

ORIGINAL PAPER

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Effects of negative life experiences on phobia onset*

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Abstract Background: Conditioning theories, stress theories and social psychological theories each suggest that negative life experiences should influence phobia onset, though the patterns of effects suggested by each type of theory are different. Few previous studies have estimated the effects of a broad enough range of life experiences on onset of multiple types of phobia to evaluate patterns of effects. **Methods:** Retrospective data on life experiences and history of phobia from a representative sample of persons 15–54 years old from the US population (the National Comorbidity Survey) are analyzed using discrete-time event history methods. **Results:** The effects of 12 negative life events and ten chronic childhood adversities on onset of agoraphobia, specific phobia, and social phobia are presented. Three discrete events have unique effects on agoraphobia onset: life threatening accidents, combat in war (for men), and a fire/flood or other natural disaster. Two chronic experiences during childhood have unique effects on specific phobia onset: violence at the hands of one or more adults, and verbal aggression between parents. Sexual assault by a relative and verbal aggression between parents have unique effects on social phobia onset. The effect of sexual assault by a relative on social phobia is confined to women, and to phobias beginning before age 12. **Conclusions:** Unpredictable and uncontrollable events that threaten or result in physical harm influence agoraphobia onset. Potentially predictable but difficult to control childhood experiences (e.g., chronic parental violence) influence specific phobia onset. Blame is a likely mediator of the effect of sexual abuse on social phobia. No data on perceptions of predictability and controllability of life experiences, or of blame, were available for

analysis. These conclusions are therefore based on speculations about social psychological processes that have been supported by previous research and theory.

Introduction

Theories of phobia etiology have offered to explain the effects of negative life events on phobia onset through conditioning processes, stress processes, and processes involving complex social psychological mechanisms. Conditioning theory suggests that phobic situations (i.e., situations that are irrationally feared) should resemble situations in which adversity previously occurred. Driving phobias among persons who have been exposed to frightening experiences in automobiles, for example, are consistent with conditioning theory (Munjack 1984). In contrast, stress theories suggest that phobias result from exposure to aversive events in general. If stress precipitates phobia onset, then all types of aversive experiences should significantly increase risk for onset. Etiology through stress processes therefore suggests that there should be little resemblance between the content of phobias and aversive experiences. In contrast, abstract resemblances among life experiences and phobias might be expected if complex social psychological processes (e.g., processes involving beliefs and expectations; Freeman and DiTomasso 1994; Rachman 1990; Reiss 1991) distill fearful experiences into unreasonable fears. This report presents estimated effects of 12 negative life events and ten chronic childhood adversities on onset of agoraphobia, specific phobia, and social phobia. Results are discussed relative to the effects of life experiences on phobias suggested by conditioning, stress, and social psychological theories. Data are from the National Comorbidity Survey (NCS; Kessler et al. 1994).

Negative events as risk factors for phobia

Twelve events are investigated as risk factors for phobia onset in this report: life threatening accidents,

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natural disasters (including fires and floods), mother's death, father's death, parental divorce (before the respondent was 16 years old), physical assaults, threats with weapons or kidnap, witnessing the serious injury or death of another, "shock" upon hearing of a terrible event that occurred to another, rape or molestation by a non-relative, rape or molestation by a relative, and combat in a war. The effects of the first nine of these events on onset of each of the phobias have previously been evaluated with data from the NCS (Kessler et al. 1997). The effects of rape and molestation were also evaluated, but sexual assault by relatives was not distinguished from sexual assault by non-relatives in those analyses.

There are at least three reasons for further investigating the effects of life experiences on phobia onset with these data. First, though previous analyses of NCS data found that childhood sexual assault did not have a significant effect on lifetime onset of phobias after prior mental illnesses were controlled (Kessler et al. 1997), childhood sexual assault, was associated with life history of any phobia in analyses of data from the Los Angeles Epidemiological Catchment Area (ECA) study (Burnam et al. 1988), and rates of each type of phobia among women reporting a history of incest are higher than rates among women in the general population (Pribor and Dinwiddie 1992). Inconsistencies among previous studies suggest that childhood sexual assault, and incest in particular, should be further investigated as a potential precipitant of phobia onset.

Second, previous analyses of the NCS data on life events and phobias (Kessler et al. 1997) have not estimated variations in the effects of separate life events on each type of phobia over time. Time decays in the effects of events were explored in previous analyses, but those analyses combined multiple events. Time-limited effects of particular life events could therefore not be detected. Temporal variations in effects are estimated separately for each event in the current report.

Finally, effects of some negative events estimated in previous analyses of these data (Kessler et al. 1997) run counter to theoretical expectations and the results of previous studies. For example, father's death and exposure to natural or man made disasters were estimated to *decrease* risk of agoraphobia onset. Exposure to natural or man made disasters was also estimated to *decrease* risk of specific phobia onset. Neither of these effects are consistent with theoretical expectations. Moreover, events that theoretically should increase risk for phobia onset did not have significant effects in the previous analyses. Studies utilizing data from clinical samples, have found physical injury (Last and O'Brien 1984; Lindesay 1991; Scheibe and Albus 1992), physical assault (Foa et al. 1984), and loss of mother (Last and O'Brien 1984; Solyom et al. 1974; Thyer et al. 1988) to increase risk for agoraphobia onset. Loss of mother before age 10 and parental divorce were also found to be associated with increased prevalence of both agoraphobia with panic and specific phobia in one of the

few previous studies utilizing data from a general population sample (Tweed et al. 1989).

