Traumatic events and post-traumatic stress disorder in the community: prevalence, risk factors and comorbidity

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Objective: Lifetime and 12-month prevalence of traumatic events and DSM-IV post-traumatic stress disorder as well as risk factors and comorbidity patterns were investigated in a representative community sample ($n = 3021$, aged 14–24 years).
Method: Traumatic events and PTSD were assessed with the Munich Composite International Diagnostic Interview (CIDI).
Results: Although 26% of male subjects and 17.7% of female subjects reported at least one traumatic event, only a few qualified for a full PTSD diagnosis (1% of males and 2.2% of females). Traumatic events and PTSD were strongly associated with all other mental disorders examined. PTSD occurred as both a primary and a secondary disorder.
Conclusion: The prevalence of PTSD in this young German sample is considerably lower than reported in previous US studies. However, the conditional probability for PTSD after experiencing traumas, risk factors and comorbidity patterns are quite similar. Traumatic events and full PTSD may increase the risk for other disorders, and vice versa.

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Introduction

Traumatic events and the way in which people subsequently cope with them play a crucial role not only in the development of post-traumatic stress disorder (PTSD) but potentially also in the development of other forms of mental disorders. Most of the previous literature investigating such mechanisms focused on high-risk samples of people exposed to circumscribed traumatic exposures or specific traumatic events (e.g. war, disasters, accidents, rape). With the introduction of explicit diagnostic criteria for PTSD (1, 2) and the development of standardized diagnostic instruments (3, 4), more recent studies have started to investigate traumatic events and PTSD as well as associations with other disorders in representative general population samples. Due to considerable differences in sampling, assessment strategies and other design features (location, age groups, etc.)

there is significant variation in prevalence findings, ranging from a minimum figure of 1% in early DSM-III studies (5, 6) to mostly remarkably higher rates of both traumatic events and full-blown PTSD in more recent studies (7, 8).

Resnick et al. (9) reported a lifetime prevalence rate of PTSD of 12.3% in a telephone survey of a US national probability household sample of adult women. Breslau et al. (10) found, in a sample of young adults, that 10.4% of women and 6% of men had a lifetime history of PTSD. The US National Comorbidity Survey (NCS) (7) estimated a 7.8% (5% for males and 10.4% for females) lifetime prevalence of DSM-III-R PTSD for the US population aged 15–55 years.

Retrospective age of first-onset analyses in general population surveys show — consistent with clinical studies (11) — that traumatic events and PTSD may occur quite early in life, and that the

prevalence of full-blown DSM-III-R PTSD is already high in the 15–24-year age group (7). The NCS estimates in this age group a lifetime prevalence of 2.8% (men) and 10.3% (women) of PTSD. Similarly high prevalence estimates were also reported by Breslau et al. (10) in an urban sample of young adults and also by Breslau et al. (8) in the Detroit Area Survey of trauma, using DSM-IV criteria. The latter study also showed that the occurrence of traumatic events peaks at age 16–20 years. Lower lifetime prevalence estimates (females, 3%; males, 1%) have recently been reported by Cuffe et al. (12) using the DSM-IV criteria for PTSD in a community sample of adolescents in a suburban south-western school district.

Consistent with previous findings (13), these epidemiological data also confirmed that most traumatic events are much more common than the diagnosis of PTSD itself. For example, 61% of all males and 51% of females in the NCS reported at least one traumatic event in the screening question portion of the PTSD section of the Composite International Diagnostic Interview (14). The most common type of trauma in the NCS was witnessing someone being injured or killed, physical attacks and threat by weapons, being involved in fire, flood or natural disasters and accidents. The frequency of specific traumas as well as the respective trauma-specific probabilities of developing PTSD varied considerably according to gender. For males, the NCS revealed that combat exposure (fairly uncommon in the total population) was the event most commonly associated with PTSD, followed by witnessing someone being killed or badly injured and serious accidents (both common in the general population). For females, rape and molestation (relatively common in the general population) were most frequently associated with PTSD, followed by physical abuse and threat with a weapon. Even higher prevalence estimates of traumatic events of 89.6% were reported by Breslau et al. (8), who included a wider range of qualifying events, finding 'learning about traumas that happen to others' (62.4%) and 'sudden unexpected death of a close friend or relative' (60.0%) were the most commonly reported events in their sample. In this study the prevalence of PTSD was 13% in women and 6.2% in men.

The NCS, consistent with many other studies (5, 6, 10, 15, 16), also suggests that PTSD is frequently associated with other mental disorders. Lifetime comorbidity rates range from 62% to 92%, with strong associations with affective, anxiety and substance use disorders (7, 17, 18). Although some of this comorbidity might be artefactual, due to the overlap of PTSD symptoms with features of anxiety, somatoform and affective syndromes

(19), Breslau et al. (20) and Kessler et al. (21) suggested the existence of at least two likely causal pathways that should be investigated more closely in future studies. These were prior mental disorders increasing vulnerability for exposure to traumatic events and subsequent onset of PTSD, as well as mental disorders appearing after the onset of PTSD.

Aims

The general aims of this study were twofold. First, we wished to attempt a cross-national replication of the predominantly US-based prevalence findings of traumatic events and DSM-IV-defined PTSD, their age of onset, risk factors and comorbidity patterns in a representative community sample of 3021 subjects in Munich, Germany, aged 14–24 years. Secondly, we wanted to examine the temporal pattern of comorbid conditions among subjects with experience of traumatic events and PTSD. We assume that our restriction to the 14–24 years age group reduces the risk of artefactual explanations due to recall biases, because most respondents are examined within months or a few years after the onset of trauma. More specifically, the following questions were examined.

(i)   What is the prevalence of DSM-IV traumatic events and full-blown PTSD among German adolescents and young adults?
(ii) What types of traumatic events are most frequent and most critical in terms of subsequent PTSD development?
(iii) Which sociodemographic risk factors are associated with traumatic events and PTSD in this sample?
(iv) How frequently and in what way are traumatic events and PTSD associated with other forms of mental disorders?

Material and methods

The data presented here are derived from the first wave of the Early Developmental Stages of Psychopathology (EDSP) Study (22), which was designed to collect data on prevalence, risk factors, comorbidity and course of mental disorders in adolescents and young adults. The overall design of the study is prospective, consisting of a baseline survey and two follow-up surveys at approximately 15 and 30 months after the baseline. The follow-up surveys investigate symptom and diagnosis progression, incidence and remission, as well as professional help-seeking and the development of impairment and comorbidity. The present paper reports exclusively on data collected at baseline in

the year 1995. For a more extended description of the EDSP study methodology, the reader is referred to Wittchen et al. (23).

Sample

The EDSP sample was drawn from the 1994 Bavarian government registry of residents in metropolitan Munich. All registrants who would be 14–24 years of age during the first half of 1995 were eligible for selection. Because the study was designed as a longitudinal investigation with special interest in the development of substance disorders, 14–15-year-olds were sampled at twice the probability of those aged 16–21 years, and 22–24-year-olds were sampled at half the probability of those aged 16–21 years. From the total of 4809 sampled individuals, 4263 subjects were located and found to be eligible for inclusion in the study. Sampled individuals who were not located were disproportionally older and uncontactable because they had either moved outside the metropolitan Munich area during the time period between their registration and the beginning of the study in 1995 (8.8%), or could not be associated with the listed address during the field work period (2.4%). From the 4263 individuals a total of 3021 interviews were completed, resulting in a response rate of 71%. In addition, partial information (a short telephone version of the interview) was obtained for a further 6.2%. Refusal to participate (18.2%) was by far the most frequent reason for non-response, followed by a reported lack of time (3.3%), failure to contact anyone in the identified household (3.1%) and failure to contact the sampled individual in an identified household (3.0%). Demographically, the rate of non-response increased with age, especially among women. The non-response rate was slightly higher among women than men aged 18 years or over. The slightly higher proportion of refusals among women was due to increased reports of lack of time, failure to contact anyone in the household and failure to contact the sampled individual. To account for the differential sampling probabilities and non-responders, as well as individuals who were not located, the data have been adjusted by age, sex and geographical location to match the distribution of the sampling frame.

