Age of traumatisation as a predictor of post-traumatic stress disorder or major depression in young women

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Background Findings in developmental psychopathology suggest that traumatisation in childhood may increase the risk of both post-traumatic stress disorder (PTSD) and major depressive disorder, whereas traumatisation in adolescence is more likely to lead to elevated PTSD risk.

Aims To estimate the impact of traumatisation in childhood or adolescence in a community sample.

Method A representative sample of 1966 young women from Dresden aged 18–45 years were interviewed for occurrence of traumatic events and the onset of PTSD and major depression. The sample was subdivided into a childhood trauma group (trauma up to age 12 years) and an adolescent trauma group (trauma from age 13 years).

Results A quarter of all participants reported traumatic events meeting the DSM AI criterion. In the childhood group conditional risks for PTSD and major depressive disorder were 17.0% and 23.3%, respectively, compared with risks of 13.3% and 6.5%, respectively, in the adolescent group. In 29% of those with PTSD, major depression was also present.

Conclusions The risk of developing major depressive disorder after traumatisation in childhood is approximately equal to the risk of developing PTSD. After age 13 years, the risk of PTSD is greater than the risk of major depression after traumatisation.

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Traumatic events and the way in which people subsequently cope with them have a crucial role in the development of post-traumatic stress disorder (PTSD) and also in the development of major depression. Reported studies tend to follow one of two separate lines of research: some studies report exclusively on the aetiology of major depression with regard to childhood trauma (e.g. Kendler *et al*, 2002), whereas studies in general populations focus on the development of PTSD (Kessler *et al*, 1995; Breslau *et al*, 1998; Perkonigg *et al*, 2000). Guided by a developmental psychopathological perspective (Maercker, 1999), we assume that development of PTSD requires a certain maturation of memory organisation and arousal modulation which is not achieved before adolescence (Pynoos *et al*, 1999). The very nature of intrusions requires the recording, processing and analysing of sensory information with kinaesthetic and somatic registration, which depends on frontocortical dominance. This developmental perspective suggests that there are age-differential vulnerabilities for trauma-related disorders. There are indications that the age at which a person experiences a traumatic event is an important predictor for the severity or prevalence of PTSD. Green *et al* (1991) found fewer PTSD symptoms after a disaster in the youngest age group compared with an adolescent group. Maercker (1999) found higher PTSD prevalence rates in traumatised adolescents than in young adults, in a study of former victims of political violence. Our study on a population-based sample of young women investigates whether childhood traumas are related in particular to major depression and whether traumas in adolescence and early adulthood are primarily related to PTSD. Furthermore, we investigated whether trauma and PTSD prevalence rates in our sample correspond with those found in other representative studies (Kessler *et al*, 1995; Breslau *et al*, 1998; Perkonigg *et al*, 2000). Finally, the comorbidity rate for PTSD and major depressive disorder was estimated.

METHOD

Sample

The data used in this report derive from a large epidemiological study of mental disorders of young women in the city of Dresden in Germany. The sample has been described in detail by Becker *et al* (2001) and Hoyer *et al* (2002). The representative sampling by age and city area was done with the support of the city government registry of residents. The age criterion for participants was 18–24 years. Initially, 5204 women were identified and deemed eligible for the study, of whom 2064 (39.7%) agreed to take part. After a complete description of the study to the participants, written informed consent was obtained.

For the purposes of the current analysis, the sample was further restricted. Participants who failed to supply data concerning the time of the trauma (n=67) or who had an episode of depression before experiencing a trauma (n=31) were withdrawn from the analysis. The final sample for our analysis therefore consisted of 1966 women, and the mean age was 21.8 years (s.d.=1.80).

The majority of the women in the final sample had a stable intimate partner (62.1%); 4.2% were married and 0.5% were separated or divorced. About half (51.8%) were living with their parents at the time of the study, about a third with a partner or spouse (26.2%) and 6.8% with spouse or partner and children. With regard to educational level, 93.2% had completed school education, with 6.7% having had the lowest level of school education (*Hauptschule*), about a third (30.1%) having had the medium level of schooling (*Realschule* or *Polytechnische Oberschule*) and about half (55.5%) having left school with the qualification that allows German students to attend university (*Abitur*).

