories differ in important ways. Whereas self-percepts related to the execution of relevant coping behaviors in response to potential threats play a central role in self-efficacy theory, the expectancy model does not include specific appraisals of coping.

Reiss and McNally's (1985) expectancy model posits that the tendency to perceive anxiety as threatening (i.e., anxiety sensitivity) is a dispositional variable that operates whenever situationally based anxiety expectations are activated. Consequently, the theory predicts that fear behavior should be influenced by the interaction of the expectation of anxiety, viewed as being situation-specific, and the tendency to perceive fear as threatening, which is viewed as a dispositional variable. Self-efficacy theory also allows for an interaction between anxiety expectancies and individual differences in the fear of fear; self-efficacy is believed to be influenced by appraisals of emotional arousal and "upon how such information is cognitively processed" (Bandura, 1986, p. 365). Thus, self-efficacy is proposed as a higher-order cognition that incorporates situation-specific appraisals and individual difference variables; the effects of lower-order variables, like those of the expectancy model, are believed to operate through their effects on self-efficacy.

This paper reports on two studies from a larger program of research examining the role of cognitive appraisals in pathological fear. Study 1 explores the development of a measure of claustrophobia danger expectancies and a measure of claustrophobia coping self-efficacy. Study 2 examines the factor structure and reliability of the scales. Finally, the predictive validity of the expectancy model variable set and the coping self-efficacy scale are then examined using behavioral, subjective, and physiological reactions during a claustrophobic Behavioral Approach Test (BAT).

STUDY 1

Method

Study Participants

Study participants were recruited from introductory psychology classes at the University of Texas at Austin, and received partial course credit for their participation. Participants were selected from a large pool ($N > 5{,}200$) of introductory psychology students. Selection was based on a response of 3 (moderate fear) or higher to each of two screening questions using a 5-point Likert scale (*none, mild, moderate, severe, extreme*). Screening items included: (a) overall fear of closed-in spaces; and (b) fear associated with entering a very small, pitch dark, narrow closet and remaining there for several minutes. Of the 158 students meeting these selection criteria, 138 (85.7%) agreed to participate in this study. The sample was predominantly female (86.2%) with a mean age of 18.0 years ($SD = 1.7$).

Procedure

Study participants first completed a questionnaire packet that included 12 claustrophobic danger expectancy items. These items were generated from responses to open-ended questions posed to participants following exposure trials in a previous study (Valentiner et al., 1993). Participants rated each item for their degree of concern associated with being enclosed in a small space. The research assistant then escorted the participant to the claustrophobic chamber, partially opened the door of the chamber (approximately 30°), and instructed the participant to look inside for 5 sec. The chamber consisted of a long, narrow observation corridor measuring 11.40 m (length), 0.57 m (width), and 2.29 m (height). Participants were told that they would be entering the chamber. They then were directed to complete the five claustrophobic coping self-efficacy items assessing their confidence in their ability to cope with the potential threats associated with being in the chamber. These items were created based upon both theoretical considerations and clinical impressions from past studies with this population (e.g., Valentiner et al., 1993).

Results

An exploratory factor analysis conducted on the 12 danger expectancy items resulted in two principal-component factors with eigenvalues greater than 1.0. An examination of the scree plot suggested that these data would best be understood using a two-factor solution. These factors accounted for 61.0% and 9.8% of the item variance, respectively. The factor loadings from the orthogonal rotation are presented in Table I. Oblique rotation of the two factors produced similar results, with the two factors being highly

Table I. Results of Exploratory Factor Analysis of 12 Claustrophobic Danger Concerns[a]

Questionnaire item	Factor I Suffocation	Factor II Entrapment	Communality
I might start to choke.[1]	<u>.62</u>	–.12	.77
I might suffocate.	<u>.57</u>	–.07	.75
I might run out of air.[2]	<u>.55</u>	.00	.85
I might have difficulty breathing.[3]	<u>.55</u>	–.01	.83
I might not be able to get enough air.[4]	<u>.55</u>	–.01	.83
I might lose control of my senses.	<u>.41</u>	.02	.50
I might pass out.	<u>.39</u>	.07	.58
I might not be able to escape if I had to.[5]	–.25	<u>.74</u>	.88
I might not be able to get out.[6]	–.16	<u>.68</u>	.88
I might be trapped.[7]	.02	<u>.51</u>	.78
I might not be able to move.[8]	.04	<u>.38</u>	.48
Something might be hiding in there.	–.00	<u>.37</u>	.37

