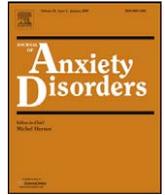




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Predictors of specific phobia in young women: A prospective community study

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ABSTRACT

Potential predictors of incidence of specific phobia were investigated within the conceptual framework of the vulnerability–stress model. At two time points separated by approximately 17 months, a community sample of 1261 German women (18–25 years of age) completed a structured interview. A broad range of potential stress- and vulnerability-related predictors was recorded at initial assessment. The strongest predictors of incidence were: high levels of preexisting psychopathology, a lack of coping skills, and a negative cognitive style. Assessing individual differences in stress and vulnerability thus seem to offer additional information about etiology of specific phobia beyond traditional learning theory. Incorporating the role of these risk factors may be useful for identifying individuals who are at increased risk and improving measures of prevention.

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1. Introduction

Specific phobia is an impairing mental disorder in which people display an “extreme and persisting fear of clearly discernible objects or situations” (American Psychiatric Association, 1994). Recent epidemiological studies suggest that approximately 9.4–12.5% of the adult population will experience at least one specific phobia at some point in their lives. Interestingly, women are even more than twice as likely to be affected as men (Depla, ten Have, van Balkom, & de Graaf, 2008; Kessler et al., 2005; Stinson et al., 2007). In a community sample of young women aged 18–25 years from which the present report is derived, we found a lifetime prevalence of specific phobia according to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994)* of 12.8% (Becker et al., 2007).

The dominant model of etiology for specific phobia was formulated by Rachman (1977). He proposed that specific phobia could be acquired through three pathways: direct negative conditioning experiences, learning through observing others, and transmission through verbal information. Although studies have provided support for all three pathways, not all specific phobias can be traced back to one of these methods. Moreover, people do not always develop phobic fear as a result of these learning experiences (King, Eleonora, & Ollendick, 1998). An additional point of concern is that Rachman's account is purely

environmental and largely ignores the influence of internal cognitive processes involved in specific phobia. These problems with the learning theory approach suggest that a variety of additional factors may need to be considered (Barlow, 2002; Mineka & Zinbarg, 2006; Ollendick, King, & Muris, 2002).

An alternative approach to study etiology of specific phobia would be to explain the disorder within the framework offered by vulnerability–stress models (Ingram & Luxton, 2005; Richters & Weintraub, 1990; Zubin & Spring, 1977). Vulnerability–stress models state that each individual has a particular set of vulnerabilities that when activated by stress lead to the development of the disorder. Such vulnerabilities may be defined as inherited or acquired characteristics that arise from the influence of multiple predictors from biological, psychological, and social domains. These predictors may have a protective value or may be risk factors and both concur in determining the individual's vulnerability to the disorder (Muris & Merckelbach, 2001; Muris, Merckelbach, de Jong, & Ollendick, 2002).

To identify predictors of the incidence of specific phobias, prospective studies in community samples are needed. To date, very few such studies are available. One study that followed up children from birth to 7 years of age found that low birth weight did not increase risk for specific phobia (Breslau et al., 1996). With regard to protective factors, regular physical activity was found to be associated with a reduced risk for incidence of specific phobia (Ströhle et al., 2007). Other health-behavior-related factors such as smoking (Cuijpers, Smit, ten Have, & de Graaf, 2007) and cannabis use (van Laar, van Dorselaer, Monshouwer, & de Graaf, 2007) did not predict the incidence of specific phobia. Studies investigating

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the role of psychopathology reveal that panic attacks (Goodwin et al., 2004) and parental depression (Lieb, Isensee, Höfler, Pfister, & Wittchen, 2002) predict the incidence of specific phobia, but that childhood separation anxiety (Brückl et al., 2007) is not associated with developing specific phobia, when using strictly prospective analyses.

Summarizing from these studies, previous research identified very few factors associated with incidence of specific phobia. Results revealed that preexisting psychopathology is a risk factor but also protective factors seem to play a role in the development of specific phobia. However, many other components of the vulnerability–stress model such as stress, coping, and cognitive factors have never been studied as potential predictors of specific phobia.