Approximately two-thirds of the sample were currently attending or had attended gymnasium (secondary education preparing students for possible entrance to university) and were currently living with their parents. In total, 23% of the sample were living alone and 75% of the sample were living in suburban Munich.

Diagnostic assessment

Psychopathological as well as diagnostic assessment was based on the Munich-Composite International Diagnostic Interview (24). The M-CIDI is an updated computer-assisted version of the WHO-CIDI 2.0 developed to cover DSM-IV criteria (25–27). The M-CIDI allows for the assessment of symptoms, syndromes and diagnoses of 48 mental disorders (not including various subtypes of major disorders), together with information about onset, duration, clinical and psychosocial severity. The reliability and validity findings of the M-CIDI have been reported elsewhere in detail (27, 28).

The M-CIDI section for DSM-IV post-traumatic stress disorder is similar to the one used by Kessler et al. (29) in the NCS. However, several modifications were necessary to match DSM-IV criteria as well as to take into account more recent methodological innovations from the CIDI development group. (i) The PTSD section is administered immediately after an extensive past years life event and life condition assessment module, aiming to improve the respondent accuracy of recall of events. (ii) The module starts with screening questions and a respondent list of about 10 groups of specified events, almost identical to the method used in the NCS. The introductory sentence emphasizes that the event involves actual or threatened death, serious injury or significant threat to one's own or another's physical integrity. (iii) In addition, an open-ended question about any other traumatic event was presented. Because the majority of events in this open-ended question could be categorized under 'sudden death of close associate' or a 'threat of death to close associates', these events are presented as an additional separate category. (iv) The visual presentation of the list allows respondents and interviewers to avoid speaking about sometimes embarrassing and stigmatizing traumas, such as rape and sexual abuse, by simply indicating the number of the event. (v) Initial responses to these specific events will be labelled *traumatic events* throughout this paper (covering the DSM-IV A1 criterion for PTSD). (vi) Each event was then probed for the DSM-IV A2 criterion (when the event occurred, did you feel or react with intense fear, hopelessness, horror or irritability?). Events for which this criterion was acknowledged will be labelled as *qualifying traumatic event*. Each event was dated. (vii) In the event of several events being acknowledged, further probing aimed at assessing the most severe event as well as linkages between the event were reported. Subsequently, all DSM-IV criteria questions were then asked only for people having at least one A2 qualifying traumatic event or event cluster. If a respondent indicated

several A2 events that did not cluster, only the criteria for the worst and most distressing event were assessed.

Diagnostic analysis is based on the M-CIDI diagnostic package DSM-IV diagnostic algorithms (25). The diagnostic findings reported in this paper are based on the M-CIDI DSM-IV algorithms without using the DSM-IV hierarchy rules, unless otherwise stated in the text. It should be noted that we broadened the DSM-IV criterion C of persistent avoidance and numbness of responsiveness in some analyses by reducing the mandatory three symptoms from this group to at least one in order to obtain a subthreshold diagnosis. This addition was introduced after extensive pilot testing and clinical validation revealing that it was difficult for young adolescents to answer validly the questions on diminished interest and restricted affect (2). The prevalence data for this additional subthreshold diagnosis are presented separately.

Interviewing procedures

The survey staff were highly experienced and consisted of 10 clinical interviewers and 25 full-time professional health research interviewers from Infratest-Gesundheitsforschung, a survey company specializing in health interviews. The clinical interviewers consisted of 10 clinical psychologists in postgraduate training to become licensed clinical psychologists. Most of these had already had extensive experience in diagnostic interviewing, including the CIDI, as well as in the developmental work of the M-CIDI. All interviewers received 2 full weeks of training in the use of the study instrument, including the CIDI standard training components. All of the interviewers were trained in the use of both the paper-and-pencil version and the computerized version. This training period was followed by at least 10 practice interviews that were closely monitored by the staff. Immediately prior to the beginning of the study, one day of pre-field training was completed to stress important points and techniques and increase the motivation of the interviewers. Throughout the field period interviewers were closely monitored by both the Infratest

field staff and specially trained clinical editors with clinical experience.

Statistical analysis

The results are based on weighted data. Proportions and standard errors were calculated with the SVYPROP program in the STATA software package (30). The LOGISTIC program for logistic regressions was used for univariate and multivariate analyses of associations between traumatic events/ PTSD and sociodemographic as well as trauma-specific factors. Predictor analysis with other mental disorders was generated by using Cox proportional hazards models for survival data with time-dependent covariates operationalized in the STSET and STCOX program of STATA. Two general models were examined. First, other primary mental disorders preceding traumatic events and PTSD and second primary traumatic events and PTSD preceding other mental disorders were investigated. A dataset based on person-time records with the onset of the other DSM-IV disorders as time-dependent covariates was generated in order to calculate adjusted hazard ratios as relative risks for secondary traumatic events and PTSD in individuals with or without prior other disorders. To calculate adjusted hazard ratios as relative risk for secondary other DSM-IV disorders in individuals with prior traumatic events and PTSD, separate datasets based on person-time records with the onset of traumatic events and PTSD as time-dependent covariates were generated. All analyses of correlates and predictors of PTSD include subthreshold cases.

Results

Prevalence of DSM-IV traumatic events and PTSD

In total, 21.4% of the respondents reported having experienced at least one A1 event at some time in their life. However, only 17% of the total sample also qualified for the A2 entry criterion for DSM-IV PTSD, qualifying traumatic events by acknowledging that experiencing these events also caused horror and anxiety. Among these, 7.8% met all of

Table 1. Prevalence of traumatic events and post-traumatic stress disorder

	Men (%)	Women (%)	Total (%)
A1 traumatic events	25.2 (1.3)[a]	17.7 (1.1)[a]	21.4 (0.9)[a]
A2 qualifying traumatic events	18.6 (1.1)	15.5 (1.1)	17.0 (0.8)
Lifetime PTSD/A2-qualifying events	2.2 (1.0)	14.5 (2.8)	7.8 (1.5)
Lifetime PTSD/total sample	0.4 (0.2)	2.2 (0.4)	1.3 (0.3)
12-month PTSD/total sample	0.1 (0.1)	1.2 (0.3)	0.7 (0.2)
12-month PTSD/lifetime PTSD	33.3 (26.4)	55.9 (10.6)	52.5 (9.7)
12-month PTSD/13+ month PTSD (persistence)	0.1 (0.1)	1.1 (0.3)	0.6 (0.2)

[a] SE is shown in parentheses.

the diagnostic criteria for PTSD, resulting in a lifetime prevalence of 1.3% and a 12-month prevalence of 0.7% (Table 1).

Male subjects were more likely to report both lifetime A1 events (25.2% vs. 17.7%, $z = 24.6$, $P < 0.001$), and A2-qualifying traumatic events (18.6% vs. 15.5%, $z = 5.2$, $P < 0.05$). Females were also significantly more likely than males to develop PTSD (12.5% vs. 1.6%, $z = 32.6$, $P < 0.001$), resulting in a significantly higher lifetime prevalence (0.4% vs. 2.2%, $z = 15.5$, $P < 0.001$) and 12-month prevalence (0.1% vs. 1.3%, $z = 9.2$, $P < 0.01$). It is noteworthy that the ratio of lifetime compared to 12-month prevalence is also significantly higher among women than men (0.1% vs. 1.1%, $z = 9.1$, $P < 0.01$), indirectly suggesting that the course of PTSD may be more chronic among women than men.