Some of the inconsistencies of results of previous analyses of the NCS data with other studies might be rectified if standard errors, and the statistical tests based on them, are adjusted for the complex sampling design of the NCS. Such adjustments are necessary when data are from complex samples (Koch and Lemeshow 1972). Estimates of statistical significance from the previous analyses of the NCS data, however, were based on unadjusted standard errors. Conclusions based upon those analyses might therefore be in error.

Chronic childhood adversities as risk factors for phobias

Previous general population studies have not investigated the effects of chronic childhood adversities perpetrated by adults and siblings in the childhood household on phobia onset. Moreover, the effects of parental conflict on phobias have rarely been evaluated with data from clinical or general population samples, even though Bowlby (1973) observed "perpetual conflict" between parents to be common among persons in treatment. The effects of exposure to moderate and severe physical aggression, as well as exposure to verbal aggression by adults in the childhood household, and at the hands of siblings, are presented in this report.

Timing of negative experiences and phobia onset

Both stress and conditioning theories suggest that the effects of negative life experiences on phobia onset should be fairly immediate, certainly occurring within 1 year. Lagged effects can be incorporated within stress and conditioning frameworks, though, by postulating that conditioned and stress responses are modified by subsequent learning, maturational processes, or other stressful experiences. Long lags in effects of negative experiences on phobias also suggest mediation of susceptibility to phobia through social or psychological processes.

Gender, negative life experiences and phobias

Prevalence rates of all three phobias are higher among women than men (Boyd et al. 1990; Magee et al. 1996). Sex differences in exposure to experiences that precipitate phobia onset, and differences in vulnerability to phobogenic effects of negative experiences, might explain these differences in rates. For example, women are much more likely than men to report a history of sexual abuse, and sexual abuse is a risk factor for multiple phobias (Burnam et al. 1988; Ernst et al. 1993). Moreover, gender norms for the expression of fear might modify the effects of negative experiences on

phobias. Sex differences in vulnerability to phobogenic life experiences, however, have not been previously explored.

Subjects and methods

Sample

The National Comorbidity Survey (NCS) was administered in two parts to a stratified sample of non-institutionalized persons aged between 15 and 54 years residing in the coterminous United States. The response rate was 82.4%. Part one of the interview included a modified version of the Composite International Diagnostic Interview Schedule (CIDI) (Kessler et al. 1994), as well as an assessment of sociodemographic characteristics. Part two of the interview included a detailed battery of questions about exposure to life experiences and post-traumatic stress disorder (PTSD). All respondents who were identified in the part one interview as having a history of mental illness were administered the part two interview, as were all respondents aged between 15 and 24 years old, and a random sub-sample of all others. Data from respondents to the part two interview ($n = 5877$) were analyzed for this report.

Measures

Phobias

Social phobia and simple phobia (renamed specific phobia in the DSM-IV; APA 1994) are defined according to DSM-III-R criteria (APA 1987). As in previous epidemiological research (Magee et al. 1996), the two diagnoses referring to agoraphobia are combined into a single category.

Prevalence rates of phobias estimated from these data have been previously presented (Kessler et al. 1994; Magee et al. 1996). Test-retest reliabilities of these diagnoses are $\kappa = 0.46$ for simple phobia, 0.47 for social phobia, and 0.63 for agoraphobia (Wittchen et al. 1996). Concordances with the Structured Clinical Instrument for DSM-III-R diagnoses (SCID) are $\kappa = 0.45$, 0.62 and 0.63 respectively. Wittchen et al. (1996) found discrepancies between phobia diagnoses made with the Comprehensive International Diagnostic Instrument (CIDI) and SCID diagnoses. These discrepancies are primarily due to under-diagnosis of clinician-defined phobias by the CIDI. This suggests that persons identified by the CIDI as having a history of simple or social phobia have relatively severe cases of these phobias. Consistent with the name change from "simple phobia" to "specific phobia" in the DSM, the term specific phobia is used throughout this report.

Age of phobia onset is defined as the age at which the respondent reports that an unreasonably strong fear of the relevant type began. It was anticipated that age of phobia onset would be difficult to accurately recall, so respondents were asked a series of questions to assess age of onset. Respondents who reported that their fear first began more than a year before the interview were asked whether they could remember the exact age of onset. Those who said that they could not remember the exact age were asked if they could remember "About how old you were the first time you had (this/any of these fears?)" and "What is the earliest age you clearly remember having (this/any of these) fears?". Age of onset reports by NCS respondents do not cluster around recent years, a pattern observed in data collected with previous diagnostic instruments (Zhao 1997). Clustering of age of onset reports has been interpreted as a sign of recall bias. Age of onset estimates from the NCS therefore seem to be less biased than in previous studies. It is likely, however, that some childhood onset phobias were forgotten by NCS respondents. If so, estimated effects of childhood and adolescent experiences on phobia onset will be smaller than true effects. Although information on age of onset might be imprecise, utilization of this information reduces more extensive biases that result when the timing of experiences relative to phobia onset is ignored.

Negative life events

Respondents were asked whether any of the events on a list (presented visually) had ever occurred to them, and how old they were when they were first exposed to the event. The percentages of persons reporting exposure to each of 12 events are as follows: life threatening accident (18.8%), fire or flood or other natural disaster (16.8%), witnessing someone being badly injured or killed (24.4%), rape or sexual molestation by a relative (5.2%), rape or molestation by a non-relative (6.2%), serious physical attack or assault (8.7%), being threatened with a weapon or held captive (12.4%), suffering a great shock because one of the above events happened to someone close to you (11.5%), mother's death (15.4%), father's death (28.8%), parental divorce before the respondent reached age 16 (18.7%), and combat in war (3%). Age of first exposure was not assessed for combat, which is assumed to have first occurred at age 18.