Assessment

The data on traumatic events, symptoms and disorder onsets were gathered retrospectively. Diagnostic assessment was done using the *Diagnostisches Interview bei psychischen Störungen – Forschungsversion* (F–DIPS; Margraf *et al*, 1996), a structured interview for diagnosing DSM–IV disorders (American Psychiatric Association, 1994). The F–DIPS is a modified version of the

Anxiety Disorder Interview Schedule for DSM–IV – Lifetime version (ADIS–IV–L; DiNardo *et al*, 1994), which is widely used for the assessment of anxiety disorders and shows excellent psychometric properties (Brown *et al*, 2001). The modification consisted of the addition of comprehensive diagnostic modules for affective and childhood disorders according to DSM–IV criteria.

Interviewers were either psychology students in their last year of training in clinical psychology, psychologists or medical doctors. All underwent extensive training totalling approximately 40 h and received biweekly supervision. For control and supervisory purposes, all interviews were audiotaped and randomly selected tapes were assessed by supervisors. Interviews took place either in the participant's home or in the university department of psychology. There was no financial reimbursement for participants in the study.

Traumatic events

The DSM–IV A1 criterion of trauma was assessed with an open question: 'Have you ever experienced a traumatic or life-threatening event? (Examples of such events are physical assaults, severe injuries, rape, killing, combat actions, accidents, natural disasters and man-made catastrophes.)' Participants were then asked whether they had witnessed such an event happening to others. Any number of traumatic events could be noted, and the respondent's age at the time the event occurred was recorded for each example. The following question was asked specifically for childhood trauma: 'Can you remember events of this kind that took place in your childhood?' Again, an unlimited number of events were noted, together with the dates of their occurrence. The next question addressed 'personal experience of intense fear, helplessness, or horror' (the DSM–IV A2 criterion of trauma), and in the concluding question participants were asked to identify one event that was most upsetting – the worst trauma of their lives.

Assessment of PTSD and major depression

The F–DIPS structured interview evaluated all DSM–IV criteria for PTSD and major depressive disorder in the order listed in the DSM. For appropriate PTSD symptoms (e.g. loss of interest, sense of restricted future, irritability), questions were followed by the prompt, 'Did this occur only in the aftermath of the event?' The F criterion (clinically significant distress) was assessed by asking, 'Did the disturbances cause any significant distress or handicap in your professional life or other areas like family life or leisure?' All symptoms or criteria were rated on a nine-point scale from 0 (not present) to 8 (extreme). Only symptom endorsement values of 4–8 were counted as symptom presence.

Major depression was assessed according to the DSM–IV algorithm asking introductory questions and questions regarding current and past episodes. In the introductory section, the main question was: 'Has there ever been a phase lasting a minimum of 2 weeks in which you felt depressed, sad, or hopeless or in which you lost interest or pleasure in all your usual activities?' This was followed by the childhood-specific question: 'Was there a phase of 2 weeks in your life before age 18 where you were in a very irritable mood?' Participants were subsequently asked to indicate how long such phases lasted. Current and past episodes were assessed by asking single symptom questions relating to the current and the most distressing past episode. Finally, patients were asked to disclose any excluding symptom criteria according to DSM–IV (e.g. drug misuse, medication, physiological conditions).

Psychosocial functioning

Psychosocial functioning was assessed by the clinicians' rating of DSM Axis V (Global Assessment of Functioning, GAF; Endicott *et al*, 1976) separately for current and past years of general assessment of functioning (GAF scale rating range 1–100).

