The Etiology of Phobias

An Evaluation of the Stress-Diathesis Model

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Background: We evaluated for phobias the prediction of the stress-diathesis model that the magnitude of stress at onset is inversely proportional to the level of underlying diathesis.

Methods: In more than 7500 twins from a population-based registry, we assessed the personality trait of neuroticism—as an index of phobia-proneness—and the lifetime histories of 5 phobia subtypes (agoraphobia, social, animal, situational, and blood or injury) and their associated irrational fears. Interviewers classified the mode of acquisition of the fear in phobic twins into 5 possible categories: trauma to self (further divided by severity), observed trauma to others, observed fear in others, taught by others to be afraid, and no memory of how or why fear developed. Analyses were conducted by logistic regression and analysis of covariance.

Results: The mode of acquisition had moderate test-retest reliability and differed meaningfully across phobia subtypes. None of the 3 tests of the stress-diathesis model was confirmatory: (1) the risk of phobias was not elevated in co-twins of twins who had no memory of their mode of acquisition, (2) the risk of phobias was not decreased in co-twins of twins who had severe trauma to self, and (3) no significant relationship, in phobic twins, was found between levels of neuroticism and mode of acquisition.

Conclusions: These results are inconsistent with the traditional etiologic theories for phobias, which assume conditioning or social transmission. However, they are compatible with nonassociative models, which postulate that the vulnerability to phobias is largely innate and does not arise directly from environmental experiences. The stress-diathesis model may not be an appropriate paradigm for phobic disorders.

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SUBJECTS AND METHODS

SAMPLE

The data used in this report derive from an ongoing study of white twin pairs from the Virginia Twin Registry, a population-based registry formed from a review of all birth certificates in the Commonwealth of Virginia. Female-female twin pairs born between 1933 and 1972 were initially ascertained through mailed surveys to female twin pairs in the registry, the response to which was approximately 64%. Twins were then interviewed face to face, at which time our refusal rate was approximately 12%. For the fourth interview wave in this project, 2228 members of female-female pairs from the Virginia Twin Registry were eligible to participate in a structured telephone interview. These twins were unselected except that they had participated in previous face-to-face interviews in this project. Of these 2228 twins, 1937 were successfully interviewed in 1995 to 1997. At the fourth wave, the mean (±SD) age and years of education of the sample were, respectively, 36.3 ± 8.2 years and 14.3 ± 2.2 years. To assess test-retest reliability, 190 randomly selected twins were reinterviewed 4.3 ± 1.5 weeks after their initial interview.

Male-female and male-female twin pairs were selected from the birth years of the registry of 1940 to 1974. Of 9417 eligible individuals for the wave 1, 6814 (72.4%) completed the interview. At least 1 year after the completion of the first-wave interview, which was performed, in most instances, by telephone, we contacted the twins again and attempted to schedule a second-wave interview. The number of subjects eligible for wave 2 interviews included the 6814 with complete wave 1 interviews as well as 3 subjects interviewed at wave 2 who were eligible but not interviewed at wave 1. Where possible, this interview was completed face to face (79.4% of sample). Of the 6817 eligible individuals for the wave 2 interview, 5629 (82.6%) were successfully interviewed. At the second wave, the mean (±SD) age and years of education of the sample were, respectively, 37.0 ± 9.1 and 13.6 ± 2.6 years. To assess test-retest reliability in this sample, 195 randomly selected twins were reinterviewed 4.4 ± 1.3 weeks after their initial interview.

All interviews were conducted blind to information about the co-twin. These projects were approved by our local institutional review board. Subjects were informed about the goals of the study and provided verbal consent before telephone interviews and written informed consent before face-to-face interviews and collection of DNA samples. Zygosity was determined by algorithms that included photographs, anthropometric data, and questions about physical similarity and frequency of being mistaken for one another as children, and DNA analysis.27

ASSESSMENTS

We assessed a lifetime history of phobias with an adaptation of the Phobic Disorders section of the Diagnostic Interview Schedule, version III-A.28 We assessed 22 specific irrational fears (Table 1) and also asked respondents, “Is there anything else you’ve been unreasonably terrified to do or be near?” If any phobia described in response to this question best belonged with 1 of the 5 subtypes, it was so treated.