[a]N = 138. The principal loading for each item is underlined. Items used to construct danger expectancy scales for Study 2 are indicated with superscripts, and correspond to the numbered items in Fig. 1.

correlated (r = .80). These two factors were named Suffocation Concerns and Entrapment Concerns. Four items with large primary loadings (greater than .50 in both the orthogonal and oblique solutions) were selected to construct a Suffocation scale; while a fifth item had an equivalently high primary loading on this factor, four items were deemed adequate to construct a reliable measure. Three items with large primary loadings (greater than .50) were selected to construct an Entrapment scale, and a fourth item with a moderate loading (greater than .35) was selected to ensure that the scale was long enough to reliably tap the underlying construct. These eight items comprised the two danger expectancy scales to be used in Study 2.

Similarly, an exploratory factor analysis was conducted on the five Coping Self-Efficacy items, resulting in one eigenvalue greater than 1.0. An examination of the scree plot suggested that these data would best be understood using a single-factor solution.

Factor loadings from the principal-component analysis are presented in Table II. This factor accounted for 61.1% of the item variance. Four items with large primary loadings (greater than .50 in both the orthogonal and oblique solutions) were selected to construct a Coping Self-Efficacy scale; while a fifth item had an equivalently high primary loading on this factor, four items were deemed adequate to construct a reliable measure. These four items comprised the Coping Self-Efficacy scale to be used in Study 2.

Table II. Results of Exploratory Factor Analysis of Five Claustrophobic-Specific Coping Self-Efficacy Questions[a]

Questionnaire item	Factor I	Communality
Estimate your confidence in being able to reduce your fear to a manageable level while in the chamber.[9]	.89	.83
Estimate your confidence in being able to think clearly while in the chamber.[10]	.84	.85
Estimate your confidence in being able to remain in control of your actions while in the chamber.[11]	.82	.86
Estimate your confidence in being able to control fearful thoughts or images while in the chamber.[12]	.77	.86
Estimate your confidence that you could remain in the chamber for 2 minutes if you suddently felt panic or high anxiety.	.77	.87

[a]N = 138. Items used to construct the Coping Self-Efficacy scale for Study 2 are indicated with superscripts, and correspond the numbered items in Fig. 1.

STUDY 2

Method

Study Participants

Study participants were recruited from introductory psychology classes at the University of Texas at Austin, and received partial course credit for their participation. Participants were selected from a large pool ($N > 7.000$) of introductory psychology students. This screening pool and the eventual study sample did not overlap with those of Study 1. Selection was based upon the same criteria used in Study 1. Two hundred two students met the entry criteria and agreed to participate in this study. The sample was predominantly female (74%) with a mean age of 19.2 years ($SD = 3.1$).

Measures

Anxiety Sensitivity. Participants completed the 16-item Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). The ASI is designed to assess concern about possible negative consequences of anxiety. For each item, responses are measured using a 5-point Likert scale ranging from 0 (*very little*) to 4 (*very much*). The ASI score was computed by summing across responses to the 16 items. The ASI has shown adequate psychometric properties, including internal reliabilities around 0.90 (e.g., Gursky & Reiss, 1987; Telch, Shermis, & Lucas, 1989).

Danger Expectancies. Immediately prior to entering the claustrophobia chamber, participants rated on a 0 (*no concern*) to 100 (*extreme concern*) scale each of the four Suffocation Concern items and the four Entrapment Concern items.

Expected Anxiety. Immediately prior to entering the claustrophobia chamber, participants rated on a 0 (*no fear*) to 100 (*very severe*) scale their expected fear associated with walking to the end of the chamber and remaining inside for 2 min.

Coping Self-Efficacy. Immediately prior to entering the claustrophobia chamber, participants rated each of the four Coping Self-Efficacy items on a 0 (*not confident at all*) to 100 (*extremely confident*) scale.