Ideally, predictors of specific phobia should be studied in a sample during the peak risk phase, which is, based on retrospective age-at-onset reports, scheduled at the time of childhood and adolescence (Burke, Burke, Regier, & Rae, 1990; Kessler et al., 2005). However, one study distinguished between age at onset of fear and specific phobia (i.e., the time when the fear causes enough distress and impairment to meet full diagnostic criteria) and found that there was an average time interval of 9 years between the onset of the fear and the onset of the specific phobia. The typical age at onset for the specific phobia was during early adulthood (Antony, Brown, & Barlow, 1997). Thus, studying predictors of the incidence of the diagnostic threshold in a sample of young adults appears to be promising. Given the large number of women with specific phobia, examining women in this age group is clearly important.

To conclude, our knowledge about predictors of specific phobia is hampered by a paucity of prospective community studies and use of limited sets of predictors. The purpose of this study was to further investigate the etiology of specific phobia, studying predictors of the incidence of specific phobia during early adulthood. Data came from a prospective study in which a community sample of German women completed a diagnostic interview at two time points. A broad range of potential predictors of specific phobia was examined using information from interview and self-report questionnaires at initial assessment. As part of this investigation, we will report incidence rates of specific phobia subtypes in this sample.

2. Method

2.1. Participants

Subjects were 1261 German women who participated in the Dresden Predictor Study (DPS; also referred to as the Dresden Mental Health Study), a prospective epidemiological study of mental disorders. A description of the study as well as details about sampling and representativeness of the sample have already been reported elsewhere (Trumpf, Vriends, Meyer, Becker, Neumer, & Margraf, 2009). Also, initial prevalence and incidence findings of *DSM-IV* disorders for this sample are presented elsewhere (Becker et al., 2000). The current study is restricted to those participants who completed a diagnostic interview at both waves of data collection and a battery of self-report questionnaires at least at baseline.

Participants were drawn randomly from the 1996 population registers of residents in Dresden, former East Germany. All participants had to meet the selection criteria of being female and being aged 18–25 years at the time of initial assessment. At baseline, no reimbursement for participation in the study could be offered. At follow-up, participants received a small gift package funded by sponsorship. A total of 5203 women was located and deemed eligible for the study. Of these, 2138 women (41.1%) did not respond. Reasons for nonresponse were refusal to take part (68.3%), lack of time (24.6%), and failure to appear at the interview (7.2%). Analyses of response bias suggested that women with more

mental problems were less likely to participate in the study (see Trumpf et al., 2009). At baseline assessment between July 1996 and September 1997, a total of 2068 women completed the diagnostic interview and 997 filled out questionnaires only, resulting in a response rate of 58.9%. Of the 2068 participants who took part in the interview, 1881 also filled out questionnaires.

At the follow-up assessment approximately 17 months later ($M = 16.9$ months, $SD = 6.0$, range = 7–30 months), 1435 (76.3%) participants returned for a readministration of the diagnostic interview. Biases that might have emerged due to dropout were examined by comparing dropouts ($n = 446$) with the remaining 1435 participants according to sociodemographic characteristics and mental disorders. Dropout was associated with having a romantic partner, $\chi^2(1) = 14.0$, $p < .001$; a lower educational level, $\chi^2(5) = 46.1$, $p < .001$; being employed full-time, $\chi^2(4) = 10.7$, $p < .05$; and having a lower socioeconomic status, $\chi^2(2) = 25.5$, $p < .001$. Dropouts were more likely to be diagnosed with a current somatoform disorder at baseline, $\chi^2(1) = 4.4$, $p < .05$. However, dropouts did not differ from follow-up participants regarding all other current mental disorder diagnoses.