Data analysis

Trauma categories

The idiosyncratic terms for traumatic events given by the participants were noted by the assessors. In a subsequent step they were grouped into nine categories of traumatic events, according to previously published trauma category lists (Breslau *et al*, 1991; Kessler *et al*, 1995). Raters were given descriptions of the categories as follows:

(a) 'serious accident' included motor vehicle, other traffic, home, occupational, or leisure accidents;

(b) 'physical attack' included attempts or acts of intentional physical violence, e.g. severe beating, physical family violence, violent robbery assaults, hate crimes;

(c) 'molestation' included all sexual assaults without accomplished intercourse, e.g. molested by family members, friends, or strangers, or having been inappropriately 'touched' or having witnessed ejaculation;

(d) 'rape' comprised sexual assaults or abuse (whether as single, multiple or long-lasting events);

(e) 'sudden death/death threat to associate' included reports of losses or feared losses of loved ones (parents, siblings, close friends, close family members) e.g. through fatal accident, crime or disease;

(f) 'serious illness' comprised own life-threatening disorders;

(g) 'disaster/fire' included explosions, large-scale catastrophes and fires;

(h) 'witnessing trauma' included having witnessed major violent or life-threatening acts (whether or not family members were involved);

(i) the category 'don't want to talk about it' applies when participants refused to answer.

Three clinically experienced members of the research group categorised a total of 761 idiosyncratic terms into the above categories. There was agreement across all categories and raters of 77.5%, and dyadic kappa coefficients ranged from 0.88 to 0.94. The category showing least agreement was 'witnessing trauma' (average agreement 55.6%) and the category with the highest agreement was 'rape' (96.8%). In the case of non-agreement, the idiosyncratic term was assigned to the category endorsed by two of the three raters. In cases of total disagreement (22 of 761 trauma terms), all three raters discussed it until a consensus was reached.

Post hoc *group divisions*

The sample was divided into subgroups according to the age at which an individual's worst trauma took place or began. Following conventional distinctions of childhood and adolescence derived from developmental psychology (Bornstein, 1999) and previous research (Mullen *et al*, 1993), we assigned participants who experienced a traumatic event at age 12 years or younger to the childhood trauma group, whereas a traumatic event occurring after age 13 years qualified the participant for the

adolescent trauma group. Finally, we divided the sample according to DSM–IV diagnosis, ending up with a pure PTSD group, a pure major depression group and a comorbid (mixed) PTSD and major depression group.

Statistical analyses

Data were analysed using the Statistical Package for Social Sciences, version 10.x for PC. Statistical tests included analyses of variance, χ^2 tests and relative risk estimates.

RESULTS

Exposure to traumatic events

A quarter of the total group reported having experienced at least one A1 event at some time in their life (Table 1), and a fifth fulfilled both the A1 and the A2 criteria for DSM–IV PTSD by reporting events that caused horror or helplessness (qualifying trauma). 'Serious accident' was the most common trauma category, with 7.9% and 6.0% prevalences of A1 criterion and A1+A2 criteria respectively, followed by physical attack (4.2% for A1 and 3.9% for A1+A2). The trauma category with the highest number of A2 criteria reports was 'rape' (97.8% participants with A1 also endorsed A2), and the category with the lowest concordance was 'disaster/fire' (72.7%). Table 1 lists the prevalences of traumatic events in descending order.

Conditional risks of PTSD and major depressive disorder

Table 1 also shows the conditional risks of PTSD and major depressive disorder for the total sample. 'Rape' and 'serious accident' had the highest and lowest probability of PTSD respectively, with 'rape' having a PTSD probability of 43.3% and 'serious accident' having a PTSD probability of 2.5%. The categories 'rape' and 'Don't want to talk about it' had the highest probability of major depressive disorder (both 25.0%), followed by 'molestation', which had a PTSD probability of 23.8%. 'Serious accident' had the lowest probability of major depressive disorder (8.5%).