It is noteworthy that relaxing the DSM-IV criterion C of persistent avoidance and numbness of responsiveness (requiring at least one symptom instead of three) did increase the lifetime prevalence from 1.3% to 2.1% in the total sample and from 7.8% to 12.5% among the respondents reporting qualifying traumatic events.

Types of A1 traumatic events and qualifying traumatic events and risk for PTSD

Table 2 reports the prevalence (ranked by frequency) of A1 and A2 events in the population, together with their conditional probabilities for PTSD.

The most commonly reported A2 qualifying traumatic events were physical attacks (7.5%) followed by serious accidents (5.4%), witnessing traumatic events happen to another person (3.6%), and sexual abuse as a child (2.0%). Men reported more physical attacks (10.1% vs. 4.9%, $z = 27.7$, $P < 0.001$) and serious accidents (6.6% vs. 4.3%, $z = 7.5$, $P < 0.01$) and witnessing traumatic events (4.6% vs. 2.6%, $z = 8.4$, $P < 0.01$). Women reported more sexual abuse as a child (0.3% in men vs. 3.7% in women, $z = 26.2$, $P < 0.001$) and rape (0% vs. 2.3%). All other event types were uncommon, with prevalence estimates of less than 1% and no significant differences between men and women. Overall, the conditional probability (column 3) for any A1 event also to qualify for A2 events is higher in women ($z = 16.5$, $P < 0.001$), ranging from 66.7% to 100% for specific traumatic events, but without significant differences except for physical attacks ($z = 12.2$, $P < 0.001$).

In total, 79% of those respondents with A2 events reported just one qualifying traumatic event for which the DSM-IV diagnostic criteria were subsequently assessed; 15.6% reported two and 4.5% reported three or more with no significant gender differences in each of these categories. In more than 50% of the multiple trauma cases, the reported events were linked (e.g. at the same time raped and witnessed physical assault to others) and were therefore probed together. For the few remaining cases, only the most distressing event was evaluated.

Given that an A2 event was reported, females had a higher overall probability for subthreshold and threshold PTSD (column 4: 22.6% vs. 3.9% in males) as well as for threshold DSM-IV-PTSD alone (14.5% vs. 2.2% in males. This gender difference also applies for all types of specific events, except for the two very uncommon (prevalence <1%) traumatic events 'terrible war experience' and the residual category of 'other traumatic events'. For threshold PTSD, column 5 reveals for women the highest conditional probabilities for rape (44.4%), followed by sexual abuse as a child (31.3%) and experiencing actual sudden death or threat of sudden death of close associates (27.3%). For men, the base rate for PTSD is too low to allow a firm interpretation of the conditional probabilities in relation to specific event types.

Age of onset of A2 qualifying traumatic events and PTSD

The cumulative age of onset curves (Fig. 1) for first onset of trauma, subthreshold and threshold PTSD reveals fairly convergently few cases reporting an onset before the age of 11 years.

The initial steep increases in incidence are mainly accounted for by sexual abuse and rape in females up to the age of 15 years, whereas between the ages of 15 and 21 years physical attacks, or witnessing traumatic events, prevail. The increase in males is mainly accounted for by physical attacks and serious accidents.

Sociodemographic and trauma-specific correlates of PTSD

The risk of experiencing traumatic events as well as for PTSD was found to be significantly associated with being female, older and of low social class and living in metropolitan Munich. However, age and residence were no longer significant in the multivariate logistic regression. Development of PTSD was most impressively associated with sexual abuse or rape as well as the number of traumatic events and age below 12 years when the event took place. Each of these variables remained significant in the multivariate model. The progression to PTSD in the subsample of individuals with at least one trauma was only associated with gender, number and type

of trauma in both the univariate and multivariate analyses.

Associations of traumatic events and PTSD with other disorders (comorbidity)

The exploration of lifetime associations of qualifying traumatic events and PTSD with other forms of mental disorders in our sample revealed that almost all other lifetime disorders are significantly but moderately associated with traumatic events. Odds ratios ranged from 2.0 for any depressive disorders to 10.1 for panic disorder. In total, 87.5% of all PTSD experienced in our study had at least one additional diagnosis, and 77.5% had two or more additional diagnoses (31). Taking the retrospective age of onset for each disorder, qualifying traumatic events and onset of PTSD in comorbid cases, Table 4 reveals that some mental disorders precede both traumatic events and PTSD more often than others, e.g. simple phobia (71.4% of cases prior to event and

Table 2. *Lifetime prevalence of specific traumatic events and conditional probabilities for PTSD by gender*

	Lifetime prevalence		Conditional probabilities		
Traumatic event	A1 traumatic events (%)	A2 traumatic events (%)	For A1 given A2 pr$_1$ (%)	For subthreshold PTSD or PTSD given A2 (worst) pr$_2$ (%)	For DSM-IV PTSD given A2 (worst) pr$_3$ (%)
Any traumatic event					
Men	25.2* (1.3)[a]	18.7* (1.1)[a]	74.0 (2.6)*[a]	3.9 (1.3)*[a]	2.2 (1.1)*[a]
Women	17.7 (1.1)	15.4 (1.1)	86.7 (2.4)	22.6 (3.2)	14.5 (2.8)
Total	21.4 (0.9)	17.0 (0.8)	79.3 (1.8)	12.5 (1.7)	7.8 (1.5)
Physically attacked					
Men	14.1* (1.0)	10.1* (0.9)	71.6 (3.6)*	1.6 (1.0)*	0.8 (0.8)
Women	5.4 (0.7)	4.9 (0.6)	91.5 (3.2)	14.3 (5.4)	3.6 (2.4)
Total	9.7 (0.6)	7.5 (0.5)	77.1 (2.8)	5.6 (2.0)	1.7 (1.0)
Serious accident					
Men	9.8* (0.9)	6.6* (0.7)	67.8 (4.6)	1.3 (1.2)*	0 (…)
Women	5.8 (0.7)	4.3 (0.6)	73.0 (5.6)	10.6 (4.9)	0 (…)
Total	7.8 (0.6)	5.4 (0.5)	69.8 (3.5)	4.9 (2.0)	0 (…)
Witness					
Men	6.0* (0.7)	4.6* (0.6)	75.5 (5.1)	1.8 (1.8)	1.8 (1.8)
Women	2.9 (0.5)	2.6 (0.5)	90.9 (5.5)	9.7 (4.7)	3.2 (3.2)
Total	4.4 (0.4)	3.6 (0.4)	80.6 (3.9)	4.8 (2.1)	2.4 (2.4)
Sexually abused as a child					
Men	0.3* (0.1)	0.3* (0.1)	100 (…)	25.0 (14.8)	0 (…)
Women	3.8 (0.5)	3.7 (0.6)	96.6 (3.7)	41.7 (8.5)	31.3 (8.2)
Total	2.1 (0.3)	2.0 (0.3)	96.8 (3.4)	38.5 (8.0)	28.8 (7.7)
Rape					
Men	0.0 (…)	0.0 (…)	0 (…)	0 (…)	0 (…)
Women	2.7 (0.5)	2.3 (0.4)	85.4 (6.8)	51.9 (11.4)	44.4 (11.6)
Total	1.4 (0.2)	1.2 (0.2)	85.4 (6.8)	51.9 (11.4)	44.4 (11.6)
Sudden (threat of) death of associate					
Men	0.7 (0.2)	0.7 (0.2)	100 (…)	30.0 (15.9)	10.0 (8.7)
Women	0.9 (0.3)	0.7 (0.3)	84.6 (12.0)	27.3 (18.0)	27.3 (15.9)
Total	0.8 (0.2)	0.7 (0.2)	91.7 (6.9)	28.6 (12.0)	14.3 (9.4)
Natural catastrophe					
Men	0.6 (0.2)	0.4 (0.2)	66.7 (19.4)	0 (…)	0 (…)
Women	0.4 (0.2)	0.4 (0.2)	100 (…)	0 (…)	0 (…)
Total	0.5 (0.1)	0.4 (0.1)	80.0 (13.4)	0 (…)	0 (…)
Other traumatic event					
Men	0.4 (0.2)	0.3 (0.2)	66.7 (18.7)	66.7 (28.1)	66.7 (28.1)
Women	0.3 (0.2)	0.3 (0.2)	100 (…)	25.0 (21.5)	25.0 (21.5)
Total	0.4 (0.1)	0.3 (0.1)	81.8 (9.8)	37.5 (21.9)	37.5 (21.8)
Horrific experience during war					
Men	0.2 (0.1)	0.1 (0.1)	66.7 (29.0)	50.0 (40.8)	50.0 (40.8)
Women	0.5 (0.2)	0.4 (0.1)	85.7 (14.0)	0 (…)	0 (…)
Total	0.3 (0.1)	0.3 (0.1)	80.0 (13.7)	14.3 (12.1)	14.3 (12.1)
Imprisoned, taken hostage, kidnapped					
Men	0.2 (0.1)	0.2 (0.1)	100 (…)	0 (…)	0 (…)
Women	0.1 (0.1)	0.1 (0.1)	100 (…)	0 (…)	0 (…)
Total	0.1 (0.1)	0.1 (0.1)	100 (…)	0 (…)	0 (…)