Chronic adversities during childhood

The ten chronic childhood adversities evaluated as risk factors for phobias in this report fall into three groups: verbal aggression, physical aggression, and verbal and physical conflict between parents. Exposure to physical aggression during childhood is assessed by asking respondents whether any of the experiences on a list (presented visually) had ever happened to them when they were growing up. The highest level of physical aggression can be characterized as violence (e.g., being punched). Persons exposed to violence are distinguished from those exposed to only moderate forms of physical aggression (e.g., being shoved). A series of binary variables are used to indicate the source of violence and aggression directed toward the respondent. Violence from multiple sources in the family (e.g., stepfather and any sibling) is coded 1 for 4.8% of respondents. Exposure to sibling violence alone was reported by 18.6% of the sample, and 8.1% report that one adult was violent. More respondents reported that they were the target of physical aggression by an adult (23.5%) than by a sibling (3.9%). The list of physically aggressive acts by adults mixes spanking with less socially acceptable behaviors (e.g., shoving).

Insults and threats of violence were also assessed. More respondents report being often or sometimes exposed to these forms of verbal aggression by an adult (33.5%) than by a sibling (10.0%).

The same criteria for defining violence and aggression (verbal and non-verbal) towards the respondent are used to define violence and aggression between respondents' parents. The prevalence rates of violence and aggression between parents, based on retrospective reports of respondents, are: severe violence (14.6%), physical aggression (8.2%), verbal aggression (31.0%).

Analysis methods

Effects are estimated by discrete-time event history methods (Allison 1984). Person-years are the unit of analysis. Effects of negative events are estimated separately from effects of exposure to chronic childhood adversities, because information on age of first exposure is available for events, but not chronic adversities. The lagged effects of events after 2–5 years, 6–9 years, and 10 or more years are estimated, as well as effects on onsets within 1 year of the event. Variation in effects of events and chronic adversities over time (i.e., interactions with age) are also explored. Variations in effects are investigated across three age-of-onset periods: 1–11 years, 12–22 years, and over 22 years. The rates of onset of each phobia increase, level off, and decrease over these age periods (Magee et al. 1996). This age grouping therefore permits the evaluation of the effects of life events and childhood adversities on early versus late onset phobias of each type.

Sex, age, birth-cohort, previous phobias, and four disorders that are highly comorbid with phobias (major depression, PTSD, drug abuse or addiction, and alcohol abuse or addiction) are included as covariates in all analyses. Interactions of life experiences with age and gender are also evaluated. Previous phobias and comorbid disorders are controlled in these analyses, because previous

research (Kessler et al. 1997) suggests that failure to control for previous disorders might result in biased estimates of direct effects, and because unique effects of each life experience on onset of each type of phobia are of primary interest (Arrindell et al. 1989).

Bayesian Information Criteria (BIC) are adopted for judging statistical significance (Raftery 1995). The formula used to calculate critical t -values is: $|t| > \sqrt{(\log n)}$, where n equals the unweighted number of phobia onsets. This formula results in critical t -values of 2.48 in analyses of agoraphobia onset ($n = 464$), 2.60 in analyses of specific phobia onset ($n = 859$), and 2.64 in analyses of social phobia onset ($n = 1042$). These t -values indicate levels of confidence equivalent to a two-tailed alpha level of 0.05 when sample sizes are equivalent to those for which t -values were originally developed (Raftery 1995). In order to facilitate comparisons of results for the three phobias, all experiences that have estimated effects on specific and social phobia which are at least 2.48 times as large as their standard errors are highlighted, and effects that are statistically significant at conventional levels ($t \geq 1.96$) are identified as being of borderline statistical significance. The data are weighted in all analyses to adjust for variation in probabilities of selection within and between households. These weights are described by Kessler et al. (1994). Standard errors of estimates are adjusted for design effects (Koch and Lemeshow 1972) using the "svylogit" procedure in the Stata statistical software package (StataCorp 1997).

The statistical significance of variations in effects of chronic experiences over time and by sex are tested by comparing the fit of baseline models that include indicators of all childhood experiences, sex, and two of three age periods (i.e., ages 1–11, 12–22, 23+) to models that include interactions between the indicators of the experiences with age period, or with sex. Interactions involving violence and aggression directed at the respondent are evaluated as a group, and separately from interactions involving violence or aggression between parents. The BIC likelihood-ratio statistic (Raftery 1995) is used to evaluate these comparisons. This statis-

tic is calculated by transforming the likelihood-ratio test statistic (LRT) from each model as follows: $BIC = -LRT + p_k(\log n)$, where p_k is the number of degrees of freedom and n equals the unweighted number of onset cases. Non-proportionalities in effects of childhood adversities over time are suggested when BIC-values for models including interactions of age periods are lower than BIC-values for a baseline model that do not include interactions. If the baseline model BIC-value is 10 or more points larger than BIC calculated from a model that includes interactions, evidence for non-proportionality of effects can be judged "strong" (Raftery 1995). A BIC difference of greater than 2 provides "positive" evidence for non-proportional effects. Sex differences in the effects of childhood experiences on phobia onset among men and women are similarly evaluated by comparing BIC from baseline models to BIC-values from models that include interactions between indicators of childhood experiences and an indicator of sex.