In a comparison of the PTSD and major depressive disorder conditional probabilities, the only trauma category with a significant probability difference was 'witnessing trauma' ($\chi^2(1)=5.33$, $P<0.05$) with a probability of 3.8% for

Table 1 Prevalence rates of traumatic events, conditional probabilities and relative risks for post-traumatic stress disorder and major depressive disorder when trauma occurred in childhood or adolescence

	Total sample % (*n*)	Childhood trauma % (*n*)	Adolescent trauma % (*n*)	RR[1] (95% CI)
Any traumatic event[2]	25.3 (498)	10.7 (210)	14.6 (288)	
Qualifying trauma[3]	21.6 (424)	9.0 (176)	12.6 (248)	
Conditional probability for PTSD[4]	14.9 (63)	17.0 (30)	13.3 (33)	1.3 (0.8–2.0)
Conditional probability for MDD[5]	13.4 (57)	23.3 (41)	6.5 (16)	3.6 (2.1–6.2)
Serious accident	7.9 (156)	3.0 (59)	4.9 (97)	
Qualifying trauma	6.0 (118)	2.4 (47)	3.6 (71)	
Conditional probability for PTSD	2.5 (3)	0.0 (0)	4.2 (3)	
Conditional probability for MDD	8.5 (10)	12.8 (6)	5.6 (4)	2.3 (0.7–7.6)
Physical attack	4.2 (82)	1.6 (31)	2.6 (51)	
Qualifying trauma	3.9 (77)	1.4 (28)	2.5 (49)	
Conditional probability for PTSD	15.6 (12)	28.6 (8)	8.2 (4)	3.5 (1.2–10.6)
Conditional probability for MDD	11.7 (9)	28.6 (8)	2.0 (1)	14.0 (1.8–106.2)
Molestation	3.5 (68)	1.8 (36)	1.7 (32)	
Qualifying trauma	3.2 (63)	1.7 (33)	1.5 (30)	
Conditional probability for PTSD	23.8 (15)	27.3 (9)	20.0 (6)	1.4 (0.6–3.4)
Conditional probability for MDD	14.3 (9)	15.2 (5)	13.3 (4)	1.1 (0.3–3.8)
Witnessing trauma	3.3 (66)	1.7 (34)	1.7 (32)	
Qualifying trauma	2.6 (52)	1.3 (25)	1.4 (27)	
Conditional probability for PTSD	3.8 (2)	4.0 (1)	3.7 (1)	1.1 (0.1–16.4)
Conditional probability for MDD	19.2 (10)	36.0 (9)	3.7 (1)	9.7 (1.3–7.3)
Rape	2.3 (45)	0.8 (16)	1.5 (29)	
Qualifying trauma	2.2 (44)	0.8 (15)	1.5 (29)	
Conditional probability for PTSD	43.3 (19)	26.7 (4)	51.7 (15)	0.5 (0.2–1.3)
Conditional probability for MDD	25.0 (11)	40.0 (6)	17.2 (5)	2.3 (0.8–6.4)
Sudden death/death threat of associate	2.3 (46)	0.9 (17)	1.4 (29)	
Qualifying trauma	2.1 (43)	0.8 (16)	1.4 (27)	
Conditional probability for PTSD	18.6 (8)	25.0 (4)	14.8 (4)	1.7 (0.5–5.8)
Conditional probability for MDD	9.3 (4)	18.8 (3)	3.7 (1)	5.1 (0.6–44.6)
Serious illness	0.7 (14)	0.3 (6)	0.4 (8)	
Qualifying trauma	0.6 (11)	0.2 (4)	0.4 (7)	
Conditional probability for PTSD	18.2 (2)	50.0 (2)	0.0 (0)	
Conditional probability for MDD	9.1 (1)	25.0 (1)	0.0 (0)	
Disaster/fire	0.6 (11)	0.3 (6)	0.3 (5)	
Qualifying trauma	0.4 (8)	0.2 (4)	0.2 (4)	
Conditional probability for PTSD	12.5 (1)	25.0 (1)	0.0 (0)	
Conditional probability for MDD	12.5 (1)	25.0 (1)	0.0 (0)	
'Don't want to talk about it'	0.5 (10)	0.2 (5)	0.3 (5)	
Qualifying trauma	0.4 (8)	0.2 (4)	0.2 (4)	
Conditional probability for PTSD	12.5 (1)	25.0 (1)	0.0 (0)	
Conditional probability for MDD	25.0 (2)	50.0 (2)	0.0 (0)	