As our goal was to study incidence of specific phobia, follow-up participants who reported lifetime specific phobia in the diagnostic interview at baseline ($n = 174$) were not included in the present analyses. This provided a sample size of 1261 for the present study. The baseline sociodemographic characteristics of this sample were as follows: Their mean age was 21.3 years old ($SD = 1.9$, range = 18–25). A minority of the participants (2.2%) had completed pre-secondary schooling with the lowest educational level (“Hauptschule” = mandatory basic school, 9 years). About 30% had attended intermediate level school (“Realschule” or “Polytechnische Oberschule” = intermediate type of secondary school that allows qualification for specific university curricula, 10 years) whilst the majority (64.5%) had completed the highest educational level that qualified them for university entry (“Abitur” = secondary school that prepares for entrance to university, 12–13 years). Altogether, 58.3% of the women were still enrolled in professional education, 1.2% had already completed a university degree, 7.6% had completed college, and 16.2% had completed their apprenticeships. Almost half of the participants were working; 17.7% worked part-time, 28.6% full-time. About 30% of participants were classified as belonging to lower socioeconomic status; most participants (62.6%) were classified as belonging to middle socioeconomic status and few participants were classified as high (9.3%). In this context, it should be noted that Dresden is a city with several large universities; and the high density of nonworking young adults with the highest educational level is rather typical for Dresden.

2.2. Diagnostic interview

Diagnostic interviews were conducted with each participant using the “Diagnostisches Interview für Psychische Störungen – Forschungsversion” (F-DIPS; translation: Diagnostic Interview for Mental Disorders – Research Version; Margraf, Schneider, Soeder, Neumer, & Becker, 1996). The F-DIPS is an earlier version of the DIPS (Schneider & Margraf, 2006) and is based on a German translation and extension of the Anxiety Disorders Interview Schedule (ADIS-IV-L; Di Nardo, Brown, & Barlow, 1995). It is a structured interview for the assessment of Axis I mental disorders according to *DSM-IV* criteria. At baseline, the F-DIPS was used to assess lifetime and 7-day disorders; at follow-up, the interval version was applied to assess disorders during the 17-month follow-up and the past 7 days.

F-DIPS interviews at baseline were conducted by a total of 80 interviewers; interviews at follow-up by a total of 72 interviewers. Overall, 16 interviewers were involved in the fieldwork of both investigations. Most of the interviewers were clinical psychology

graduate students or clinical psychologists; very few had advanced degrees in social work and two of the interviewers were physicians. To ensure blinding, the interviewer who conducted the follow-up interview was unaware of the participant's assessment at baseline. All interviewers underwent an intensive 1-week training focusing on the content of the study and the use of the F-DIPS. Interviewers received biweekly supervision during fieldwork. Moreover, supervisors proofread every single completed interview protocol for formal consistency, appropriate recording and coding. In cases where problems were detected, the interviewer was contacted and instructed for corrections.

For the set of interviewers in the current study, reliability ratings were obtained on audiotapes of 43 randomly selected interviews by a second interviewer. Degree of agreement between the two interviewers for the lifetime diagnoses for five diagnostic categories (i.e., anxiety, affective, somatoform, eating, and childhood disorders) was reflected by a mean Cohen's kappa of .83 (range = .58–1.0) and a mean Yule's Y of .89 (range = .64–1.0). The retest reliability of the F-DIPS (range retest interval = 1–4 weeks) was also tested in a sample of 191 psychosomatic patients (Keller, 2000). For current diagnoses for five diagnostic categories (i.e., anxiety, affective, somatoform, substance, and eating disorders), the study yielded a mean kappa value of .72 (range = .64–.89) and a mean Yule's Y of .78 (range = .65–.94). For specific phobia, the retest reliability was modest ($\kappa = .56$, $Y = .73$). In the same study, the validity of the F-DIPS was evaluated with self-report questionnaires and diagnoses made by therapists. Overall, the F-DIPS proved to be a valid instrument for the assessment of mental disorders.