Behavioral Approach. Behavioral Approach was operationalized as a binary variable, i.e., whether or not the participant was able to stay in the claustrophobia chamber for the full 2-min maximum. Participants were not told specifically how long they would be expected to stay in the chamber. In a previous study (Valentiner et al., 1993), we operationalized

Behavioral Approach as duration (in seconds) in the chamber. In the current study, however, the nonnormal distribution of this variable was more apparent. Accordingly, we elected to recode the number of seconds into a binary variable (0 = *left the chamber before 2 min had elapsed*, 1 = *stayed in the chamber for the full 2 mins*) and use a discriminant analysis strategy.

Subjective Fear. Immediately upon exiting the claustrophobia chamber, participants recorded on a 0 (*no fear*) to 100 (*very severe*) scale their maximum level of anxiety while in the chamber.

Heart-Rate Reactivity. Participants' heart-rates were measured every 15 sec during a 5-min baseline period using an ambulatory heart-rate monitor (UNIQ Heartwatch Model 8799, Computer Instruments Corp.). The unit consists of an electrode belt worn around the chest which transmits heart-rate signals to a wrist receiver that depicts and stores the heart-rate data. It also has a built-in event marker which was used to indicate when participants entered and exited the chamber. Baseline heart rate was computed as the average of these twenty 15-sec measurements. Participants' heart rates during the two Behavioral Approach Tests were also measured every 15 sec and averaged to produce a single index. Heart-Rate Reactivity was defined as heart-rate during the BAT minus baseline heart rate. For the small number of participants (n = 3 on the first BAT, and n = 8 on the second) that had slightly higher baseline than exposure heart rates, Heart-Rate Reactivity was coded as zero.

Procedure

Prior to the two BATs, each participant was fitted with the heart-rate unit by a female undergraduate research assistant. Each participant then completed the packet of self-report questionnaires. The research assistant then partially opened the door of the chamber (approximately 30°) and instructed the participant to look inside for 5 sec. The participant was then told that shortly he or she would be asked to enter this dark narrow corridor, walk to the end, and remain there for as long as he or she could. The subject was also informed that this procedure would be repeated several times. Participants were informed that the exit door would remain unlocked at all times and that they would be free to leave the chamber at any time. However, participants were encouraged to try to remain in the corridor for as long as they could or until the research assistant opened the door to signal the end of the trial.

The door of the chamber was then shut, and each participant was instructed to complete the preexposure questionnaire, which included measures of Expected Anxiety, Suffocation Concerns, Entrapment Concerns, and Coping Self-Efficacy. Upon completion of the preexposure questionnaire, instructions outlining specific exit procedures were provided. Participants were told that, if they felt the need to leave the chamber, they were to continue without stopping to the exit door and exit, even if upon approaching the exit door their discomfort/anxiety was reduced to a manageable level. Moreover, participants were reminded that the research assistant would open the door to signal the end of the trial. Although participants were encouraged to stay for 2 min, they were not provided specific information on the duration of exposure. Each participant was then asked to enter the chamber and to walk to the end without stopping or looking back. As the participant walked into the chamber, the research assistant pressed the marker button on the heart-rate recording unit to mark the beginning of the BAT. Upon reaching the back wall of the chamber, the participant was instructed to remain there for as long as possible and was reminded that the exit door was unlocked. If the participant remained in the chamber for the full 2 min, the research assistant opened the door and instructed the participant to exit. When the participant exited the chamber, the research assistant pressed the marker button on the heart-rate recording unit to mark the end of the BAT and recorded the time of exposure in seconds. Immediately upon exiting, each participant rated the maximum subjective fear they experienced while in the chamber.

Following an initial training BAT, each participant completed a second BAT. Both BATs included the preexposure questionnaire, self-directed exposure inside the chamber with heart-rate monitoring, and the postexposure rating of subjective fear. A training BAT was included because predicted responses have been shown to increase in accuracy over trials (Rachman & Bichard, 1988). Consistent with our past research (Valentiner et al., 1993), the data reported here are from the second BAT.[2] Following the two BATs, each participant was instructed to sit quietly for 5 min while resting heart-rate data were collected. Each participant was debriefed following the study.