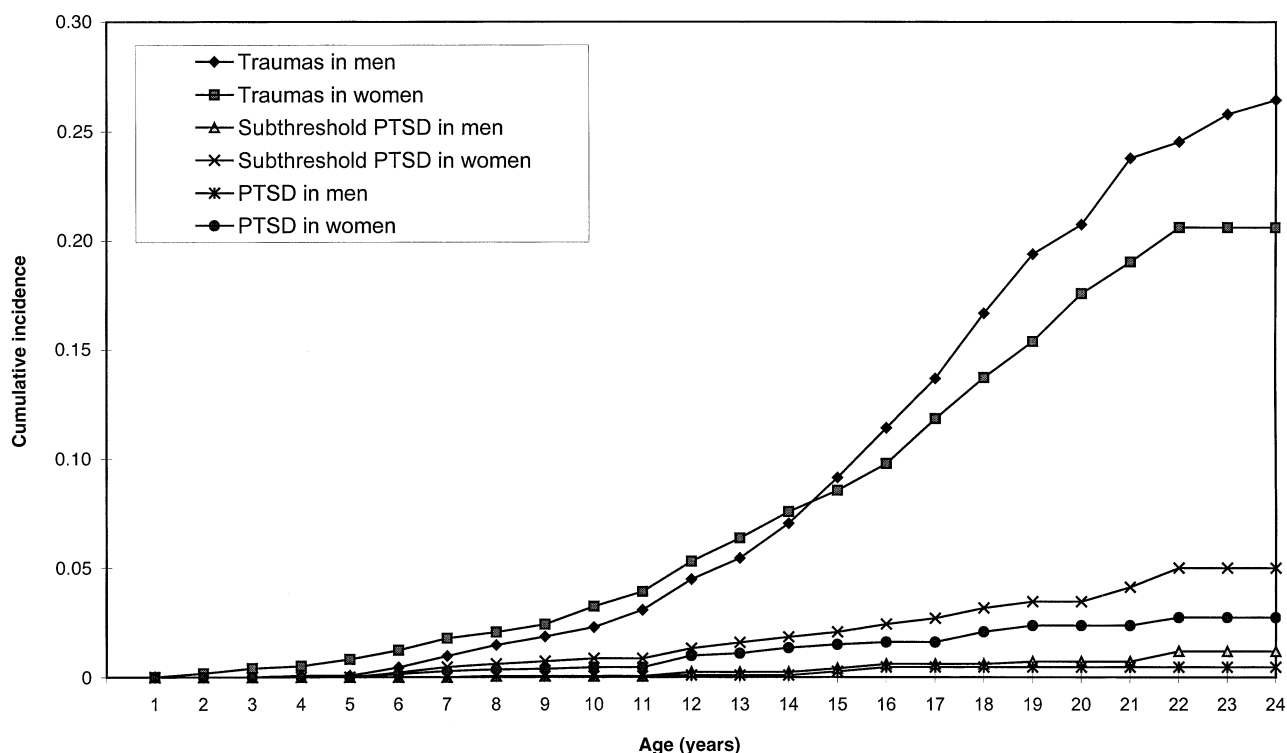[a] SE is shown in parentheses; pr = proportion.

Fig. 1. Cumulative incidence of worst traumas, subthreshold PTSD and PTSD by gender.

Table 3. Sociodemographic and trauma-specific correlates of traumatic events and lifetime PTSD

	Any traumatic event		Lifetime PTSD		Lifetime PTSD in trauma subsample	
	Univariate OR (95% CI)	Multivariate AOR (95% CI)	Univariate OR (95% CI)	Multivariate AOR (95% CI)	Univariate OR (95% CI)	Multivariate AOR (95% CI)
Sex						
Male	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.80* (0.66–0.97)	0.81* (0.66–0.98)	4.88* (2.56–9.39)	2.23* (1.06–4.66)	7.09* (3.56–14.15)	3.56* (1.65–7.69)
Age (years)						
14–17	1.00	1.00	1.00	1.00	1.00	1.00
18–24	1.55* (1.25–1.93)	1.56* (1.16–2.14)	2.05* (1.07–3.94)	2.30 (0.91–5.75)	1.45 (0.74–2.83)	1.63 (0.67–3.94)
Occupation						
Student	0.75* (0.61–0.91)	1.06 (0.79–1.42)	0.71 (0.40–1.23)	2.32* (1.02–5.26)	0.91 (0.52–1.61)	1.96 (0.90–4.27)
Other	1.00	1.00	1.00	1.00	1.00	1.00
Social class						
Low	2.24* (1.67–3.00)	2.11* (1.58–2.83)	4.46* (2.53–7.92)	2.30* (1.05–5.00)	2.65* (1.41–5.00)	1.93 (0.92–4.06)
Middle/high	1.00	1.00	1.00	1.00	1.00	1.00
Residence						
Central city	1.20 (0.94–1.52)	1.17 (0.92–1.27)	2.30* (1.09–4.76)	1.62 (0.71–3.67)	2.11 (0.99–4.53)	1.58 (0.70–3.65)
Suburban	1.00	1.00	1.00	1.00	1.00	1.00
Number of traumas						
One trauma			1.00	1.00	1.00	1.00
More than one trauma			22.49* (12.94–38.86)	7.97* (3.86–16.40)	2.90* (1.67–5.10)	2.61* (1.36–5.00)
Age at trauma (years)						
12 or younger			21.08* (9.49–35.87)	3.79* (1.82–7.85)	2.40* (1.41–4.07)	1.28 (0.68–2.42)
Older than 12			1.00	1.00	1.00	1.00
Trauma type						
Non-sexual			1.00	1.00	1.00	1.00
Sexual abuse or rape			74.29* (3.74–131.63)	16.91* (7.77–36.97)	10.34* (5.81–18.54)	50.4* (2.46–10.38)

* Significance *P* < 0.05.