2.3. Measures of predictor variables

1. *Positive mental health* was assessed with the 14-item Mental Health Scale (P-scale; Lutz, Heyn, Schmid, Sick, & Steinl, 1992) on which participants rated, using a scale from 0 (*disagree*) to 3 (*agree*), their agreement with self-descriptions related to positive mental health (e.g., "I believe that my life has meaning").
2. *Social support* was assessed using the 22-item Social Support Scale (SOZU-K; Fydrich, Sommer, Menzel, & Höll, 1987) on which participants rated, using a scale from 0 (*that does not apply to me*) to 4 (*that applies exactly to me*), their subjective belief in receiving support from their social environment.
3. *Self-efficacy* was assessed with the 10-item General Self-efficacy Scale (GKE; Jerusalem & Schwarzer, 1986) on which participants rated, on a scale from 1 (*not at all true*) to 4 (*exactly true*), their confidence in coping with a variety of stressful demands (e.g., "I will find a solution for every problem").
4. *Life satisfaction* with important life areas was assessed with a 12-item questionnaire (Lutz, Heyn, Schmid, Sick, & Steinl, 1992) on which participants rated, on a scale from 0 (*very dissatisfied*) to 4 (*very satisfied*), their satisfaction with 12 life areas (e.g., health, occupation, leisure time).
5. *Stress from life events and daily hassles* were assessed with a modified version of the Inventory for Determining Life-Changing Events (ILE; Siegrist & Dittmann, 1983), on which participants indicated if 17 critical life events and 16 daily hassles were present within the last 12 months of their life or in the life of a significant other person. Using a scale from 0 (*not at all*) to 4 (*very much*), participants rated the degree of stress they were experiencing from each event and daily hassle. Stress ratings from life events and daily hassles in participants' own lives were then analyzed.
6. *Problem-focused and emotion-focused coping* were assessed with the Ways of Coping Checklist (WOC; Folkman & Lazarus, 1980; German version by Ferring & Filipp, 1989), a

list of 25 items that described a range of problem-focused and emotion-focused coping strategies. Problem-focused coping tries to activate resources to solve the stress-inducing problem. Emotion-focused coping attempts to ease inner tension without trying to solve the problem (e.g., wishful thinking, self-preoccupation, mental rumination, self-blame, and emphasizing the positive). There is evidence documenting the negative adaptive outcomes of emotion-focused coping, mainly when the stressful situation can be ended by problem-focused responses (McCrae & Costa, 1986). The WOC asks participants to first state the most stressful event or problem experienced in the past 12 months. Then, using a scale from 0 (*not at all*) to 4 (*a great deal*), participants rated the 25 items according to the extent to which they actually employed each strategy in dealing with the particular stressful event or problem.

7. *Anxiety sensitivity* was assessed with the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986; German version by Ehlers, 1986), which asks participants to estimate on a scale from 0 (*very little*) to 4 (*very much*) the extent to which they believe that anxiety and its accompanying symptoms may lead to physically, psychologically, or socially harmful consequences.
8. *Fear of bodily sensations* was assessed using the Body Sensations Questionnaire (BSQ; Chambless, Caputo, Bright & Gallagher, 1984; German version by Ehlers, Margraf, & Chambless, 1993), on which participants rated their fear from 0 (*none*) to 4 (*extreme*), for each of 17 sensations mostly related to autonomic arousal.
9. *Dysfunctional attitudes* were assessed with the Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978; German version by Hautzinger, Luka, & Trautmann, 1985), on which participants rated, using a scale of 0 (*totally agree*) to 6 (*totally disagree*), their agreement with irrational beliefs and faulty assumptions about reality that are etiologically related to depression.
10. *The number of diagnoses* for participants' lifetime anxiety, affective, and other disorders was assessed with the F-DIPS diagnostic interview.
11. *General psychopathology* over the last 7 days was assessed with the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1977; German version by Franke, 1995). The Global Severity Index (GSI) was used to measure overall psychological distress. Means, standard deviations, and correlations among the variables are shown in Table 1.