MDD, major depressive disorder; PTSD, post-traumatic stress disorder; RR, relative risk.
1. Relative risk of PTSD/MDD when trauma occurred in childhood.
2. Rates of endorsement of DSM–IV A1 trauma criterion.
3. Rates of trauma fulfilling the full DSM–IV (A1+A2) trauma definition.
4. Refers to qualifying trauma; conditional probabilities for PTSD.
5. Refers to qualifying trauma; conditional probabilities for MDD.

PTSD and 19.2% for major depressive disorder. Accordingly, for the comprehensive category 'any traumatic event', there was no significant difference between conditional probability for PTSD (14.9%) and conditional probability for major depressive disorder (13.4%; $\chi^2(1)=0.30$, $P=0.58$).

Overall, the PTSD prevalence rate of the total sample was 3.2%. The prevalence for trauma-related major depression in the total sample was 3.0%; however, if trauma is not taken into consideration, the overall (non-trauma-related) prevalence of major depression in the total sample was 10.3% ($n=203$).

Table 2 Age-related risk for disorders, mean age at trauma and general assessment of functioning in three diagnostic groups

	Diagnostic group		
	PTSD ($n=45$)	PTSD/MDD ($n=18$)	MDD ($n=43$)
Risk of disorders: [OR (95% CI)]			
Trauma ⩽12 years	0.91 (0.48–1.69)	2.85 (1.05–7.71)	5.18 (2.49–10.78)
Trauma ⩾13 years	1.10 (0.59–2.06)	0.35 (0.13–0.95)	0.19 (0.09–0.40)
Age at trauma, years: mean (s.d.)	13.8* (4.41)	9.9 (5.31)	9.8† (4.48)
GAF score: mean (s.d.)[1]			
Past year[1]	76.5* (13.48)	66.7 (12.72)	73.4 (11.65)
Current[1]	79.5* (12.56)	68.4 (14.12)	79.9* (9.55)

GAF, Global Assessment of Functioning; MDD, major depressive disorder; PTSD, post-traumatic stress disorder.
1. High values indicate better functioning.
* $P<0.05$ *v.* PTSD/MDD group; † $P<0.05$ *v.* pure PTSD group.

Age specific risks of PTSD and major depressive disorder

Table 1 also includes comparisons of the two age groups. In accordance with our prediction, the probabilities for A1 criterion of any traumatic event differed between the age groups ($\chi^2(1)=12.22$, $P<0.001$), with more cases in the adolescent group than in the child group (288 *v.* 210). The conditional probability of PTSD for any traumatic event did not differ between the age groups (17.0% *v.* 13.3%; $\chi^2(1)=0.14$, $P=0.71$), with a non-significant relative risk of 1.3. For major depressive disorder, both the estimated relative risk (3.6; 95% CI 2.09–6.22) and the conditional probability (23.3% *v.* 6.5%; $\chi^2(1)=12.07$, $P=0.001$) indicated a higher risk of developing major depression when trauma occurred in childhood. The trauma category 'witnessing trauma' had a relative risk of 9.7 for subsequent major depressive disorder, with 36.0% conditional risk for the younger group and 3.7% for the older group ($\chi^2(1)=6.40$, $P=0.01$). For physical attack the relative risk was 14.0, with significant differences in conditional probabilities for the different age groups (childhood trauma 28.6% *v.* adolescent trauma 2.0%; $\chi^2(1)=5.44$, $P=0.02$).

The sample was then divided into three groups: PTSD only ('pure PTSD'), trauma-related major depressive disorder only ('pure major depressive disorder') and a mixed PTSD/trauma-related major depressive disorder group. Table 2 shows the odds ratios of these groups for the two age groups. In accordance with our prediction, the odds ratio for pure major depressive disorder is increased in the childhood trauma group and decreased in the adolescent trauma group. There was no difference in odds ratios between the age groups for pure PTSD.