Table 4. Time-related associations between traumatic events, PTSD and other mental disorders

DSM-IV disorders	Traumatic events									PTSD								
	Primary			Same year			Secondary			Primary			Same year			Secondary		
	n	%	(SE)	n	%	(SE)	n	%	(SE)	n	%	(SE)	n	%	(SE)	n	%	(SE)
Any substance abuse/dependence	92	41.1	(4.0)	28	12.5	(2.5)	104	46.4	(4.0)	10	29.4	(10.5)	3	8.8	(6.0)	21	61.8	(10.9)
Alcohol abuse/dependence	52	39.7	(5.1)	20	15.3	(3.3)	59	45.0	(5.1)	6	31.4	(15.6)	3	15.8	(11.2)	10	55.5	(16.1)
Drug abuse/dependence	14	31.8	(8.5)	1	2.3	(1.3)	29	65.9	(8.5)	2	25.0	(24.9)	0	0.0	(...)	6	75.0	(27.2)
Nicotine dependence	43	27.7	(4.6)	19	12.3	(3.0)	93	60.0	(4.8)	7	21.2	(9.4)	2	6.1	(5.4)	24	72.7	(10.3)
Any anxiety disorder	33	42.9	(6.6)	5	6.5	(3.9)	39	50.6	(6.7)	13	54.2	(13.8)	3	12.5	(10.4)	8	33.3	(13.0)
Agoraphobia (syndrome)	31	44.3	(6.7)	8	11.4	(4.2)	31	44.3	(6.9)	7	31.8	(12.1)	4	18.2	(11.9)	11	50.0	(14.2)
Panic attacks (syndrome)	14	29.8	(7.2)	7	14.9	(7.0)	26	55.3	(8.5)	5	26.3	(11.3)	10	52.6	(14.9)	4	21.1	(11.0)
Agoraphobia without panic disorder	6	30.0	(11.6)	2	10.0	(8.5)	12	60.0	(13.1)	2	25.0	(20.9)	1	12.5	(8.2)	5	62.5	(22.5)
Panic disorder with agoraphobia	4	30.8	(14.7)	0	0.0	(...)	9	69.2	(14.7)	0	0.0	(...)	4	80.0	(30.5)	1	20.0	(16.6)
Panic disorder without agoraphobia	1	14.3	(13.9)	3	42.9	(39.9)	3	42.9	(39.9)	0	0.0	(...)	3	75.0	(39.9)	1	25.0	(25.4)
Any social phobia	23	62.2	(9.4)	0	0.0	(...)	14	37.8	(9.4)	9	75.0	(15.1)	0	0.0	(...)	3	25.0	(15.1)
Any simple phobia	15	71.4	(12.6)	0	0.0	(...)	6	28.6	(12.6)	6	85.7	(14.3)	0	0.0	(...)	1	14.3	(14.3)
GAD	4	57.1	(22.8)	0	0.0	(...)	3	42.9	(22.8)	1	33.3	(32.5)	0	0.0	(...)	2	66.7	(32.5)
OCD	6	60.0	(16.7)	2	20.0	(13.7)	2	20	(14.2)	0	0.0	(...)	2	100.0	(...)	0	0.0	(...)
Any mood disorder	56	38.4	(4.8)	10	6.8	(2.2)	80	54.8	(4.9)	12	31.6	(8.8)	6	15.8	(8.8)	20	52.6	(10.4)
Any bipolar disorder	9	49.2	(13.3)	2	9.0	(6.6)	8	41.8	(12.6)	1	20.0	(20.0)	2	40.0	(23.8)	2	40.0	(23.8)
Any single or recurrent depressive disorder	28	30.1	(5.6)	7	7.5	(2.9)	58	62.4	(6.0)	7	30.4	(11.3)	3	13.0	(8.9)	13	56.5	(12.9)
Dysthymic disorder	20	52.6	(9.6)	1	2.6	(1.6)	17	44.7	(9.5)	5	41.7	(16.4)	1	8.3	(7.9)	6	50.0	(16.7)
Any somatoform disorder	21	63.6	(9.4)	0	0.0	(...)	12	36.4	(9.4)	8	66.7	(15.8)	0	0.0	(...)	4	33.3	(15.8)
Any eating disorder	11	39.3	(11.2)	3	10.7	(6.1)	14	50.0	(11.2)	4	80.0	(19.9)	0	0.0	(...)	1	20.0	(19.9)

85.7% prior to PTSD), whereas others are occurring approximately simultaneously ('same year', e.g. panic without agoraphobia) or are clearly 'secondary' to the onset of traumatic events or PTSD (e.g. major depression, substance disorders).

The highest proportions of temporally primary disorders preceding traumatic events were found for somatoform disorders (63.6%) and other specific anxiety disorders, especially social phobia (62.2%) and simple phobias (71.4%). The highest proportions for secondary other disorders following traumatic events were found for single or recurrent depressive disorders (62.4%), drug abuse and dependence (65.9%), nicotine dependence (60.0%) and agoraphobia with or without panic disorder. This pattern of temporality is also seen for PTSD diagnosis. In most comorbid PTSD cases, depressive disorders (68.5%), agoraphobia with or without panic disorder as well as substance abuse or dependence (70.6%) are occurring simultaneously or are secondary.

To investigate which of the pathways is the more important one when other possible influences are controlled for, we examined time-lagged effects using Cox regressions of (i) temporally primary disorders as predictors of the onset of subsequent traumatic events as well as PTSD and (ii) temporally primary traumatic events and PTSD as predictors of the onset of other mental disorders.

Primary mental disorders as predictors of trauma events and PTSD?

Table 5 shows in the first two columns the hazard ratios for primary mental disorders for secondary onset of traumatic events and PTSD onset, adjusted for gender, age and social class. In addition, in the third column, the hazard ratios are shown for the onset of PTSD after the experience of a traumatic event in the subsample of individuals who experienced traumatic events. The model in the last column controls for type of events, the experience of multiple traumas and the age at the time of trauma, which might possibly influence the pathway from other disorders to PTSD after experiencing traumatic events.

Primary substance use disorders, especially alcohol use disorders, significantly increase the risk of experiencing secondary traumatic events. However, they do not predict the onset of PTSD in any of the models. Significant hazard ratios were found for individuals with dysthymic disorder (AHR = 4.62). Subjects with *primary anxiety disorders*, namely social (AHR = 2.1) and simple phobia (AHR = 1.8) and panic attacks (AHR = 2.0) are not only at greater risk of reporting secondary onsets of traumatic events, but are also at increased risk of