In the Diagnostic Interview Schedule, to be considered a phobia, the irrational or unreasonable fear must result in (1) seeing a physician, (2) taking medications, or (3) reporting the fear or its avoidance “interfered with life or activities a lot.” Given the low and variable rates of treatment seeking for phobias,29 we defined phobias solely through a modification of the third criterion: objective behavioral impact of the fear on respondent behavior. In contrast to the Diagnostic Interview Schedule, where the respondent makes the judgment about fear-associated interference, in our interview, the interviewer—who had either a master’s degree in a mental health–related discipline or a bachelor’s degree and 2 years of clinical experience—made this assessment.

For each fear that was judged to be associated with impairment, the interviewers asked, “Thinking back, how did this unreasonable fear begin?” If the initial response was no memory, they were instructed to ask, “Was there a specific event or situation in which you were frightened or hurt? Did the fear begin when you saw others being afraid? Did someone teach you to be afraid?”

The interviewers coded the response of the twin into 1 of the 5 MOAs outlined above. If the twin reported phobia onset associated with a traumatic event to self, the interviewer asked for details about the event and then rated it as severe (eg, in plane crash with several fatalities, severely mauled by large dog), moderate (eg, bitten by a non-poisonous snake, locked in a dark closet for a significant period), or mild (eg, found a spider in a sleeping bag, fall from tree without injury). Neuroticism was measured with 12 items empirically chosen from the Eysenck Personality Questionnaire.30 In our female twins, the test-retest reliability of this measure over 17 and 61 months was +0.69 and +0.63, respectively.

STATISTICAL ANALYSIS

Reliability was assessed by means of the unweighted κ coefficient31 and is reported as κ ± SE. The association between MOA and phobia subtypes was assessed by standard χ² analysis. We assessed the relationship between MOA in one twin and the risk of phobia in the co-twin by logistic regression, controlling for zygosity, age at interview, sex of co-twin, and study (female-female vs male-male/male-female). We corrected for the correlational structure of our data, which includes both the correlation among multiple phobias within the same individual and the correlation within twin pairs, using independent estimating equations32 as implemented in the SAS procedure GENMOD.33 Differences in the level of the personality trait neuroticism across groups were assessed by analysis of covariance with the same set of covariates. In these analyses of covariance only, the use of independent estimating equations resulted in a substantial loss of degrees of freedom, and in 2 of the analyses did not converge to a stable solution. All of these results were rerun without the independent estimating equations, with only modest changes. We therefore present these more stable results herein.

In a large epidemiologic twin sample, we evaluated 3 predictions from the stress-diathesis model applied to phobias:

1. Given the importance of familial-genetic factors in the etiology of phobias and irrational fears, in twins with a lifetime history of phobias, the risk of fears and
phobias in their co-twins will be highest in twins with the lowest level of environmental trauma.

2. Among phobic twins with an MOA of trauma to self, an inverse relationship will be seen between the severity of the trauma and the risk of fears and phobias in their co-twin.

3. The personality trait of neuroticism—which reflects predisposition to negative emotionality—is significantly related to the risk of phobias and can therefore serve as a quantitative index of phobia-proneness. The stress-diathesis model then predicts that (1) levels of neuroticism will be highest in phobic twins whose onset was associated with the lowest levels of trauma and (2) among phobic twins who report onset associated with trauma to self, an inverse relationship will be seen between level of trauma and level of neuroticism.

MODE OF ACQUISITION

Our sample contained 7545 interviewed twins with complete data on fears and phobias. Of those, 1967 (26.1%) reported one or more phobias. These 1967 individuals reported a total of 3374 individual impairing fears that met criteria for phobias on which we had information on MOA. The number of individual fears with impairment reported ranged from 1 to 13, with a mean (SD) of 1.9 (1.4). When asked about the MOA of these fears, no memory was the most common response (48.8%), followed by trauma to self (35.7%), taught fear (7.6%), observed in others (4.1%), and trauma to others (3.9%).

Substantial differences in mode of acquisition were observed in individual fears and by phobia subtypes (Table 1). The distribution of the 5 MOAs in the 5 phobic subtypes was highly nonrandom ($\chi^2=360.9, P<.001$).

“No memory” was the response in more than 50% of subjects for all the agoraphobic fears and all but one of the social and situational fears, but none of the animal or blood/injury fears. By contrast, trauma to self was reported by more than 40% of the subjects for all of the animal fears and for fear of other closed places, needles/injections, and dentists/hospitals. Trauma to others was reported by more than 10% of the sample only for 2 blood/injury fears: fear of blood and fear of diseases. “Observed in others” was given most commonly for fear of bats, and here it was endorsed by only 8.1% of the subjects. “Taught fear” was reported by more than 10% of the sample for public bathrooms, fear of mice, snakes, bats, and other animals, and fear of airplanes and diseases.