Results

Effects of events on onset within 1 year

Estimated effects of the 12 negative events on onset of each phobia are presented in Table 1. For combat, effects on any subsequent phobia are presented because age of combat is unknown, and an age of 18 was arbitrarily assigned as age of first combat. Estimates for all other events are for onsets within 1 year of the event (i.e., onsets during the same year of the event, or the following year). Estimates are derived from models that include all events, including controls

Table 1 Effects of life events on phobia onset within 1 year^a

	Agoraphobia ^b ($n=466$)			Specific phobia ^c ($n=861$)			Social phobia ^d ($n=1043$)		
	<i>b</i>	(SE)	OR	<i>b</i>	(SE)	OR	<i>b</i>	(SE)	OR
Life threatening accident	1.09	(0.36)	2.97**	-0.55	(0.31)	0.58	-0.19	(0.35)	0.83
Fire, flood, or natural disaster	0.79	(0.39)	2.20*	-0.32	(0.33)	0.73	0.20	(0.32)	1.22
Mother died	0.28	(0.71)	1.32	0.18	(0.48)	1.20	-1.03	(0.68)	0.36
Father died	0.55	(0.55)	1.73	-0.90	(0.48)	0.41	-0.57	(0.78)	0.57
Parents divorced ^e	0.26	(0.19)	1.30	0.17	(0.11)	1.18	0.13	(0.12)	1.14
Raped/molested by relative	0.06	(0.48)	1.06	0.10	(0.42)	1.10	0.96	(0.42)	2.61*
Raped/molested by non-relative	-0.14	(0.49)	0.87	-0.06	(0.36)	0.94	0.12	(0.32)	1.13
Physically assaulted	-0.03	(0.55)	0.97	-0.80	(0.61)	0.45	0.31	(0.39)	1.36
Threatened with weapon/kidnapped	0.07	(0.45)	1.07	0.50	(0.45)	1.65	-0.65	(0.46)	0.52
Witnessed injury/killing	-0.49	(0.39)	0.61	0.23	(0.30)	1.26	0.41	(0.27)	1.50
Shocked	-0.27	(0.65)	0.76	-0.16	(0.72)	0.85	-0.28	(0.36)	0.76
Combat in war ^f	1.26	(0.50)	3.52**	-0.30	(0.52)	0.74	-0.82	(0.41)	0.44

* Estimated effect meets conventional criterion for two-tailed statistical significance ($P < 0.05$); ** estimated effect meets Bayesian criteria for statistical significance as described in notes b–d and in text

^a Controlling for: previous exposure to event, time, cohort, interactions of time with cohort, sex, prior phobias, post-traumatic stress disorder, Major depressive disorder, alcohol abuse and drug abuse

^b Critical ratio (b/SE) is 2.48. Unweighted cases are in parentheses, control person-years are 173,261

^c Critical ratio (b/SE) is 2.60. Unweighted cases are in parentheses, control person-years are 170,131

^d Critical ratio (b/SE) is 2.64. Unweighted cases are in parentheses, control person-years are 167,824

^e Estimated effects are for parental divorce by the time respondent was 15 on all subsequent onsets

^f Date of combat was not ascertained. Age 18 is assumed as the age of first exposure to combat and estimated effects are for any history of combat. Only one woman reported combat experience, so results are for men only

for prior exposure to each event. Odds-ratios (ORs) therefore indicate rates of phobia onset among those exposed to the event in the preceding year relative to rates of onset among those who have never experienced any of these events. Age, birth-cohort, sex, prior phobias, and four potentially comorbid illnesses are also controlled.

Life threatening accidents and combat in war have significant effects on agoraphobia onset, and the effect of exposure to fire, flood, or other natural disaster meets the criterion for borderline statistical significance. Exposure to accidents and disasters leads to a more than twofold increase in the rate of agoraphobia onset during the subsequent year (ORs range from 2.2 to 2.79). Exposure to combat in war increases the rate of agoraphobia onset in all person-years after age 18 by more than three times (OR = 3.52). Only one woman reported engaging in combat, so sex differences in the effects of this experience could not reliably be ascertained. None of these events are associated with statistically significant increases in rates of specific or social phobia onset. The effect of rape or molestation by a relative on social phobia onset, however, is of borderline statistical significance. The age-specific analyses reveal more about the effect of this experience.

Age-specific effects

Age-specific effects of events are presented in Table 2. Only events that have at least borderline effects in the analysis of all person-years combined have significant effects within particular age periods. No additional events have effects that significantly vary over time. Inestimability of effects of events within specific age-of-onset periods (indicated in Table 2), however, suggests significant variations over time.

The two events that had statistically significant effects on agoraphobia onset in the previous analysis have significant effects on onset within at least one age group. Moreover, the effect of exposure to fire, flood, or other natural disaster, which was of borderline significance in the previous analysis, is statistically significant when analyses focus on onset of agoraphobia after age 22. Variation in the effect of this event over time is not statistically significant, however, so the effect estimated with all person-years, and presented in Table 1, is the most acceptable estimate if parsimony is held primary.

The usefulness of investigating the effects of rape/molestation by a relative within each age period is apparent. The effect of rape/molestation by a relative on social phobia onset is constrained to onsets before age 12 (OR = 3.0; $b = 1.10$; SE = 0.38). This effect, which is confined to women, is weaker in the analyses of all person-years, because no one who was first raped/molested by a relative after age 12 developed social phobia within 1 year of the assault.