Table 5. Other mental disorders as predictors of traumatic events and PTSD

Previous DSM-IV disorders	Secondary traumatic events AHR (95% CI)[a]	Secondary PTSD AHR (95% CI)[a]	Secondary PTSD in trauma subsample AHR (95% CI)[a]	Secondary PTSD n trauma subsample controlling trauma characteristics AHR (95% CI)[b]
Any substance abuse/dependence	2.28*(1.66–3.13)	2.41 (0.78–7.45)	1.48 (0.50–4.42)	0.40 (0.03–4.70)
Alcohol abuse/dependence	1.97*(1.34–2.89)	3.50 (0.82–15.06)	2.04 (0.51–8.19)	1.87 (0.50–6.94)
Drug abuse/dependence	2.19*(1.21–3.98)	3.02 (0.46–19.93)	2.08 (0.33–13.13)	2.46 (0.42–14.31)
Nicotine dependence	1.77*(1.18–2.66)	2.13 (0.75–6.04)	1.32 (0.78–7.45)	0.91 (0.30–2.80)
Any anxiety disorder	1.81*(1.21–2.71)	4.34*(1.99–9.48)	2.37*(1.11–5.05)	1.73 (0.80–3.76)
Agoraphobia (syndrome)	1.68*(1.12–2.53)	2.49 (0.96–6.44)	2.23 (0.88–5.69)	2.07 (0.82–5.24)
Panic attacks (syndrome)	2.03*(1.09–3.78)	4.90*(1.72–14.01)	2.31 (0.86–6.26)	1.55 (0.46–5.27)
Agoraphobia without panic disorder	1.61 (0.65–4.01)	3.03 (0.62–14.92)	2.48 (0.43–14.48)	3.13 (0.48–20.52)
Panic disorder with agoraphobia	2.42 (0.73–8.01)	(...)	(...)	(...)
Panic disorder without agoraphobia	1.23 (0.17–8.82)	(...)	(...)	(...)
Any social phobia	2.13*(1.32–3.42)	5.26*(2.09–13.23)	3.33*(1.50–7.39)	2.89 (0.79–10.62)
Any simple phobia	1.80*(1.03–3.12)	3.41*(1.27–9.15)	2.11 (0.81–5.47)	2.02 (0.95–4.31)
GAD	2.47 (0.68–1.02)	2.86 (0.29–28.57)	1.09 (0.10–11.61)	0.59 (0.14–2.49)
OCD	3.87*(1.55–9.65)	(...)	(...)	(...)
Any mood disorder	2.18*(1.53–3.10)	2.41*(1.03–6.59)	1.64 (0.66–4.04)	1.64 (0.67–4.01)
Any bipolar disorder	2.11 (0.92–4.85)	1.48 (0.19–11.78)	0.93 (0.10–8.68)	0.59 (0.06–5.70)
Any depressive disorder	1.74*(1.09–2.78)	2.93*(1.02–8.39)	1.92 (0.74–4.99)	2.52*(1.01–6.25)
Dysthymic disorder	4.62*(2.50–8.52)	4.71*(1.19–18.60)	2.76 (0.74–10.31)	(...)
Any somatoform disorder	2.32*(1.40–3.84)	5.21*(2.03–13.39)	2.32 (0.95–5.69)	1.61 (0.65–4.03)
Any eating disorder	1.98 (0.93–4.18)	3.82*(1.09–13.42)	2.46 (0.76–7.96)	2.89 (0.79–10.62)

AHR=adjusted hazard ratio.
[a] Adjusted for gender, age and social class.
[b] Adjusted for gender, age, social class, type of index trauma, multiple trauma and age at trauma.
* Significance $P<0.05$.

Table 6. Traumatic events and PTSD as predictors of other mental disorders

Previous DSM-IV disorders	Prior traumatic events AHR (95% CI)[a]	Prior PTSD AHR (95% CI)[a]	Prior PTSD in trauma subsample AHR (95% CI)[a]	Prior PTSD in trauma subsample controlling for trauma characteristics AHR (95% CI)[b]
Any substance abuse/dependence	1.38*(1.09–1.75)	2.88*(1.72–4.82)	2.02*(1.16–3.51)	1.84 (0.96–3.55)
Alcohol abuse/dependence	1.29 (0.94–1.77)	3.09*(1.39–6.86)	1.99 (0.86–4.61)	2.28 (0.86–6.03)
Drug abuse/dependence	2.13*(1.30–3.48)	3.58*(1.05–12.18)	2.32 (0.68–7.92)	2.65 (0.78–9.00)
Nicotine dependence	1.80*(1.38–2.36)	4.26*(2.59–7.00)	2.84*(1.65–4.91)	2.50*(1.36–4.60)
Any anxiety disorder	2.23*(1.48–3.37)	2.80*(1.28–6.10)	1.82 (0.77–4.31)	1.32 (0.51–3.43)
Agoraphobia (syndrome)	1.73*(1.09–2.77)	2.67*(1.07–6.65)	2.51*(1.07–5.88)	2.01 (0.79–5.09)
Panic attacks (syndrome)	2.29*(1.36–3.87)	2.39 (0.83–6.86)	1.06 (0.35–3.21)	0.64 (0.19–2.09)
Agoraphobia without panic disorder	3.40*(1.58–7.36)	5.83*(1.88–18.01)	3.75*(1.16–12.15)	4.13*(1.11–15.43)
Panic disorder with agoraphobia	5.44*(1.81–16.38)	1.99 (0.19–20.78)	0.85 (0.66–11.01)	0.38 (0.02–7.47)
Panic disorder without agoraphobia	1.43 (0.28–7.16)	3.10 (0.39–24.67)	1.71 (0.16–18.29)	0.51 (0.05–5.43)
Any social phobia	2.54*(1.26–5.10)	3.00 (0.78–11.47)	0.52 (0.06–4.31)	1.72 (0.34–8.64)
Any simple phobia	2.46 (0.74–8.25)	2.10 (0.32–13.78)	1.24 (0.19–7.97)	0.78 (0.12–5.21)
GAD	1.43 (0.41–3.01)	7.54*(1.50–37.92)	7.54 (0.67–85.02)	5.08 (0.24–107.83)
OCD	1.95 (0.43–8.72)	(...)	(...)	(...)
Any mood disorder	2.06*(1.53–2.77)	3.55*(1.89–6.67)	2.13*(1.06–4.27)	1.90 (0.91–3.97)
Any bipolar disorder	2.69*(1.13–6.42)	3.63 (0.80–16.58)	1.40 (0.26–7.48)	1.07 (0.17–6.67)
Any depressive disorder	1.93*(1.34–2.77)	3.03*(1.41–6.52)	1.94 (0.85–4.42)	2.08 (0.90–4.81)
Dysthymic disorder	2.54*(1.39–4.65)	4.24*(1.48–12.15)	2.31 (0.72–7.45)	1.54 (0.46–5.21)
Any somatoform disorder	3.85*(1.90–7.81)	7.00*(2.49–19.66)	4.01*(1.37–11.76)	2.51 (0.75–8.44)
Any eating disorder	2.25 (0.83–5.29)	0.87 (0.11–6.82)	0.52 (0.06–4.31)	0.65 (0.09–4.48)

AHR=adjusted hazard ratio.
[a] Adjusted for gender, age and social class.
[b] Adjusted for gender, age, social class, type of index trauma, multiple trauma and age at trauma.
* Significance P<0.05.

onset of secondary PTSD. The same applies to the few subjects with *primary depressive disorders* and somatoform disorders.

The findings for the models shown in the third column highlight the critical role of only one primary anxiety disorder, namely social phobia (AHR = 3.33). Controlling for event type and other trauma characteristics in the last column of Table 4 shows that primary depressive disorder (AHR = 2.52) independently of the event characteristics predicts the development of PTSD after experiencing traumas. Because most of the traumatic events leading to PTSD were sexual abuse or rape in women, this highlights the fact that other anxiety disorders, especially social phobia, may play a significant role in PTSD in women who experience sexual abuse or rape, while preceding depressive disorders might generally be predictors of PTSD after traumatic events.

Traumatic events and PTSD as predictors of other mental disorders?

The first two columns of Table 6 show for almost all mental disorders increased risks for secondary onsets not only after the experience of traumatic events, but also (more pronounced) after the onset of a threshold PTSD diagnosis. Secondary disorders with particularly pronounced odds ratios after onset of PTSD included: somatoform disorders, dysthymia, GAD and agoraphobia. Noteworthy exceptions to this pattern are simple phobia, OCD and eating disorders, which do not show any significant associations, as well as social phobia, which reveals an increased risk of secondary onset after a trauma, but not after PTSD. Further secondary GAD has the highest AHR for PTSD, but is not associated with trauma. The failure to demonstrate a significant association with panic attacks might be due to the fact that most panic attacks occurred in the same year.