[2]We also conducted an analysis of the data from the first BAT. The results were similar to those for the second BAT, with the following exceptions: in the prediction of subjective fear, entrapment concerns was not significant and anxiety sensitivity was significant; in the prediction of heart-rate reactivity, the Step 1 variables accounted for significant variance, although none of the four Step 1 variables accounted for significant unique variance; in the prediction of behavioral approach, the univariate *F* for expected anxiety was not significant, and the fourth discriminant function was not a significant improvement over the third discriminant function. Overall, these results are consistent with the notion that appraisals increase in accuracy over trials (Rachman & Bichard, 1988).

Results

Factor Structure of Claustrophobia Scales

Analytic Strategy. A confirmatory factor analysis (CFA) was conducted on the four Suffocation Concerns items, the four Entrapment Concerns items, the four Coping Self-Efficacy items, and the Expected Anxiety item, using LISREL VII (Jöreskog & Sörbom, 1989). LISREL allows for a test of each factor loading, as well as an examination of whether model fit would be significantly improved by adding secondary loadings. The alpha level was set at .05 for these tests.

Confirmatory Factor Analysis. The CFA results are illustrated in Fig. 1. Factor loadings were significant and generally large, indicating that the proposed scale items adequately tapped the underlying constructs. These latent variables showed close associations, with correlations ranging in absolute value from .35 to .62. The proposed factor structure left a significant portion of variance unaccounted for (χ^2 = 146.01, *df* = 61, p < .01). The Goodness-of-Fit Index (Jöreskog & Sörbom, 1989) was .904. The incremental normed fit index (Bentler & Bonett, 1980), compared to the null model in which all covariances were fixed to zero, was .946. These fit indices exceed the traditional cut-off of .900.

These results suggested that, although the proposed factor structure was reasonable, improvements could be made. Modification indices suggested two additional paths (i.e., secondary loadings), namely, from the la-

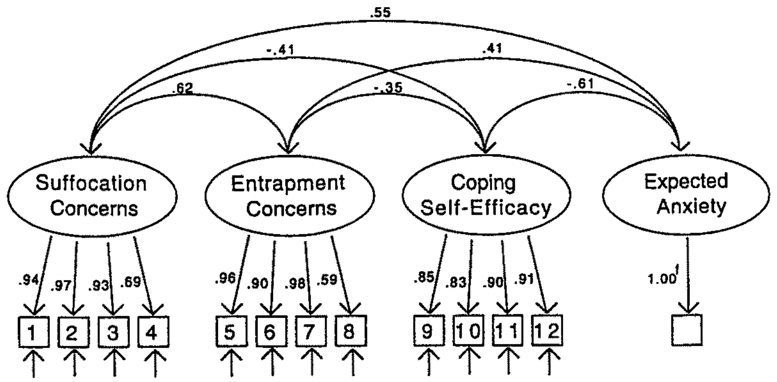

Fig. 1. Results of confirmatory factor analysis of 13 situation-specific appraisal items. (*Note*: All paths are significant at the .01 level. *N* = 202. Item numbers correspond to superscripts in Tables I and II. Superscript *f* indicates a fixed path.)

tent variables of Suffocation Concerns and Coping Self-Efficacy to the Entrapment Concerns scale item "I might not be able to move."

Reliability

Cronbach alphas, means, and standard deviations of the study variables are presented in Table III. Although there was substantial variability, most participants displayed modest levels of Subjective Fear and Heart-Rate Reactivity. Also, most participants (95.5%) were able to remain in the claustrophobia chamber for the entire 2-min testing period. Note that there was a considerable amount of missing data for heart-rate reactivity due to apparatus malfunctions. All three proposed scales showed high internal consistencies despite the relatively small number of items in each.

Predictive Validity in the Subjective and Physiological Domains

Analytic Strategy. The danger component (*Ed*) of the Reiss and McNally (1985) expectancy model was operationalized using two variables: Suffocation Concerns and Entrapment Concerns. Following the analytic strategy presented in Valentiner et al. (1993), we chose to operationalize the anxiety component ($Ea \times Sa$) using three variables: Expected Anxiety (EA), Anxiety Sensitivity (ASI), and EA × ASI. While Expected Anxiety and Anxiety Sensitivity represent the linear contributions of anxiety expectancy (*Ea*) and anxiety sensitivity (*Sa*), respectively, the product of the standard scores of Expected Anxiety and Anxiety Sensitivity (i.e., EA × ASI) represents the unique contribution associated with the interaction between these two variables. Self-efficacy was operationalized using the Coping Self-Efficacy scale. These six variables comprised the independent variable set: Suffocation Concerns, Entrapment Concerns, Expected Anxiety, Anxiety Sensitivity, the interaction term (i.e., EA × ASI), and Coping Self-Efficacy.