Effects of chronic adversities during childhood

Effects of chronic childhood adversities are estimated by including all indicators of chronic adversity, and all events found to have significant effects in the previous analyses, in a single multivariate model for each phobia. Estimates of effects of exposure to each level and type of chronic adversity presented in Table 3 are therefore independent of all other chronic adversities (i.e., effects of aggression between parents are independent of effects of aggression directed towards the respondent). Variables identifying respondents who grew up as "only" children and those who grew up in single-parent homes are included in all analyses. The omitted contrast group in these analyses are therefore persons who grew up in a two-

Table 2 Effects of life events on phobia onset by type of phobia and age of onset^a

	<12 years old			12–22 years old			23+ years		
	<i>b</i>	(SE)	OR	<i>b</i>	(SE)	OR	<i>b</i>	(SE)	OR
Agoraphobia^b									
Life thrt. accident	0.36	(0.97)	1.43	1.95 ^d	(0.48)	7.03**	-0.33	(1.04)	0.72
Fire/flood	0.63	(0.57)	1.88	0.59	(0.50)	1.80	1.82 ^e	(0.67)	6.17**
Combat in war	na	na	na	1.61	(0.82)	5.00*	0.50	(0.99)	1.65
Social phobia^c									
Rape/molest by relative	1.10	(0.38)	3.00**	#	#	#	#	#	#

* Estimated effect meets conventional criterion for two-tailed statistical significance ($P < 0.05$); ** estimated effect meets Bayesian criteria for statistical significance as described in notes b–d and in text

^a Controlling for age, cohort, sex, prior phobias, PTSD, MDD, alcohol abuse, and drug abuse

^b Critical ratio (b/SE) is 2.48. Number of onset cases (unweighted) by age period are as follows: 116 before age 12, 195 between ages 12 and 22, and 155 after age 22

^c Critical ratio (b/SE) is 2.64. Number of onset cases (unweighted) by age period are as follows: 327 before age 12, 591 between ages 12 and 22, and 125 after age 22

^d Significantly greater effects among men than women

^e No men exposed to this event experienced a phobia onset during this period. The estimated effect among women is: $b = 2.87$, SE = 0.34 OR = 17.64**

Parameter not stable or estimable: none or only one phobia onset among persons exposed to this life event during this time period

Table 3 Effects of chronic physical or verbal abuse during childhood on phobia onset^a

	Agoraphobia ^b (<i>n</i> = 466)			Specific phobia ^c (<i>n</i> = 861)			Social phobia ^d (<i>n</i> = 1043)		
	<i>b</i>	(SE)	OR	<i>b</i>	(SE)	OR	<i>b</i>	(SE)	OR
Violence by multiple sources	-0.091	(0.226)	0.91	0.367	(0.144)	1.44*	0.250	(0.203)	1.28
Violence by an adult only	0.273	(0.174)	1.27	0.565	(0.205)	1.76**	0.261	(0.184)	1.30
Violence by a sibling only	0.053	(0.130)	1.05	0.187	(0.152)	1.20	0.180	(0.136)	1.20
Physical aggression/spanking by adult	-0.091	(0.121)	0.91	-0.049	(0.131)	0.95	0.068	(0.128)	1.07
Physical aggression by sibling	0.117	(0.230)	1.12	-0.351	(0.237)	0.70	-0.046	(0.218)	0.96
Verbal aggression by adult	-0.009	(0.120)	0.99	0.160	(0.138)	1.17	0.301	(0.124)	1.35*
Verbal aggression by sibling	-0.353	(0.203)	0.70	-0.035	(0.204)	0.97	-0.032	(0.174)	0.97
Violence between parents	-0.001	(0.150)	1.00	-0.151	(0.171)	0.86	-0.127	(0.148)	0.88
Physical aggression between parents	0.044	(0.162)	1.04	-0.001	(0.218)	1.00	0.020	(0.149)	1.02
Verbal aggression between parents	0.071	(0.122)	1.07	0.413	(0.110)	1.51**	0.316	(0.117)	1.37**

* Estimated effect meets conventional criterion for two-tailed statistical significance ($P < 0.05$); ** estimated effect meets Bayesian criteria for statistical significance as described in notes b–d and in text^a Controlling for: previous exposure to event, age, cohort, interactions of age with cohort, sex, prior phobias, PTSD, MDD, alcohol abuse, and drug abuse

^b Critical ratio (b/SE) is 2.48. Unweighted cases are in parentheses, control person-years are 173,261

^c Critical ratio (b/SE) is 2.60. Unweighted cases are in parentheses, control person-years are 170,131

^d Critical ratio (b/SE) is 2.64. Unweighted cases are in parentheses, control person-years are 167,824

parent household with at least one sibling, and who report that they experienced no violence or physical or verbal aggression from any source. Parental education is included in all models as a control variable in order to reduce the possibility that the effects of childhood experiences on phobias are owing to effects of socioeconomic background on both childhood experiences and phobias. None of the family characteristics that are included as control variables, however, are significantly associated with onset of any of the phobias.