The age-dependence hypothesis is further corroborated by the difference between the diagnostic groups of pure PTSD and pure major depressive disorder with regard to the mean age at trauma, with an age for the PTSD group of 13.8 years compared with 9.8 years for the major depressive disorder group and 9.9 years for the mixed group ($F_{(2,103)}=8.36$, $P<0.001$).

Finally, analyses of psychosocial functioning (GAF rating) during the current and previous year revealed significant differences between the three groups (Table 2). For current GAF, analysis of variance indicated significant group differences ($F_{(2,100)}=6.83$, $P=0.002$). In *post hoc* analyses, the comorbid group showed the lowest level compared with the PTSD or major depressive disorder groups, whereas the GAF ratings of the pure PTSD and pure major depressive disorder groups did not differ.

DISCUSSION

Age-differential pathways

The main goal of this study was to investigate age-differential conditional probabilities of developing either major depression or PTSD after traumatisation. We were able to show that experiencing a traumatic event in childhood (up to age 12 years) is related to higher rates of major depression than is experiencing a traumatic event in adolescence (after age 13 years). This age-related difference could not be found for PTSD. In other words, there is a higher probability of developing major depressive disorder if a trauma is suffered during childhood than if the trauma occurs in adolescence. The finding of childhood trauma being related to affective disorder is in line with results from neurobiology (Heim & Nemeroff, 2001) and developmental psychopathology (Pynoos *et al*, 1999). Developmental psychological studies of the generation of intense negative emotions indicate ways in which childhood traumatic experiences might challenge maturing mechanisms of emotional or mood regulation. Thus, the findings indicate that traumatic experiences in children are processed differently from those in adults, resulting in a slightly different phenotype and sequelae of childhood PTSD (Pynoos *et al*, 1999). Heim & Nemeroff (2001) found that severe stress early in life is related to greater sensitivity of the hypothalamic–pituitary–adrenal axis to stress in adulthood, which underlies greater vulnerability to major depression. Furthermore, epidemiological research has confirmed the aetiological role of childhood trauma in later psychopathological disorder: Kendler *et al* (2002) showed childhood sexual abuse to be a major aetiological pathway within a multifactorial model.

A complementary explanation of our results could refer to the fact that the length of time elapsing between the reported trauma and the assessment of psychopathological state can also affect the degree of depression. The natural history of response to trauma seems to indicate that the response begins with anxiety symptoms and then – possibly mediated by functional impairment and resulting vulnerabilities – evolves towards depression (Wittchen *et al*, 2000). However, we consider this explanation to be of limited value, as it does not

explain why the group of respondents traumatised in childhood separate into a pure major depressive disorder group and a comorbid PTSD and major depressive disorder group.

Prevalences of trauma and PTSD

The rates of exposure to traumatic events and prevalences for PTSD can be seen as meaningful with regard to previous studies (Kessler *et al*, 1995; Breslau *et al*, 1998; Perkonigg *et al*, 2000). Our population-based sample of young women (aged 18–24 years) showed a trauma prevalence (DSM A1 criterion) of 25.3% and a PTSD prevalence rate of 3.4%. Another study in Germany (Perkonigg *et al*, 2000) with a sample aged 14–24 years found a somewhat lower trauma prevalence (DSM A1 criterion) of 17.7% and a PTSD prevalence rate of 2.2% for female participants.