For the analysis of subjective fear and heart-rate reactivity, a hierarchical multiple-regression approach was used. On the first step of the analyses, four variables were entered into the regression model: Suffocation Concerns, Entrapment Concerns, Expected Anxiety, and Anxiety Sensitivity. On the second step of these analyses, the interaction variable (i.e., EA × ASI) was entered into the regression model. Following the procedure outlined by Aiken and West (1991), we defined the interaction effect as the product of the standard scores, and report the unstandardized coefficient in place of the standardized coefficient. On the third step of these

Table III. Alphas, Means, and Standard Deviations for Each Variable[a]

	N	Mean	SD	Alpha
	Dependent variable			
Behavioral Approach (in seconds)	200	116.2	18.4	
Subjective Fear	202	48.8	25.4	
Hear-rate reactivity	139	13.5	8.0	
	Independent variable			
Suffocation Concerns	200	21.2	27.9	0.91
Entrapment Concerns	200	36.1	28.6	0.93
Expected Anxiety	202	51.1	25.8	—
Anxiety Sensitivity	202	24.5	9.6	—
Coping Self-Efficacy	202	64.7	23.5	0.92

[a]Behavioral Apprach is defined as the duration of stay in the claustrophobia Behavioral Approach Test (BAT) chamber in seconds, with a maximum stay of 120 s. Subjective fear is the participant's rating of the maximum fear he/she experienced while in the BAT chamber, rated immediately following the exposure trial, measured on a 100-point scale. Heart-rate reactivity is defined as the average heart rate during exposure minus average resting heart rate, with negative numbers recoded to zero. The independent variables are self-report measures explained in the text. Reliability of the Anxiety Sensitivity Index was not calculated.

analyses, Coping Self-Efficacy was entered into the regression model. By entering Coping Self-Efficacy on the third step, we examine its incremental contribution controlling for variables entered on prior steps.

Prediction of Subjective Fear. The results of the regression model for Subjective Fear are reported in Table IV. Step 1 of the analysis was significant, with Entrapment Concerns and Expected Anxiety each accounting for significant unique variance in Subjective Fear. Anxiety Sensitivity and Suffocation Concerns did not account for significant unique variance. Step 2 was not significant; the interaction term (i.e., EA × ASI) did not account for significant unique variance of Subjective Fear. On Step 3, Coping Self-Efficacy accounted for significant additional variance in Subjective Fear. In the final model, Entrapment Concerns, Expected Anxiety, and Coping Self-Efficacy all accounted for significant unique variance in Subjective Fear. All significant associations were in the expected direction.

Prediction of Heart-Rate Reactivity. The results of the regression model for Heart-Rate Reactivity are reported in Table V. Step 1 of the analysis was not significant; Anxiety Sensitivity, Suffocation Concerns, Entrapment Concerns, and Expected Anxiety did not account for significant variance in Heart-Rate Reactivity. Step 2 was not significant; the interaction term (i.e., EA × ASI) also did not account for significant variance of Heart-Rate Reactivity. On Step 3, Coping Self-Efficacy accounted for significant variance in Heart-Rate Reactivity. In the final model, only

Table IV. Results of the Hierarchical Multiple Regression of Subjective Fear with the Expectancy Model Variable Set and the Coping Self-Efficacy Scale

	Change in R^2	Standardized coefficient on Step 1	Standardized coefficient on Step 2	Standardized coefficient on Step 3
Step 1	.55[b]			
Anxiety Sensitivity		.03	.03	.02
Suffocation Concerns		−.04	−.04	−.06
Entrapment Concerns		.16[a]	.17[a]	.18[a]
Expected Anxiety		.68[b]	.67[b]	.57[b]
Step 2	.00			
Expected Anxiety × Anxiety Sensitivity			−.03[c]	−.04[c]
Step 3	.02[b]			
Coping Self-Efficacy				−.19[b]

[a]$p < .05$, N = 200.
[b]$p < .01$, N = 200.
[c]For the interaction term, the unstandardized coefficient associated with the product of the standard scores is reported, following Aiken and West (1991).