There are no significant gender variations in effects of these chronic childhood experiences on any of the phobias (all differences in BIC-values are below 2.0). Comparisons of BIC-values indicate that all of these childhood experiences also have similar effects on agoraphobia and social phobia at every age. BIC-values for baseline models of agoraphobia and social phobia onset are lower than BIC-values from models that include interactions with age periods, indicating that there are no significant variations in effects across age periods. With one exception, the analyses of specific phobia onset also reveal that effects do not vary by age. The exception is in the effect of verbal aggression between parents on specific phobia onset, which varies significantly over time (BIC difference = 9.18). Verbal aggression between parents has a significant effect on onset before age 12 ($b = 0.865$, $SE = 0.138$, $OR = 2.37$), but has no effect on first onset of a specific phobia from age 12 onwards ($b = -0.103$, $SE = 0.168$, $OR = 0.90$). This effect is also statistically

significant when data from all person-years are analyzed. Violence by an adult also has a statistically significant effect on specific phobia onset ($OR = 1.76$). The borderline effect of violence by both an adult and sibling in the childhood household is consistent with this effect, and suggests that only violence by an adult influences specific phobia onset.

Finally, the effect of verbal aggression between parents on social phobia onset is statistically significant ($OR = 1.37$). The effect of verbal aggression by an adult directed towards the respondent is of similar magnitude ($OR = 1.35$), and of borderline significance.

Discussion

Limitations of the data and analyses

Before discussing the implications of these results, it is important to examine the limitations of the analyses. Information on phobias and life events was collected through retrospective reports, which are subject to recall biases. Though recent research (Zhao 1997) suggests that recall of age of onset is less biased in the NCS data than in previous studies, errors in recall might nevertheless have resulted in biases.

Another potential source of bias is model misspecification. Not all variables that might have influenced both phobias and negative life experiences were assessed

in the NCS. Level of danger in the childhood neighborhood, for example, was not assessed. The significant effects of accidents, fire, flood, or natural disasters on agoraphobia might be explained by the general level of danger in the childhood neighborhood.

Finally, it is important to note that data on contingencies of reinforcement, and on potential social psychological mediators or moderators of the effects of life experiences, are generally unavailable in the NCS. Hypotheses about specific processes and contingencies therefore cannot be tested with these data. General patterns of association of negative experiences with phobias, though, can be compared to patterns suggested by conditioning theories, stress theories, and theories that emphasize the social psychological processing of experience.

Specificity of effects of life experiences

Most of the life events and childhood adversities investigated in this report have unique effects on only one type of phobia. The only experience to have statistically significant effects on more than one type of phobia is verbal aggression between parents. The patterns of unique effects observed are inconsistent with the idea that a simple stress process governs the link between life experiences and phobias. These patterns of effects are also inconsistent with straightforward conditioning explanations, because the life experiences which precipitate phobia onset generally do not resemble the situations feared. The results presented, however, are broadly consistent with the hypothesis that past life experiences that are perceived as unpredictable or uncontrollable influence expectations of future harm. Social psychological processes involving predictability, controllability, and expectations (Reiss 1991) are not demonstrated by examining basic patterns of association of life experiences with phobias. These speculations are nevertheless elaborated with regard to each phobia in the following sections.

Agoraphobia

The events that influence agoraphobia onset are: natural disasters such as fires or floods, life threatening accidents, and combat during war. Why do these experiences produce unreasonably strong fears of internal states (e.g., panic attacks), and thus result in agoraphobic avoidance, when traumatic events such as physical assault do not? Conditioning might explain these effects. For example, if natural disasters, accidents, and combat are not accompanied by adequate cues of impending trauma, an unusually broad range of stimuli might be latched upon as potential cues for future traumas. These cues (i.e., conditioned stimuli) might subsequently trigger the types of physiological reactions (e.g., panic attacks) that motivate agoraphobic behaviors (Hallam 1985).

Alternatively, a social psychological interpretation emphasizing perceptions of controllability, and estimates of the likelihood of future exposure to negative events, could be developed. For example, it could be easier to convince oneself of the adequacy of one's precautions against being harmed in the future by events such as physical assaults, than the adequacy of one's precautions against being harmed by future natural disasters, accidents, and combat in war (while one is in the military). The events that were found to influence agoraphobia onset in the analyses presented here might have been perceived as particularly uncontrollable and unpredictable, yet likely to recur. If so, the events that precipitate agoraphobia onset can be characterized as unpredictable and uncontrollable physical harms. Characteristics of events that precipitate agoraphobia onset therefore resemble the core of agoraphobia phenomenology – fear that one might unpredictably lose self-control, especially control over one's physiological functions, or lose one's self through psychosis or death (Hallam 1985). Abstract resemblances of this sort implicate social psychological processes in phobia etiology.

Specific phobia

Violence by an adult in the childhood household is the only life experience to have a unique effect on specific phobia onset. Conditioning might explain this association if violence typically occurred in contexts typically feared by persons with specific phobias. The objects or situations most frequently feared by persons with specific phobias are of heights and animals (Curtis et al. 1998). It seems unlikely that many persons who were exposed to family violence, and who subsequently develop a specific phobia, experienced family violence in high places or around animals. Because different types of specific phobias were not separately assessed in the NCS, it is not possible to argue against conditioning as an explanation based on lack of resemblance among life experiences that precipitate phobia with the content of the phobia. It is nevertheless useful to speculate how family violence, and verbal aggression between parents, might influence specific phobia in general through social psychological processes.

One plausible social psychological explanation is that violence by adults and verbal aggression between parents create an environment of constant threat. Constant threat of physical harm might lead children to constantly expect harm, and to generalize such an expectation to relatively harmless objects (e.g., friendly dogs) or situations (e.g., high places). Verbal aggression between parents might also contribute to the perception of threat among children. For example, parental conflict might signal the possibility that a caregiver and protector might leave the marriage. Children who identify with a parent who is being verbally threatened might feel personally threatened. Predictable harms might thus influ-

ence expectations of harm, which in turn influence onset of specific phobias throughout the lifecourse.