Of the 385 twins who completed test-retest interviews, 56 reported fears with impairments in the same phobia subtype on both occasions. Reliability for our 5 categories of MOA was moderate ($\chi^2=53.5, P<.001; \kappa=0.50 \pm 0.09$). Only 14 twins reported phobias of the same subtype due to trauma to self on both occasions. The reliability of the severity ratings in this small sample was modest ($\kappa=0.38 \pm 0.22$).

The sample contained 106 twin pairs concordant for the same phobia subtype. No significant twin resemblance was observed in MOA in these pairs ($\kappa=0.11 \pm 0.07$). Furthermore, no significant excess was seen of pairs where both reported trauma to self (as would be expected if both twins developed a phobia in reaction to a shared traumatic experience) (observed, 14 pairs; expected, 12.2 pairs; cell $\chi^2=0.27$) or pairs where one twin reported trauma to self and the other twin reported trauma to others (observed, 5 pairs; expected, 3.4 pairs; cell $\chi^2=0.81$). The resemblance for MOA was similar in monozygotic ($\kappa=0.12 \pm 0.08$) and dizygotic ($\kappa=0.09 \pm 0.09$) pairs.

RELATIONSHIP BETWEEN MOA AND RISK IN CO-TWIN

No Memory vs Other MOAs

Our first test of the diathesis-stress model applied to phobias examined the risk of the same phobia subtype or of any phobia in the co-twins of 2 groups of phobic twins: (1) those who reported a specific MOA for their fear (ie, trauma to self, trauma to others, observed in others, or taught fear) and (2) those who reported no memory of their MOA. When adjusted for zygosity, sex, age at interview, and the correlational structure of the data, we found no signifi-
cant difference in risk for phobias in the co-twins of these 2 groups of phobic twins (Table 2). This pattern was seen when we examined individual phobia subtypes or all phobias. Contrary to expectation, in the entire sample of phobic twins, the risk of any phobia was nonsignificantly lower (odds ratio [OR] = 0.86) in co-twins of twins who reported no memory of their MOA vs those who recalled a specific MOA. We repeated these analyses (data not shown) for each of the 22 individual fears. Significant effects were found for 2 specific fears, a result that would occur at least 30% of the time by chance alone. The co-twins of twins with a phobia of using public bathrooms (OR, 0.19; 95% confidence interval [CI], 0.04-0.97) and snakes (OR, 0.35; 95% CI, 0.13-0.98) had a lower risk of phobia if the twin had no memory of the MOA vs recalling a specific MOA.

We then repeated these analyses predicting irrational fear—rather than phobia—in the co-twin. As seen in Table 2, again no significant results were found. Contrary to prediction, lack of memory of the MOA for fears in a phobic twin did not predict an increased risk of an irrational fear in the co-twin.

Mild vs Moderate or Severe Trauma to Self

Among all those who reported trauma to self as their MAO, the level of severity of trauma was rated as follows: mild, 64.0%; moderate, 26.5%; and severe, 9.5%. We combined moderate and severe into a single category and compared the risk for phobias and fears in the co-twins of those twins who reported their fear onset after mild vs moderate or severe traumas. The results varied across phobia subtypes (Table 3). No significant effect of level of trauma on risk of phobia in co-twins was seen for agoraphobia, social phobia, and blood/injury phobia. However, contrary to our prediction, for animal, situational, and any phobia, the risk was significantly higher in the co-twins of twins whose onset of fear was associated with moderate or severe trauma. When we considered irrational fears in the co-twin, however, no significant effects were seen. That is, the level of trauma associated with the acquisition of fear in these phobic twins was unrelated to the risk of an irrational fear in their co-twins (Table 3).

No Memory vs Moderate or Severe Trauma to Self

As a final test of the hypothesis, we compared the risk of phobias and fears in the 2 groups with what we predicted to be the most divergent level of endogenous liability—those with no memory as their MAO vs those with trauma to self rated by the interviewers as either moderate or severe (Table 4). For agoraphobia, social phobias, and blood/injury phobias, no significant effects were
The goal of this report was to evaluate the stress-diathesis model for the etiology of phobias. We wished to test the hypothesis that, in individuals with phobias, the degree of environmental stress associated with fear onset would be inversely related to the level of endogenous liability to phobia-proneness. We assessed “stress” by asking adult twins about how their unreasonable fear of X began. Many twins responded that they had no memory of how their fear of X began. However, for animal phobia, situational phobia, and any phobia, the results were contrary to that predicted. The risk of phobias was significantly higher in the co-twins of those with any phobia, the results were contrary to that predicted. None of the results was significant.