Table V. Results of the Hierarchical Multiple Regression of Heart-Rate Reactivity with the Expectancy Model Variable Set and the Coping Self-Efficacy Scale

	Change in R^2	Standardized coefficient on Step 1	Standardized coefficient on Step 2	Standardized coefficient on Step 3
Step 1	.04			
Anxiety Sensitivity		.10	.06	.04
Suffocation Concerns		.02	.05	.02
Entrapment Concerns		.05	.02	.03
Expected Anxiety		.10	.12	−.01
Step 2	.01			
Expected Anxiety × Anxiety Sensitivity			−.12[b]	.10[b]
Sept 3	.05[a]			
Coping Self-Efficacy				−.26[a]

[a]$p < .01$, N = 139.
[b]For the interaction term, the unstandardized coefficient associated with the product of the standard scores is reported, following Aiken and West (1991).

Coping Self-Efficacy accounted for significant unique variance in Heart-Rate Reactivity. This significant association was in the expected direction.

Predictive Validity in the Behavioral Domain

Analytic Strategy. For the analysis of Behavioral Approach, we used a discriminant function approach. The same six independent variables from the regression analyses, above, were used for these analyses. The binary variable, Behavioral Approach, was used as a dependent variable, and the independent variables were entered into the model. Multivariate F-tests based on Wilks's lambda were used to test each model. In order to determine the contribution of each predictor, discriminant functions based on different subsets of the six independent variables were calculated and their classification tables compared using differential chi-square tests (Tabachnick & Fidell, 1989). The first discriminant function model included the same four variables as those on Step 1 of the regression analyses above. The second discriminant function model included the same five variables as those on Step 2 of the regression analyses. The third discriminant function model included the same four variables included on Step 1 above, plus Coping Self-Efficacy. The fourth discriminant function model included all six independent variables, as was done on Step 3 of the regression analyses above.

Prediction of Behavioral Approach. A discriminant function analysis using four of the expectancy model variables (i.e., Suffocation Concerns, Entrapment Concerns, Expected Anxiety, and Anxiety Sensitivity) as predictors was significant, $F = 9.60$, $df = 4$ and 193, $p < 0.01$, and provided a correct classification of 85.9% of the participants. A second discriminant function using five of the expectancy model variables (i.e., adding the interaction term EA × ASI) as predictors was also significant, $F = 12.52$, $df = 5$ and 192, $p < 0.01$, and provided a correct classification of 90.9% of the participants. This second discriminant function represented a significant improvement over the first discriminant function (differential $\chi^2 = 5.8$, $df = 1$, $p < 0.05$), due to correctly classifying an additional 12 participants as able to remain in the chamber, despite two additional participants incorrectly classified as able to remain. A third discriminant function (i.e., adding Coping Self-Efficacy to the four variables of the first discriminant function) was also significant, $F = 9.88$, $df = 5$ and 192, $p < 0.01$, and provided a correct classification of 89.4% of the participants. This third discriminant function also represented a significant improvement over the first discriminant function (differential $\chi^2 = 5.1$, $df = 1$, $p < 0.05$), due to correctly classifying an additional seven participants as able to remain in the chamber, with no change in the classification of those who were not able to remain.

A fourth discriminant function using all six independent variables as predictors was also significant, $F = 12.31$, $df = 6$ and 191, $p < 0.01$. This fourth discriminant function was not a significant improvement over the second discriminant function. This fourth discriminant function was a significant improvement over the third discriminant function (differential $\chi^2 = 6.2$, $df = 1$, $p < 0.05$), due to correctly classifying an additional nine

Table VI. Results of Discriminant Function Analysis for Behavioral Approach with the Expectancy Model Variable Set and the Coping Self-Efficacy Scale

Predictor	Standardized coefficient	Univariate F (df = 1 and 196)
Anxiety Sensitivity	.30	6.80[a]
Suffocation Concerns	.43	14.05[a]
Entrapment Concerns	.44	14.98[a]
Expected Anxiety	.65	31.72[a]
Expected Anxiety × Anxiety Sensitivity	.51	19.84[a]
Coping Self-Efficacy	−.68	35.09[a]

[a] $p < 0.01$, $N = 200$.

participants as able to remain in the chamber, despite a two additional participants incorrectly as classified as able to remain. The standardized discriminant function coefficients from this analysis, involving all six independent variables, are presented in Table VI.