Social phobia

Sexual assault by a family member and verbal aggression between parents have significant effects on social phobia onset. The effect of sexual assault by a relative on social phobia is confined to women, and to phobias beginning before age 12. Verbal aggression by an adult has a borderline effect. This pattern is not consistent with stress theory, which suggests that a wide range of negative experiences should precipitate phobia onset. The effects of sexual assault are consistent with conditioning theory, if one assumes that victims of incest are frequently blamed for their victimization (Kleinke et al. 1990). Persons who are blamed for their victimization, or who blame themselves, might develop conditioned fears of being criticized by others. Such fears might become generalized, resulting in unreasonably strong fears of being criticized by others for a wide range of social behaviors. The borderline effect of verbal aggression by an adult is also consistent with a conditioning explanation, because persons with social phobia frequently fear verbal aggression by others. It is important to note, however, that verbal aggression by siblings does not have an effect on social phobia onset. This suggests that verbal aggression from less controllable sources is particularly important in social phobia etiology. Finally, more complex social psychological mechanisms, such as identification with a parent, might play a role in the effect of verbal aggression between parents on social phobia onset. Children who see a parent with whom they identify being constantly criticized, for example, might feel that they are also constantly subject to criticism by others.

Sex differences

Sex differences in rates of phobia onset are not at all influenced by controls for the life experiences investigated. These life experiences therefore do not mediate the sex differences in phobias. There is evidence, though, for sex difference in reactivity to a few of the life experiences investigated as risk factors for phobia in this report. Men exposed to life threatening accidents between the ages of 12 and 22 are significantly more likely to develop agoraphobia than women. No men over age 22 exposed to fire, flood, or other natural disaster developed agoraphobia after exposure, though such events significantly increased onset among women. The general lack of variation in the effects of most events by sex should not be surprising. Most learning, stress and social psychological theories do not suggest that there should be sex differences in the effects of negative events on phobias.

Conclusion

Methodological, practical, empirical, and theoretical implications can be drawn from the results presented in this report. The primary methodological implication is that phobias should not be treated as a "lump" (Rachman 1990), or lumped together with other anxiety disorders in most studies of etiology. With the exception of a previous study that explored the effects of parental loss (Tweed et al. 1989), most general population studies have lumped the three phobias together. A large proportion of the clinical studies that have investigated the effects of life experiences on each phobia separately (Kuch et al. 1991; McNally and Steketee 1985; Ost and Hugdahl 1981) have been based on respondents' reports of the events which they think precipitated their phobia. Statistical analysis of data from general population studies provide necessary counterpoise to causal attributions of participants in clinical studies.

A practical implication of these results is that efforts to prevent phobia onset might be usefully targeted toward those exposed to life experiences that increase risk for phobia onset. Such preventive efforts might have important positive consequences, because a large proportion of persons who experience each of these phobias suffer significant impairment of routine activities, and all three phobias increase risk for subsequent mental illnesses (Magee et al. 1996). Interventions aimed towards reducing risk for phobia onset may therefore substantially reduce overall levels of mental illness.

An important empirical implication of these results that was not elaborated upon above is that evidence for an effect of mother's death on phobias is equivocal. Mother's death during the respondent's childhood was found to be associated with agoraphobia and specific phobia onset in analyses of data from the ECA (Tweed et al. 1989), but was not found to increase risk for onset of those phobias among respondents to the NCS. This discrepancy between studies is not due to differences in the way mother's death is coded, or because associations with prevalence were investigated in the ECA study (Tweed et al. 1989), while effects on onset were investigated here. When the zero-order association of maternal death by the time the respondent reached age 10 with prevalence of phobias is estimated with the NCS data, as was done in the ECA analyses, associations with agoraphobia and specific phobia remain non-significant ($b = 0.284$, $SE = 0.20$, $OR = 1.22$ for agoraphobia, and $b = 0.148$, $SE = 0.27$, $OR = 1.16$ for specific phobia). Differences in the way phobias were defined in the NCS and ECA studies (Magee et al. 1996) might explain differences in the results of the two sets of analyses. Unfortunately, the highly structured format of the diagnostic instruments used in the NCS and ECA studies does not permit the construction of parallel diagnoses.

Finally, these results are consistent with theories that emphasize the role of perceived predictability and con-

trollability of life experiences in phobia etiology (Cloitre et al. 1992; Rachman 1990). Sudden events that threaten or result in physical harm, and which are uncontrollable (e.g., combat), are uniquely associated with agoraphobia onset. Harmful or threatening childhood experiences that are difficult to control (e.g., parental violence), but which are somewhat predictable (e.g., cued by verbal aggression), are uniquely associated with specific phobia onset. Sexual abuse by relatives, which involves control by powerful others, and perhaps also uncontrollable criticism by others and self blame, is uniquely associated with social phobia onset.

These theoretical implications are speculative. No data on perceptions of predictability and controllability were available for analysis. The plausibility of these speculations suggests that it might be profitable to collect data on perceptions of predictability and controllability of negative life experiences in future research on the experiential etiology of phobias.