### NEUROTICISM AND MOA

Using logistic regression controlling for zygosity, sex, age at interview, interview form, and correlations within families, the level of standardized neuroticism strongly predicted risk of phobia (OR, 1.67; 95% CI, 1.58-1.77; z = 18.55; P < .001). Levels of neuroticism significantly predicted all 5 phobia subtypes, with ORs ranging from 1.39 (95% CI, 1.29-1.51) for animal phobia to 2.36 (95% CI, 2.15-2.60) for agoraphobia.

Controlling for the same variables in an analysis of covariance, we found no significant relationship of neuroticism and MOA in those with a diagnosis of agoraphobia (F(4,396) = 0.28, P = .89), social phobia (F(4,396) = 1.87, P = .11), animal phobia (F(4,410) = 1.65, P = .16), situational phobia (F(4,872) = 0.53, P = .71), blood/injury phobia (F(4,442) = 1.46, P = .21), or any phobia (F(4,2872) = 1.82, P = .12).

Among phobic twins who reported trauma to self as the MOA, with the use of the same control variables, neuroticism was not significantly associated with severity of trauma for agoraphobia (F(2,132) = 1.32, P = .27), animal phobia (F(2,236) = 0.11, P = .89), or blood/injury phobia (F(2,201) = 0.18, P = .84). However, contrary to prediction, for both twins with situational phobias and twins with any phobia who reported trauma to self as the MOA, neuroticism was significantly and positively associated with level of trauma (F(2,972) = 3.32, P = .04, and F(2,304) = 3.46, P = .03, respectively). That is, in these analyses, neuroticism was highest in those who reported phobia onset associated with severe trauma and lowest in those who reported phobia onset associated with mild trauma.

Finally, we compared the level of neuroticism in the 2 groups of phobic twins that we expected to have the most divergent level of endogenous liability: those whose onset was associated with no memory vs moderate or severe trauma to self. Neuroticism did not differ significantly for any of the 5 phobia subtypes: agoraphobia (F(1,237) = 0.05, P = .82), social phobia (F(1,280) = 2.04, P = .15), animal phobia (F(1,270) = 1.14, P = .29), situational phobia (F(1,477) = 3.18, P = .08), or blood/injury phobia (F(1,233) = 0.02, P = .88).

### Table 2. Impact of a Specific Mode of Acquisition of Phobia vs No Memory on Risk for Phobias or Fears in the Co-twin

<table>
<thead>
<tr>
<th>Phobia Subtype</th>
<th>No. of Subjects</th>
<th>Risk of Phobia in Co-twin OR† 95% CI</th>
<th>Risk of Irrational Fear in Co-twin OR† 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agoraphobia</td>
<td>330</td>
<td>0.84 (0.38-1.88)</td>
<td>1.21 (0.57-2.56)</td>
</tr>
<tr>
<td>Social</td>
<td>519</td>
<td>1.05 (0.54-2.06)</td>
<td>1.10 (0.72-1.68)</td>
</tr>
<tr>
<td>Situational</td>
<td>579</td>
<td>0.62 (0.22-1.73)</td>
<td>1.08 (0.70-1.68)</td>
</tr>
<tr>
<td>Blood/injury</td>
<td>810</td>
<td>0.61 (0.37-1.03)</td>
<td>0.74 (0.53-1.03)</td>
</tr>
<tr>
<td>Any</td>
<td>423</td>
<td>0.76 (0.32-1.82)</td>
<td>0.94 (0.54-1.63)</td>
</tr>
<tr>
<td>Any</td>
<td>2661</td>
<td>0.86 (0.63-1.17)</td>
<td>0.97 (0.81-1.18)</td>
</tr>
</tbody>
</table>

*Adjusted for zygosity, sex, age at interview, and the correlational structure of the data. OR indicates odds ratio; CI, confidence interval.†Odds of having a phobia (or fear) in the co-twin of a phobic twin with no memory of mode of acquisition vs the co-twin of a phobic twin with a memory of a specific mode of acquisition.