2.4. Creation of aggregate variables

Because a large number of interrelated variables had been administered at baseline, measures of predictor variables were reduced to a smaller number of composite scores. Measures that were found to be strongly correlated and conceptually similar were standardized and combined into a single aggregate variable. Using this procedure, measures of predictor variables were reduced to the following five aggregate variables.

2.4.1. Protective factors

The first aggregate variable, which was thought to represent protective factors in different areas of a participants life, was computed as the mean of the following standardized variables (z scores with $M = 0$, $SD = 1$): (1) self-efficacy, (2) life satisfaction, (3) positive mental health, and (4) social support.

2.4.2. Twelve-month stress

The second aggregate variable, which was thought to represent participants' stress levels in the last 12 months, was computed as

Table 1
Means, standard deviations, and correlations among the variables.

Variable at baseline (scale range)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	M (SD)
1. Positive mental health (0–56)	–															46.25 (6.43)
2. Social support (0–5)	.56**	–														4.41 (.51)
3. Self-efficacy (0–40)	.59**	.41**	–													28.51 (4.41)
4. Life satisfaction (0–5)	.55**	.53**	.32**	–												3.67 (.52)
5. Stress from life events (0–5)	–.25**	–.13*	–.15*	–.23**	–											.88 (.64)
6. Stress from daily hassles (0–5)	–.34**	–.21**	–.16*	–.35**	.62**	–										.88 (.64)
7. Problem-focused coping (0–72)	.05	.08*	.11**	.02	.16**	.18**	–									29.05 (11.35)
8. Emotion-focused coping (0–72)	–.35**	–.24**	–.27**	–.28**	.30**	.33**	.32**	–								26.08 (12.18)
9. Anxiety sensitivity (0–64)	–.26**	–.18**	–.20**	–.22**	.18**	.28**	.11**	.26**	–							12.50 (7.45)
10. Fear of bodily sensations (0–5)	–.22**	–.12**	–.20**	–.15**	.18**	.23**	.12**	.26**	.68**	–						1.82 (.62)
11. Dysfunctional attitudes (0–240)	–.48**	–.39**	–.39**	–.39**	.14**	.20**	.02	.29**	.33**	.22**	–					115.72 (23.56)
12. Number of anxiety disorders	–.19*	–.13*	–.10*	–.16**	.15**	.14**	.02	.16**	.17**	.15**	.16**	–				.20 (.51)
13. Number of affective disorders	–.18**	–.09**	–.08**	–.14**	.18**	.19**	.07*	.17**	.13**	.14**	.07**	.32**	–			.12 (.33)
14. Number of other disorders	–.23**	–.10**	–.13**	–.15**	.16**	.15**	.03	.11**	.09**	.09**	.11**	.11**	.18**	–		.19 (.48)
15. General psychopathology (0–4)	–.55**	–.38**	–.34**	–.39**	.39**	.48**	.13**	.49**	.43**	.38**	.36**	.30**	.24**	.20**	–	.32 (.30)

Note: M, mean; SD, standard deviation.
* $p < .05$.
** $p < .01$.

the mean of the following standardized variables: (1) levels of stress from life events and (2) levels of stress from daily hassles.

2.4.3. Coping skills

The third aggregate variable was thought to represent an overall index of participants' individual ways of dealing with problems and combined measures of: (1) emotion-focused coping and (2) problem-focused coping. Scores for the emotional coping variable were reversed in order that high scores reflected effective coping. The aggregate variable was then computed as the mean of the standardized scores of both coping variables.

2.4.4. Negative cognitive style

The fourth aggregate variable, thought to represent participants' negative cognitive style, was computed as the mean of the following standardized variables: (1) anxiety sensitivity, (2) fear of bodily sensations, and (3) dysfunctional attitudes.

2.4.5. Psychopathology

The fifth aggregate variable was thought to represent psychopathology and combined standardized scores of: (1) number of lifetime anxiety disorders, (2) number of lifetime affective disorders, (3) number of other lifetime disorders, and (4) general

psychopathology. Summaries of the aggregate variables and internal consistencies are provided in Table 2.