In the trauma sample with PTSD, the significant effects for secondary nicotine dependence (AHR = 2.84), agoraphobia (AHR = 3.75), any mood syndromes (AHR = 2.13) and somatoform disorders (AHR = 4.01) are significant.

After controlling for trauma-specific characteristics, agoraphobia remains the only significant secondary disorder in association with PTSD.

Discussion

Limitations

Before discussing and comparing our findings in more detail with previous epidemiological surveys, a few important issues and limitations should be addressed.

(i) Direct comparisons of our findings with other studies are limited by the fact that our study used DSM-IV criteria with their stricter and more complicated criteria. To enable the reader to at least compare some of the key findings related to traumatic events, we have indicated the prevalence of both DSM-IV A1 and A2 events throughout the descriptive part of paper. (ii) It is important to remember that we studied (similarly to Breslau et al. (10), but unlike the NCS) exclusively 14–24-year-olds. This affects not only prevalence but also the rate of comorbid conditions, which may increase considerably over time, when respondents, for example, currently aged 15 years will be 18 years or older. (iii) Being aware of the substantial difficulties in previous surveys of finding a reasonable strategy to deal with respondents who mention several qualifying events (7), the M-CIDI used in this survey included additional probe questions to identify trauma event clusters, allowing a rational approach to evaluate the DSM-IV criteria not just for one, but for a whole cluster of related events. Thus a respondent who mentioned being kidnapped, tortured and raped within the same traumatic experience was assessed for this cluster of events. This strategy has efficiently reduced the number of subjects, for which only one of these events could be comprehensively evaluated to less than 10%. (iv) The results are based on data that require lifetime recall of traumas and the symptoms associated with them. It is possible that there was some recall failure in respondents' reports, leading to underestimation of the lifetime prevalence rates of traumatic events and even more PTSD symptoms. However, it is also worth noting that in our sample recall bias might be less critical compared to other studies involving older respondents. (v) The findings of the comorbidity analyses and the time-lagged models are restricted due to the small number of cases in some of the cells. Therefore the proportions of primary and secondary disorders in particular should be interpreted with caution. Nevertheless, to describe the comorbid conditions of all threshold and subthreshold PTSD cases in this sample we think that it is useful to add all possible associations with other disorders.

Prevalence of traumatic events and PTSD

(i) Bearing in mind these considerations, the first remarkable finding of our study is the comparatively low prevalence of both traumatic events and DSM-IV PTSD. Only 25.5% of males and 17.7% of females had experienced at least one traumatic event in their lifetime, and less than 1% of males and 2.2% of females fulfilled the criteria for PTSD. Although the gender difference is in agreement with

previous studies (7, 10), the rates of traumatic events are almost three times lower than those reported for the US studies, except for the study by Cuffe et al. (12). For example, the NCS reported for males aged 14–24 years a prevalence of 60.7% and for females a prevalence of 51.2%. Due to rather similar assessment strategies of events, it is likely that this reflects a true difference between study populations, such as considerably lower event rates of natural disasters, combat, threat with weapons, and witnessing such events, in our study. Each type of event is indeed considerably less likely to occur in the Munich area, as Germany as a whole has few natural disasters, extremely restrictive laws concerning the carrying of weapons, and considerably lower crime rates. Relatively similar or only slightly lower event rates were found on the other hand for rape, physical attacks and physical and sexual abuse. Therefore our lower overall trauma rates might be due to true differences in victimization rates between geographical areas and different populations.

(ii) Taking the similarly low prevalence findings of Cuffe et al. (12) from a south-western US district as a comparison, one might also speculate about the effect of DSM-IV's stricter algorithms. The NCS consistent with the study of Breslau et al. (10) in young adults found about three times higher rates in this age group, with a lifetime prevalence of 10.3% for females and 2.8% for males. Although theoretically the stricter DSM-IV criteria (impairment/distress criterion) might have an effect, the size of the difference makes this unlikely. Furthermore, the conditional probabilities of specific events for PTSD are quite similar in all studies for both sexes. Sexual traumatic events (i.e. rape, sexual abuse, molestation) are in all three studies the events most commonly associated with PTSD in females and with combat and war experiences in males.

(iii) Thus, even though our sample has considerably lower base rates for traumatic events, the risk of developing PTSD is quite similar to that assessed in Kessler's and Breslau's studies. Furthermore, we confirm their previous findings that the number of traumatic events and timing of events (prior to the age of 14 years) play a powerful role as predictors of PTSD development.

(iv) With regard to sociodemographic correlates, the correlates of subthreshold PTSD in the trauma sample are consistent with most previous US population surveys. Despite the fact that there were more traumatic events in men, women have a higher risk of PTSD, and trauma and PTSD development were also associated with age, low social class and place of residence. The type, number and timing of traumatic events were significantly associated with all outcomes, and

seem to play a key role as potentiating factors for the development of a PTSD syndrome in association with trauma type. We also found indications of age effects. Cumulative incidence curves of onset of traumatic events (31) and PTSD revealed substantial increases in qualifying traumas with no corresponding increase in PTSD rates after the age of 11 years.

(v) With regard to comorbidity, even in 14–24 year-olds, comorbidity rates are high, with two-thirds of the PTSD cases having at least two other disorders. The high comorbidity rates are a consistent result in all of the epidemiological studies (5, 7, 10, 15, 16). These associations are extremely unlikely to be artefacts of partly overlapping diagnostic criteria of PTSD with anxiety, somatoform and depressive disorders, because a detailed investigation of this issue (31) revealed that, after excluding all comparable symptoms which a respondent acknowledged in the PTSD and in other diagnostic sections of the interview, the comorbidity rate drops only marginally.

Assuming that the retrospective age-of-onset information provided by our cases is valid, our analyses confirm various possibly overlapping pathways and disorder-specific interactions. In only about one-third of PTSD cases it is likely that primary non-PTSD psychopathology constitutes a *primary vulnerability or risk constellation* that either increases the risk of traumatic events or even strongly promotes the development of a threshold PTSD syndrome. Examples of such increases in the risk of traumatic events are the strong associations with alcohol and drug use disorders in our sample, which were, however, not confirmed for the progression to full PTSD. Other examples of potentially different pathways of this type are pre-existing phobic disorders, somatoform and depressive disorders, which all significantly affect the risk of both the experience of trauma and the progression to threshold PTSD. These results are consistent with those of Breslau et al. (20), who pointed out the critical role of primary anxiety syndromes for later PTSD, and those of Kessler et al. (21), who also found that nearly any other disorder predicted onset of PTSD. Our confirmatory findings extend these earlier results in two ways. First, our overall sample is younger, with a shorter history of other mental disorder, and secondly, the findings are less confounded than those in previous studies, because only a very small number of our cases might have experienced trauma prior to the one that we evaluated.

In the clear majority of cases, however, mental disorders obviously developed secondary to PTSD by at least 1 year, suggesting that (i) traumatic events may be a direct or indirect risk factor for

almost all types of mental disorders and (ii) that, compared to traumatic events, slightly differential secondary complications appear to be associated with full PTSD, in particular somatoform disorders, nicotine dependence, agoraphobia, generalized anxiety disorder and mood disorders. Given the fact that we required at least a 1-year time difference for this pattern of temporality, it is likely that we have underestimated the size of these effects, because rapid onsets within the same year as the onset of PTSD are not taken into account. This underestimate might be particularly pronounced for panic disorder as panic disorder cases most frequently reported an onset of both conditions within the same year.