This final discriminant function correctly classified 184 (92.9%) participants overall (i.e., six participants correctly classified as leaving the BAT chamber before 2 min had elapsed, and 178 correctly classified as able to remain in the BAT chamber for the 2 min).

Fourteen participants overall were incorrectly classified (i.e., 11 incorrectly classified as leaving and three incorrectly classified as able to remain). The relative size of the standardized discriminant function coefficients suggests that Coping Self-Efficacy, Expected Anxiety, and the interaction term (i.e., EA × ASI) all had substantial predictive value.

Summary of Discriminant Analyses. The first four variables (i.e., Suffocation Concerns, Entrapment Concerns, Expected Anxiety, and Anxiety Sensitivity) showed significant predictive validity in classifying participants. The interaction term (i.e., EA × ASI) showed incremental predictive validity over all other variables in classifying participants. Coping Self-Efficacy showed incremental predictive validity over the first four variables, but not over the interaction term (i.e., EA × ASI), in classifying participants.

GENERAL DISCUSSION

Scales relevant to Reiss and McNally's (1985) expectancy model of fear and Bandura's (1988) self-efficacy theory were developed and validated. The current findings provide some evidence that both anxiety and danger expectancies predict phobic reactions. More importantly, the interaction between Expected Anxiety and Anxiety Sensitivity meaningfully predicted phobic reactions in the behavioral domain. These findings provide support for a key assertion of the expectancy model of fear behavior (Reiss & McNally, 1985). Similarly, the current study provides support for Bandura's (1988) theoretical account of phobic reactions; Coping Self-Efficacy appears to be a useful predictor in the behavioral, subjective, and physiological domains.

Regarding the danger component of the expectancy model, we identified and operationalized two types of concerns relevant to claustrophobia. The presence of Suffocation and Entrapment Concerns is consistent with descriptive accounts of claustrophobia (Rachman, 1990) and past factor analytic studies (Rachman & Taylor, 1993). Our participants reported moderate levels of concern with entrapment, but somewhat lower levels of concern with suffocation. This finding may be an artifact of our test chamber, which because of its length might have failed to fully activate participants' suffocation concerns.

We considered the possibility that the danger component of the expectancy model may be incorporated in our Coping Self-Efficacy scale. This notion is partially supported in the examination of the factor structure underlying these items; one of the Entrapment Concern items showed associations with the Coping Self-Efficacy items not explained by the simple structural model. The Suffocation Concerns scale was not a unique predictor of phobic reactions, and Entrapment Concerns showed incremental validity only in the subjective domain. This moderate predictive value of the danger expectancy scales, however, appeared to be largely independent of the Coping Self-Efficacy scale. Although we have developed reliable measures of danger appraisals that are specific to claustrophobia, as suggested by Gursky and Reiss (1987), these scales appear to have limited predictive value. We note, however, that participants' danger concerns may have been attenuated in this research context, and that danger appraisals may be more important in nonresearch settings.

Regarding the anxiety component of the expectancy model and the prediction of Behavioral Approach, these results are largely consistent with our previous study (Valentiner et al., 1993). We reported that the interaction between Expected Anxiety and Anxiety Sensitivity accounted for unique variance in Behavioral Approach. In the present study, an alternative analytic strategy was used to accommodate the nonnormal distribution of the behavioral approach variable. These discriminant function analyses provide evidence that the interaction of Expected Anxiety and Anxiety Sensitivity accounts for unique variance of Behavioral Approach, controlling for other expectancy model variables. This interaction term also showed incremental validity over Coping Self-Efficacy. These results are consistent with a key assertion of the expectancy model; the interaction of Expected Anxiety and Anxiety Sensitivity appears to uniquely predict fear behavior. Further, Coping Self-Efficacy does not fully incorporate the joint effects of situational and individual difference variables.