2.5. Statistical analyses

Incidence refers to the number of new cases during the 17-month follow-up period among the 1261 participants, who had never met lifetime criteria for specific phobia at baseline. Prospective associations between aggregate predictor variables at baseline and the 17-month incidence of specific phobia were estimated using logistic regressions. First, a series of five separate logistic regressions, each with a single aggregate variable, was conducted. Then, multiple logistic regression analysis was used to examine the variables' relative contribution to the prediction of the incidence of specific phobia. The strength of association between the predictor variables and incidence of specific phobia is illustrated by the odds ratio (OR), which indicates by which factor the odds of developing a specific phobia increases for those with the risk factor compared to those without it. An OR of 1.0 indicates no association between the predictor variable and incidence of specific phobia. For continuous predictors, the OR indicates by which factor the odds increases if the predictor value increases by exactly one unit. The five aggregate risk variables were

Table 2
Summary of aggregate variables and internal consistencies.

Aggregate	Variables included	Source of assessment
Protective factors, $\alpha = .90$	Self-efficacy, $\alpha = .87$	GKE
	Life satisfaction, $\alpha = .76$	LZH
	Positive mental health, $\alpha = .90$	P-scale
	Social support, $\alpha = .74$	F-SOZU
12-month stress, $\alpha = .77$	Stress from life events, $\alpha = .61$	ILE
	Stress from daily hassles, $\alpha = .68$	ILE
Coping skills, $\alpha = .82$	Emotion-focused coping, $\alpha = .79$	WOC
	Problem-focused coping, $\alpha = .77$	WOC
Negative cognitive style, $\alpha = .78$	Anxiety sensitivity, $\alpha = .83$	ASI
	Fear of bodily sensations, $\alpha = .91$	BSQ
	Dysfunctional attitudes, $\alpha = .79$	DAS
Psychopathology, $\alpha = .96$	Number of other anxiety disorders	F-DIPS
	Number of affective disorders	F-DIPS
	Number of other disorders	F-DIPS
	General psychopathology, $\alpha = .96$	SCL-90

Note: Coefficient α based on the present sample ($N = 1261$) at baseline. GKE: Self-efficacy Scale; LZH: Life Satisfaction Scale; P-scale: Positive Mental Health Scale; F-SOZU: Social Support Scale; ILE: Inventory for Determining; Life-changing Events; WOC: Ways of Coping Checklist; ASI: Anxiety Sensitivity Index; BSQ: Body Sensations Questionnaire; DAS: Dysfunctional Attitude Scale; F-DIPS: Diagnostic Interview for Mental Disorders – Research Version; SCL-90: Symptom Checklist 90.

standardized across subjects to enhance comparability of the ORs. All analyses were performed using SPSS 11.0 (SPSS Inc, Chicago, IL).

3. Results

3.1. Incidence of specific phobia during follow-up

Among the 1261 participants who had never been affected at baseline, 10.0% ($n = 126$) developed at least one specific phobia during the 17-month period between baseline and follow-up. Note that about one-third of them developed more than one specific phobia. Most participants reported animal phobias (57.5%), followed by situational (28.7%), environmental (20.7%), and physical phobias (17.2%). Blood-injection-injury phobias (10.3%) and others phobias (10.3%) occurred rarely.

3.2. Predictors of incidence

Analyses revealed that all five stress and vulnerability factors predicted incidence of specific phobia during the 17-month follow-up period: Lacking protective factors, having 12-month stress, lacking coping skills, having a negative cognitive style, and having high levels of psychopathology predicted the incidence of specific phobia during the 17 months. Women with these risk factors at baseline were more likely to develop incident specific phobia than those without (Table 3).

We also examined the variables' combined contribution to the prediction of incidence in multiple logistic regression analysis, to evaluate their relative importance. When all predictors were entered jointly, lack of coping skills, a negative cognitive style, and psychopathology emerged as significant independent predictors of the incidence of specific phobia. Lack of protective factors and 12-month stress did not predict the incidence of specific phobia when adjusting for all other predictors in the model (Table 3).