### Table 3. Impact of Severe or Moderate vs Mild Trauma to Self as Mode of Acquisition on Risk for Phobia and Irrational Fears in the Co-twin

<table>
<thead>
<tr>
<th>Phobia Subtype</th>
<th>No. of Subjects</th>
<th>Risk of Phobia in Co-twin OR† 95% CI</th>
<th>Risk of Irrational Fear in Co-twin OR† 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agoraphobia</td>
<td>85</td>
<td>3.95 (0.40-39.28)</td>
<td>2.09 (0.35-12.45)</td>
</tr>
<tr>
<td>Social</td>
<td>128</td>
<td>0.31 (0.04-2.31)</td>
<td>0.80 (0.28-2.30)</td>
</tr>
<tr>
<td>Animal</td>
<td>279</td>
<td>6.75 (1.74-26.17)</td>
<td>0.63 (0.40-1.73)</td>
</tr>
<tr>
<td>Situational</td>
<td>262</td>
<td>2.90 (1.13-7.46)</td>
<td>1.71 (0.90-3.27)</td>
</tr>
<tr>
<td>Blood/injury</td>
<td>197</td>
<td>1.10 (0.44-2.75)</td>
<td>1.24 (0.57-2.67)</td>
</tr>
<tr>
<td>Any</td>
<td>951</td>
<td>2.45 (1.37-4.39)</td>
<td>1.17 (0.80-1.72)</td>
</tr>
</tbody>
</table>

*Adjusted for zygosity, sex, age at interview, and the correlational structure of the data. OR indicates odds ratio; CI, confidence interval.†Odds of having a phobia (or fear) in the co-twin of a phobic twin with a mode of acquisition of moderate or severe trauma to self vs the co-twin of a phobic twin with a mode of acquisition of mild trauma to self.

### Table 4. Impact of No Memory vs Moderate or Severe Trauma to Self as Mode of Acquisition of Phobia on Risk for Phobias or Fears in the Co-twin

<table>
<thead>
<tr>
<th>Phobia Subtype</th>
<th>No. of Subjects</th>
<th>Risk of Phobia in Co-twin OR† 95% CI</th>
<th>Risk of Irrational Fear in Co-twin OR† 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agoraphobia</td>
<td>267</td>
<td>1.37 (0.52-3.60)</td>
<td>0.89 (0.34-2.33)</td>
</tr>
<tr>
<td>Social</td>
<td>365</td>
<td>0.37 (0.05-2.44)</td>
<td>0.81 (0.31-2.13)</td>
</tr>
<tr>
<td>Animal</td>
<td>272</td>
<td>3.99 (1.19-13.44)</td>
<td>0.62 (0.30-1.29)</td>
</tr>
<tr>
<td>Situational</td>
<td>541</td>
<td>2.79 (1.41-5.52)</td>
<td>1.67 (1.00-2.79)</td>
</tr>
<tr>
<td>Blood/injury</td>
<td>213</td>
<td>1.33 (0.38-4.68)</td>
<td>1.01 (0.46-2.23)</td>
</tr>
<tr>
<td>Any</td>
<td>1658</td>
<td>1.72 (1.11-2.68)</td>
<td>0.98 (0.71-1.35)</td>
</tr>
</tbody>
</table>

*Adjusted for zygosity, sex, age at interview, and the correlational structure of the data. OR indicates odds ratio; CI, confidence interval.†Odds of having a phobia (or fear) in the co-twin of a phobic twin with a mode of acquisition of moderate or severe trauma to self vs the co-twin of a phobic twin with no memory of a mode of acquisition.

The goal of this report was to evaluate the stress-diathesis model for the etiology of phobias. We wished to test the hypothesis that, in individuals with phobias, the degree of environmental stress associated with fear onset would be inversely related to the level of endogenous liability to phobia-proneness. We assessed “stress” by asking adult twins about how their unreasonable fear of X began. Many twins responded that they had no memory of any predisposing experiences, often stating that they had “just always felt afraid of X.” We assessed the liability to phobias in 2 ways: indirectly through the risk of fears or phobias in their co-twins and directly by the personality trait of neuroticism.
All of our tests to verify the stress-diathesis model for phobias failed. Given the substantial evidence that heritable factors contribute to the liability to phobia or fear-proneness, we first predicted that the risk of fears or phobias should be higher in phobic twins who had no recollection of any trauma for their MOA vs those who recalled some specific environmental precipitant. We found no such effect.