While 92.9% of the participants were correctly classified in the discriminant function analysis, simply predicting that all participants would stay in the chamber would have resulted in the correct classification of 95.5% of the participants. Thus, these variables provided for greater sensitivity to those who were unable to remain in the chamber for the full 2 min, but did not improve upon the overall hit rate in predicting participants' behavior. The main utility of these analyses lies in theory testing, not in increasing overall predictive ability.

Several limitations associated with our analyses should be noted. First, Anxiety Expectancy was measured using a single item. We recognize that the reliability of this measure is likely to be somewhat lower that the reliability of the other measures included in this study. A more reliable index of Expected Anxiety would facilitate future research on the expectancy model. Although Gursky and Reiss (1987) have proposed a scale to measure Expected Anxiety, its items focus on somatic symptoms related to anxiety rather than on anxiety's affective dimension. At present, we know of no good alternative to the single-item index used in the current study. Second, the reliability associated with interaction effects was lower than the reliability of either measure that comprised the interaction effect (Busemeyer & Jones, 1983). These two factors undoubtedly reduced the power to test for an interaction effect. Given the nonnormal distribution of the Behavioral Approach measure, some caution should be given to interpreting this result. Future research may examine this hypothesis using different methods.

The measure of physiological reactivity also warrants comment. In previous studies (e.g., Valentiner et al., 1993), baseline heart rate was measured prior to exposure trials. In the current study, baseline heart rate was measured during a 5-min rest period following the exposure trials. These measures may also reflect anticipatory or recovery processes, respectively. While some effort should be made to control for individual differences in overall heart rate, these strategies are imperfect. In addition, heart-rate reactivity is multidetermined, and as such in this study was certainly influenced by other factors, such as physical movement. Further, we note that there were apparatus malfunctions that resulted in the loss of data.

In a recent revision of the expectancy model (Reiss, 1991), the danger component was reformulated in relational terms, incorporating both situation-based injury expectancies and the person-based component of injury sensitivity. Further, a social evaluation component has been added to the model (Reiss, 1991). The present study did not examine predictions derived from the revised Reiss expectancy model.

Claustrophobic Coping Self-Efficacy uniquely predicted Subjective Fear and Heart Rate Reactivity, even after controlling for all other variables. It also showed a large association with Behavioral Approach, but did not produce a significantly better classification of participants beyond the expectancy model variable set. These findings add to the growing body of empirical evidence supporting the operationalization of the self-efficacy construct in terms of one's control over the discrete cognitions and behaviors that are involved in an approach task rather than in terms of one's confidence to complete that task (e.g., Ozer & Bandura, 1990; Telch, Brouilard, et al., 1989). Performance appraisals may be construed as incorporating both coping self-efficacy and an individual's willingness to face the feared stimuli, which depends upon a variety of factors including incentives (Kirsch, 1982). An additional problem associated with performance appraisal scales is their high correlation with Expected Anxiety (Kirsch, Tennen, Wickless, Saccone, & Cody, 1983). While the latent variable underlying our Coping Self-Efficacy items showed a close association with Expected Anxiety, the absolute correlation between our Coping Self-Efficacy scale and Expected Anxiety was considerably smaller than those reported by Kirsch (1982) and Kirsch et al. (1983). The associations among the latent variables in the confirmatory factor analysis, while large, support the notion that self-efficacy is distinct from expected anxiety. The Coping Self-Efficacy construct, operationalized using the current scale, shows both construct and predictive validity.

Self-efficacy theory attributes individual differences in phobic reactions to differences in perceived capacities to actively control and respond to the external threats and internal responses that are likely to occur in response to these potential threats (Bandura, 1988). In this sense, self-efficacy may be seen as an integrative appraisal—one that takes into account the combined significance of appraisals of performance capacities as well as appraisals of threat. Coping self-efficacy did not, however, incorporate the expectancy model variables. In addition, the confirmatory factor analysis provides evidence that self-efficacy is relatively distinct from suffocation and entrapment concerns. Thus, both theoretical approaches appear to provided meaningful and nonoverlapping accounts of claustrophobic reactions. The expectancy model appears useful in describing fear behavior, while coping self-efficacy appears useful in describing phobic reactions in the subjective and physiological domains.

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