Finally, we examined the relation between number of participants' risk factors present at baseline and incidence of specific phobia during a 17-month period. Each participant was coded as having (or not having) each of the following three risk factors: (1) lack of coping skills, defined as a score less than one standard deviation below the sample mean; (2) a negative cognitive style, defined as a score greater than one standard deviation above the sample mean; and (3) high levels of psychopathology, defined as a score greater than one standard deviation above the sample mean. Results from logistic regression analyses revealed that the number of risk factors predicted incidence of specific phobia (OR = 1.53, 95% CI = 1.23–1.91,

$p < .001$). Incident specific phobia developed in 17.6% of the participants who displayed two or three risk factors at baseline, compared with 7.8% of participants who had no risk factors.

4. Discussion

The purpose of this study was to examine predictors of incidence of early adulthood specific phobia in the community in a 17-month prospective design. Of the women without lifetime specific phobia at baseline, 10.0% developed at least one specific phobia during follow-up. Compared to previous studies of the incidence of specific phobia, this is relatively high. For example, the Netherlands Mental Health and Incidence Study (NEMESIS) reported that in 18–24-year-old women the 12-month incidence rate for specific phobia was 4.38 per 100 person-years at risk (Bijl, de Graaf, Ravelli, Smit, & Vollebergh, 2002). Possible explanations for the high incidence in the present study might be that our study had a longer follow-up period, used DSM-IV criteria and structured interviews for diagnostic assessment, and investigated women in a restricted age range. Further, the stem question of the specific phobia section in the F-DIPS interview investigated a broad spectrum of potentially phobic stimuli (18 probes). Moreover, retrospective studies have suggested an even earlier age at onset for specific phobia than the participants' age range chosen for the DPS. This might be due to the fact that retrospective studies, which are also more likely to be affected by recall bias, usually assess onset of the first symptoms of a disorder and *not* its full-blown emergence. It should be stressed that in the present study incidence of specific phobia refers to the actual onset of DSM-IV specific phobia, e.g., the time when symptoms of fear are so strong that they meet full DSM-IV criteria. Therefore, results of the DPS suggest that young adulthood may be considered as a high-risk phase for the incidence of DSM-IV specific phobia in women. Finally, one may consider the specific time context of the study, which was conducted shortly after the German reunification. Questionnaire based studies have revealed higher levels of anxiety in East Germany in 1994 (Margraf & Poldrack, 2000), which may serve as an explanation for the extremely high incidence rate of all anxiety disorders in the DPS (Becker et al., 2000).

In a first univariate assessment, all stress and vulnerability factors studied predicted the incidence of specific phobia during the 17-month period. In multiple logistic regression analysis aimed at showing the relative importance of the predictors, lack of protective factors and 12-month stress did not predict incidence. Lack of coping skills, a negative cognitive style, and higher levels of psychopathology emerged as significant independent predictors even when adjusting for all other predictors in the model.

The finding that preexisting psychopathology predicts incidence of specific phobia concurs with previous prospective community studies (Goodwin et al., 2004; Lieb et al., 2002). Coping skills are particularly interesting in relation to the prevention of specific phobia because prevention programs can actively work to increase coping. Interestingly, the strongest predictor of incidence of specific phobia was a negative cognitive style. This is a rather novel finding because dysfunctional cognitions are not part of the etiological model of specific phobia (Rachman, 1977) and are only indirectly part of treatment (Öst, 1996). Research investigating cognitive factors in specific phobia is less focused on dysfunctional contents of thoughts; and more focused on biases in the information processing of phobia-relevant stimuli (e.g., Dalgleish & Watts, 1990). However, our data reveal that an added general cognitive vulnerability, which is probably unrelated to the phobic stimulus, seems to be involved in the development of specific phobia. As indicated by our aggregate

Table 3
Results from separate and multiple logistic regression analyses predicting the incidence of specific phobia over 17 months.