Second, we predicted that among individuals who reported fear onset associated with trauma to self, the greater the degree of trauma, the lower the level of risk for phobias in their co-twin. We found no such effect for any phobia, and for 2 subtypes (animal and situational) we found a significant effect in the opposite direction.

Third, we picked our 2 groups that, a priori, we predicted to have the highest and lowest levels of environmental stress associated with fear onset: those with moderate or severe trauma to self and those with no memory. The only significant effects found on risk of fears or phobias in the co-twin were again contrary to the prediction of the stress-diathesis model.

Fourth, using the personality trait of neuroticism as an index of liability to fear-proneness, we showed that in the entire sample this trait was strongly related to risk of phobias but did not discriminate between different MOAs among the phobic twins. Neuroticism was not, as predicted, higher in those with no memory as their MOA than in those whose phobia onset was associated with high levels of trauma. Again, the only significant effects found in these analyses were contrary to those predicted by the stress-diathesis model.

We see 3 plausible explanations for these findings. First, the stress-diathesis model may be correct but our measure of “stress” lacked sufficient reliability or validity to be useful. Skepticism about our measure is certainly warranted in that many years usually separated the onset of the fears from our assessment. Some of those reporting no memory might have had a highly traumatic experience that they subsequently repressed or simply forgot. However, MOAs assessed in our sample appear to have some face validity in that they differed meaningfully across the phobia subtypes in accord with previous literature. Our test-retest data suggested at least moderate reliability for our measures of MOA. Furthermore, our interviewers were instructed to probe any initial response of “no memory.” Finally, our sample size was large so that even if our assessment of stress were substantially error-prone, we would be likely to detect some effect.

The second plausible explanation is that the stress-diathesis model is correct but our measures of “diathesis” are invalid or unreliable. We consider this less likely, as the twin design is a powerful one and we have shown heritable components to phobias and their associated fears several times in this sample. Neuroticism is also a well studied, heritable, and valid index of general emotionality. Consistent with previous literature, neuroticism was strongly related in our data to the risk of fears and/or phobias.

Third, the stress-diathesis model may be inapplicable to phobias. We consider this the most plausible explanation given the size of our sample and the consistently negative results of our analyses. Furthermore, this result is in accord with a growing body of data from both retrospective and prospective studies that suggest that most phobias are acquired nonassociatively (ie, without the involvement of learning). This theory suggests that the liability to phobias is innate, having arisen from evolutionary selection, and does not require environmental experiences to be manifest.

If the stress-diathesis model for phobias is incorrect, 2 puzzling issues are raised. First, why do so many patients with phobias recall environmental experiences associated with their onset? Perhaps many phobia-producing experiences are so common that phobic individuals recall them in a “search after meaning.” Alternatively, individuals might recall their first contact with the feared object as traumatic because the elicitation of the innate fear was itself stressful.

Second, why are monozygotic twins only moderately correlated for their liability to phobias, even when errors of measurement are accounted for? Environmental variation of importance for phobias may reflect successful habituation experiences. Alternatively, many environmental traumatic experiences may be nonspecific and unrelated to any specific phobic stimulus, increasing the liability to all phobias. This hypothesis is supported by multivariate twin analyses of phobias in both female and male twins from the Virginia registry that found evidence of a single common factor of individual-specific environmental experiences that predisposed to all phobia subtypes.

Perhaps the most puzzling result was the evidence, found both with risk of phobia in co-twins and with levels of neuroticism, that the liability to phobia was highest rather than lowest in those whose onset was associated with moderate or severe trauma to self. This was inconsistent, found with some phobias and not others, and not found with risk of fears in the co-twin. The single traumatic phobia-producing event could have increased levels of neuroticism, but this would not explain the greater risk in co-twins. The risk in co-twins could be increased because the co-twins shared the traumatic event directly or indirectly with their twin, but we find no evidence of that. Could individuals with high liability select themselves into such traumatic events or recall them with a high likelihood? Might severe events inoculate against risk of phobias for individuals with low liability? Although highly speculative, consistent with the latter hypothesis are findings that falls resulting in injury between the ages of 5 and 9 years were associated with a reduced risk of fear of heights at age 18.

Although the stress-diathesis model for phobias is conceptually appealing, 3 different attempts to validate its predictions in a large epidemiologic sample of twins all failed. These results, which suggest that the stress-diathesis model may not be an appropriate paradigm for most phobic patients, are more consistent with nonassociative models of phobia acquisition than with traditional etiologic theories involving conditioning or social transmission.

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REFERENCES