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References

- Allison PD (1984) Event history analysis. Sage, Beverly Hills
- APA (1987) Diagnostic and statistical manual of mental disorders, 3rd edn (revised). American Psychiatric Association, Washington D.C.
- APA (1994) Diagnostic and statistical manual of mental disorders, 4th edn. American Psychiatric Association, Washington D.C.
- Arrindell WA, Kwee MG, Methorst GJ, Van der Ende J, et al (1989) Perceived parental rearing styles of agoraphobic and socially phobic in-patients. *Br J Psychiatry* 155: 526-535
- Bowlby, John (1973) Attachment and Loss: Volume II, Anxiety and Anger. Basic Books: New York
- Boyd JH, Rae DS, Thompson JW, Burns BJ, et al (1990) Phobia: prevalence and risk factors. *Soc Psychiatry Psychiatr Epidemiol* 25: 314-323
- Burnam MA, Stein JA, Golding JM, Siegel JM, et al (1988) Sexual assault and mental disorders in a community population. *Consult and Clin Psychol* 56: 843-850
- Cloitre M, Heimberg RG, Liebowitz MR, Gitow A (1992) Perceptions of control in panic disorder and social phobia. *Cogn Ther Res* 16: 569-577
- Curtis GC, Magee WJ, Eaton WW, Wittchen HU, Kessler RC (1998) Specific fears and phobias: epidemiology and classification. *Br J Psychiatry* 173: 212-217
- Ernst C, Angst J, Foldenyi M (1993) The Zurich Study. XVII. Sexual abuse in childhood: frequency and relevance for adult morbidity data of a longitudinal epidemiological study. *Eur Arch Psychiatry Clin Neurosci* 242: 293-300
- Foa EB, Steketee G, Young MC (1984) Agoraphobia: phenomenological aspects, associated characteristics, and theoretical consideration. *Clin Psychol Rev* 4: 431-457
- Freeman A, DiTomasso RA (1994) The cognitive theory of anxiety. In: Benjamin B, Wolman GSE (eds) *Anxiety and related disorders: a handbook*. Wiley series on personality processes. John Wiley, New York
- Hallam RS (1985) *Anxiety: psychological perspectives on panic and agoraphobia*. Academic Press, New York
- Kessler RC, McGonagle KA, Zhao S, Nelson CB, et al (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Study. *Arch Gen Psychiatry* 51: 18-19
- Kessler RC, Davis CG, Kendler KS (1997) Childhood adversity and adult psychiatric disorder in the US National Comorbidity Survey. *Psychol Med* 27: 1101-1119
- Kleinke CL, Meyer C (1990) Evaluation of rape victim by men and women with high and low belief in a just world. *Psychol Women Q* 14: 343-353
- Koch GG, Lemeshow S (1972) An application of multivariate analysis to complex sample survey data. *J Am Stat Assoc* 67: 780-782
- Kuch K, Evans RJ, Watson PC, Bubela C (1991) Road vehicle accidents in 60 patients with fibromyalgia. *J Anxiety Disord* 5: 273-280
- Last CG, Burlow DH, O'Brien GT (1984) Precipitants of agoraphobia: role of stressful life events. *Psychol Rep* 54: 567-570
- Lindesay J (1991) Phobic disorders in the elderly. *Br J Psychiatry* 159: 531-541
- Magee WJ, Eaton WW, Wittchen HU, McGonagle KA, et al (1996) Agoraphobia simple phobia, and social phobia in the National Comorbidity Survey. *Arch Gen Psychiatry* 53: 159-168
- McNally RJ, Steketee GS (1985) The etiology and maintenance of severe animal phobias. *Behav Res Ther* 23: 431-435
- Munjack DJ (1984) The onset of driving phobias. *J Behav Ther Exper Psychiatry* 15: 305-308
- Ost LG, Hugdahl K (1981) Acquisition of phobias and anxiety patterns in clinical patients. *Behav Res Ther* 19: 439-447
- Pribor EF, Dinwiddie SH (1992) Psychiatric correlates of incest in childhood. *Am J Psychiatry* 149: 452-456
- Rachman SJ (1990) *Fear and courage*, 2nd edn. WH Freeman, New York
- Raftery AE (1995) Bayesian model selection in social research. *Sociological methodology*, 25: 111-163
- Reiss S (1991) Expectancy model of fear, anxiety, and panic. *Clin Psychol Rev* 11: 141-153
- Scheibe G, Albus M (1992) Age at onset, precipitating events, sex distribution, and co-occurrence of anxiety disorders. *Psychopathology* 25: 11-18
- Solyom L, Beck P, Solyom C, Hugel R (1974) Some etiological factors in phobic neurosis. *Can Psychiatr Assoc J* 19: 69-78
- StataCorp (1997) *Stata statistical software release 5 edn*. Stata Press, College Station, Texas
- Thyer BA, Himle J, Fischer D (1988) Is parental death a selective precursor to either panic disorder or agoraphobia? A test of the separation anxiety hypothesis. *J Anxiety Disord* 2: 333-338
- Tweed JL, Schoenbach VJ, George LK, Blazer DG (1989) The effects of childhood parental death and divorce on six-month history of anxiety disorders. *Br J Psychiatry* 154: 823-828
- Wittchen HU, Zhao S, Abelson J, Abelson, J, Kessler R (1996) Reliability and procedural validity of UM-CIDI DSM-III-R Phobic Disorders. *Psychol Med* 11 [Suppl 3]: 15-23
- Zhao S (1997) The use of multi-stage recall in dating remote events. *Am Sociol Assoc Annual Meetings*, Toronto

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