Baseline variable	Incidence of specific phobia ($n = 126$) vs. no specific phobia ($n = 1135$)			
	Separate ^a		Multiple ^b	
	OR	95% CI	OR ^a	95% CI
Protective factors	.82 [*]	.69–.98	1.12	.92–1.37
Twelve-month stress	1.37 ^{***}	1.16–1.62	1.21	.97–1.52
Coping skills	.74 ^{***}	.62–.89	.81 [*]	.66–.99
Negative cognitive style	1.60 ^{***}	1.34–1.91	1.45 ^{***}	1.18–1.79
Psychopathology	1.43 ^{***}	1.24–1.66	1.23 [*]	1.02–1.49

Note: OR, odds ratio from logistic regression; CI, confidence interval.

^a Separate logistic regressions, each with a single aggregate predictor variable.

^b Multiple logistic regression model with all aggregate predictor variables.

^{*} $p < .05$.

^{**} $p < .01$.

^{***} $p < .001$.

measures, key cognitive factors to be studied include biased interpretation of internal and environmental stimuli such as fear of anxiety-related symptoms (as indicated by the ASI and the BSQ) and dysfunctional attitudes (as indicated by the DAS).

These results show that etiology of specific phobia is considerably more complex than originally assumed by Rachman's three pathways (Rachman, 1977). Learning theory ignores a variety of stress and vulnerability variables that act as risk factors for specific phobia. Incorporating the role of these risk factors in a vulnerability–stress model may lead to a nuanced understanding of the etiology of specific phobia. From such a vulnerability–stress perspective, the finding that some people but not others acquire a specific phobia following learning experiences is actually expected (Barlow, 2002; Mineka & Zinbarg, 2006). Regarding prevention, a vulnerability–stress model may help to identify which individuals are at increased risk of developing specific phobia.

The present findings should be interpreted in light of the strengths and limitations of the study. Particular strengths are the prospective design in a community-based sample and the examination of a broad range of predictors. Specific phobia and other mental disorders were assessed using diagnostic interviews according to *DSM-IV* criteria. Several limitations should also be noted. First, it is possible that findings from this German sample, which consisted of well-educated young women with a predominantly higher socioeconomic status, may not generalize to other populations. However, by using a sample of women in this developmental phase, we were able to investigate a time when fears often start to meet the distress and impairment criteria according to *DSM-IV*; this is probably more difficult to observe in younger samples (see Antony et al., 1997). We were also able to examine predictors with less concern for the confounding effects of age, gender and socioeconomic status, which might be problematic in a more diverse sample.

Second, the response rate of 58.9% at baseline is relatively low. The reason for this is probably rooted in the temporal context of the study, which was conducted relatively soon after the reunification of East and West Germany. Because of economic and other problems stemming from the transformation of the political system following the demise of communism, many people in Dresden were unwilling to participate in research (Maercker & Herrle, 2003). Further reasons for the low response rate at the time include the scarcity of telephones, high levels of immigration to other parts of Germany, and general reluctance regarding recordings of personal data.

A final important limitation of the current study is that the group of predictors that we selected was far from exhaustive. In particular, we had no measures of genetic information, although evidence exists that genetic factors play at least a moderate role in the etiology of specific phobia (Kendler, Neale, Kessler, Heath, & Eaves, 1992). Future studies should thus aim to assess genetic information to complement the interpretation about mechanisms of environmental influences in the development of specific phobia.

Despite these limitations, the present findings suggest that women with particular pre-existing risk factors – lack of coping skills, negative cognitive style, and psychopathology are at increased risk for specific phobia. Regarding prevention of specific phobia, our findings indicate that intervention programs are likely to be most effective if they target a comprehensive set of factors, as women with several risk factors are most likely to develop the disorder. Future studies are necessary to examine what can be done to modify risk factors and whether early prevention is able to reduce incidence. This is especially relevant given prevalence estimates that specific phobia is one of the most common mental disorders in young women.

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