Who develops PTSD once they have been exposed to an event? The answer seems to be women, poor people and children exposed to such events very early in life. Surprisingly, previous mental disorders seem to be strong predictors of exposure. One might speculate that the diagnoses themselves might in some cases be direct causes. For example, substance dependence probably leads to people getting into dangerous situations. In other cases, however, the prior mental diagnoses might be markers of other, yet unmeasured, risks. For example, coming from a family affected by severe mental disorders, with a neglectful mother and violent father, is probably a risk factor for depression and anxiety and also a risk factor for exposure to a number of traumas. Unless we control for this family background, this will induce what appears to be an effect of prior anxiety and depression on subsequent trauma exposure. The only way to clarify this in future research is to conduct a thorough analysis of the risk factors for trauma exposure.

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, revised 3rd edn. Washington, DC: American Psychiatric Association, 1984.

2. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, revised 4th edn. Washington, DC: American Psychiatric Association, 1994.

3. ROBINS LN, HELZER JE, COTTLER L, GOLDING E. National Institute of Mental Health Diagnostic Interview Schedule, version III, revised. St Louis, MO: Washington University, 1989.

4. World Health Organization. Composite International Diagnostic Interview (CIDI, Version 2.1). Geneva: World Health Organization, 1997.

5. HELZER JE, ROBINS LN, McEVOY L. Post-traumatic stress disorder in the general population. N Engl J Med 1987; 317:1630–1634.

6. SHORE JH, VOLLMER WM, TATUM EJ. Community patterns of post-traumatic stress disorder. J Ment Nerv Dis 1989; 177:681–685.

7. KESSLER RC, SONNEGA A, BROMET E, HUGHES M, NELSON CB. Post-traumatic stress disorder in the National Comorbidity Survey. Arch Gen Psychiatry 1995;52:1048–1060.

8. BRESLAU N, KESSLER RC, CHILCOAT HD, SCHULTZ LR, DAVIS GC, ANDRESKI P. Trauma and post-traumatic stress disorder in the community. Arch Gen Psychiatry 1998;55:626–632.

9. RESNICK HS, KILPATRICK DG, DANSKY BS, SAUNDERS BE, BEST CL. Prevalence of civilian trauma and post-traumatic stress disorder in a representative national sample of women. J Consult Clin Psychol 1993;61:984–991.

10. BRESLAU N, DAVIS GC, ANDRESKI P, PETERSON E. Traumatic events and post-traumatic stress disorder in an urban population of young adults. Arch Gen Psychiatry 1991;48:216–222.

11. PARRY-JONES W, BARTON J. Post-traumatic stress disorder in children and adolescents. Curr Opin Psychiatry 1995;8: 227–230.

12. CUFFE SP, ADDY CL, GARRISON CZ, WALLER JL, JACKSON KL, McKEOWN RE, CHILAPPAGARI S. Prevalence of PTSD in a community sample of older adolescents. J Am Acad Child Adolesc Psychiatry 1998;37:147–154.

13. KILPATRICK DG, RESNICK HS. Post-traumatic stress disorder associated with exposure to criminal victimization in clinical and community populations. In: DAVIDSON JRT, FOA EB, eds. Post-traumatic stress disorder: DSM-IV and beyond. Washington, DC: American Psychiatric Press, 1992; 113–143.

14. World Health Organization. Composite International Diagnostic Interview (CIDI, Version 1.0). Geneva: World Health Organization, 1990.

15. COTTLER LB, COMPTON WM, MAGER D, SPITZNAGEL EL, JANCA A. Post-traumatic stress disorder among substance users from the general population. Am J Psychiatry 1992;149:664–670.

16. DAVIDSON JRT, HUGHES D, BLAZER D, GEORGE LK. Post-traumatic stress disorder in the community: an epidemiological study. Psychol Med 1991;21:713–721.

17. YEHUDA R, McFARLANE AC. Conflict between current knowledge about post-traumatic stress disorder and its original conceptual basis. Am J Psychiatry 1995;152: 1705–1713.

18. DEGIROLAMO G, McFARLANE AC. Epidemiology of post-traumatic stress disorder: a comprehensive review of the literature. In: MARELLA AJ, FRIEDMAN M, GERRITY E, SCURFIELD R, eds. Ethnocultural aspects of post-traumatic stress disorder: issues, research and direction. Washington, DC: American Psychological Association, 1996;33–85.

19. DAVIDSON JRT, FOA EB. Diagnostic issues in post-traumatic stress disorder: considerations for the DSM-IV. J Abnorm Psychol 1991;100:346–355.

20. BRESLAU N, DAVIS G, PETERSON E, SCHULTZ L. Psychiatric

sequelae of post-traumatic stress disorder in women. Arch Gen Psychiatry 1997;**100**:81–87.

21. KESSLER RC, SONNEGA A, BROMET E, HUGHES M, NELSON CB, BRESLAU N. Epidemiologic risk factors for trauma and PTSD. In: YEHUDA R, ed. Risk factors for post-traumatic stress disorder. Washington, DC: American Psychiatric Association Press, 1999;23–59.

22. WITTCHEN H-U, NELSON CB, LACHNER G. Prevalence of mental disorders and psychosocial impairments in adolescents and young adults. Psychol Med 1998;**28**:109–126.

23. WITTCHEN H-U, PERKONIGG A, LACHNER G, NELSON CB. The early developmental stages of psychopathology study (EDSP) — objectives and design. Eur Addict Res 1998;**4**:18–27.

24. WITTCHEN H.-U, PFISTER H, eds. DIA-X-Interviews: Manual für Screening-Verfahren und Interview; Interviewheft Längsschnittuntersuchung (DIA-X-Lifetime); Ergänzungsheft (DIA-X-Lifetime); Interviewheft Querschnittuntersuchung (DIA-X-12 Monate); Ergänzungsheft (DIA-X-12 Monate); PC-Programm zur Durchführung des Interviews (Längs- und Querschnittuntersuchung); Auswertungsprogramm. Frankfurt: Swets & Zeitlinger, 1997.

25. PFISTER H, WITTCHEN H-U. M-CIDI Computerprogramm. München: Max Planck Institut für Psychiatrie, Klinisches Institut, 1995.

26. LACHNER G, WITTCHEN H-U, PERKONIGG A et al. Structure, content and reliability of the Munich-Composite International Diagnostic Interview (M-CIDI). Substance use sections. Eur Addict Res 1998;**4**:28–4.

27. WITTCHEN H-U, LACHNER G, WUNDERLICH U, PFISTER H. Test–retest reliability of the computerized DSM-IV version of the Munich-Composite International Diagnostic Interview (M-CIDI). Soc Psychiatry Psychiatr Epidemiol 1998;**33**:568–578.

28. REED V, GANDER F, PFISTER H et al. To what degree does the Composite International Diagnostic Interview (CIDI) correctly identify DSM-IV disorders? Testing validity issues in a clinical sample. Int J Meth Psychiatr Res 1998;**7**:142–155.

29. KESSLER RC, MCGONAGLE KA, ZHAO S et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. Arch Gen Psychiatry 1994;**51**:8–19.

30. Statcorp. Stata Statistical Software: Release 5.0. College Station, TX: Stata Corporation, 1997.

31. PERKONIGG A, WITTCHEN H-U. Traumatic events and DSM-IV post-traumatic stress disorder in adolescents and young adults. In: MAERKER A, SCHÜTZWOHL M, SOLOMON Z, eds. Post-traumatic stress disorder: a life span developmental perspective. Göttingen: Hogrefe, 1998:114–133.