In the USA the National Comorbidity Survey, using the somewhat more liberal DSM–III–R algorithm, reported a trauma prevalence of 51.2% and a PTSD prevalence of 10.3% for women aged 15–24 years (Kessler *et al*, 1995). Breslau *et al* (1991) reported similarly high prevalence rates for PTSD in a sample of mainly middle-aged women in Detroit: trauma prevalence was 40% and PTSD prevalence was 13.8%. Only the study by Cuffe *et al* (1998) on older adolescents in the USA reported lower prevalence rates, comparable with the range of findings from studies in Germany. The greater differences of the National Comorbidity Survey and Detroit area studies may reflect substantial changes in the definition of PTSD from DSM–III–R to DSM–IV, as well as true differences between study populations, such as considerably lower event rates of natural disasters, threat with weapons, and witnessing such events, in the different geographical regions of the studies. Interestingly, our study showed similar conditional risks of developing PTSD for the particular trauma event categories to those reported by Kessler *et al* (1995), Breslau *et al* (1991) and Perkonigg *et al* (2000): for example, for rape the risks were 55%, 49% and 52%, respectively, compared with 52% in the adolescent group in the present study.

Major depression and comorbidity with PTSD

For trauma-related major depression there are fewer published studies available. In the study by Mullen *et al* (1993) on childhood sexual abuse before age 13 years, only 13% of participants reported a major depressive disorder; our study shows a prevalence of major depressive disorder of 40% after rape and 15% after molestation. It could be speculated that these differences are due to diagnostic algorithms and definitions of events. In addition, the data of Mullen *et al* (1993) suggest that greater severity, frequency and duration of abuse result in an increased likelihood of subsequently developing depression. This might lead to the conclusion that our definition of rape or molestation as trauma may be significantly different from theirs.

In our sample, we found relatively low comorbidity rates of PTSD and major depression: 29% of the women with PTSD also had major depressive disorder, and 32% of the women with major depressive disorder also had PTSD. This indicates lower comorbidity rates than in other studies (Bleich *et al*, 1997; Goenjian *et al*, 2000). In our sample, comorbidity rates may not be as marked because of the young age of the participants. Wittchen *et al* (2000) provided evidence that comorbid disorders are developed and maintained particularly in extended, untreated, chronic courses, typical of middle-adulthood samples (Deering *et al*, 1996). Our finding of the lowest levels of psychosocial functioning in the comorbid group may point to the fact that young women suffering from more than one trauma-related disorder may struggle with a larger range of mental health problems and their distal stress consequences (Pynoos *et al*, 1999).

Limitations

There are various limitations to the present study. First, the sample consisted entirely of women, and it has been shown that the aftermath of trauma differs substantially between the genders (e.g. Springer & Padgett, 2000). Second, the response rate of the study was less than 40%. The main reason for this low response rate is probably rooted in the macrocontext of the study, which was conducted in Dresden, in the eastern part of Germany. Because of economic and other problems relating to the transformation of the political system following the demise of communism, many of those living in this part of the country are unwilling to participate in psychiatric studies (Maercker & Herrle, 2003). Specific reasons for non-participation include the scarcity of telephones at the time of the assessment (mid-1990s), high levels of economic migration to other parts of Germany, and a general reluctance to allow personal data to be reported – the legacy of years of surveillance by the East German secret security police. A third limitation was that we assessed trauma retrospectively from adults; numerous studies have suggested that such data are subject to recall bias (Maughan & Rutter, 1997). If the errors introduced in our assessment were random, this would attenuate the true associations. However, biases that would exaggerate the true associations are also possible. Fourth, the methodology differed somewhat from previous epidemiological studies on trauma consequences. Although we used DSM–IV criteria, we used the more uncommon structured interview version, originally developed for the assessment of anxiety disorders (ADIS–IV–L). Trauma categories were first assessed by using the participants' idiosyncratic terms and later classified into categories. There is no information available concerning the reliability of this method for assessing personal trauma in an epidemiological study, although the trauma prevalence rates in our study were comparable in range to those previously published. Fifth, although our study had the advantage of applying an age limit between childhood and adolescence based on developmental psychological literature, the inflexible application of this limit remains largely conventional. In developmental psychology age is regarded as a carrier variable for various psychodevelopmental processes. Further research should look for more appropriate markers (e.g. maturation of emotional or physiological regulation) in childhood and adolescent development to explain differential effects. Furthermore, since PTSD symptoms decrease over time and depression normally increases in this age group, the study may overemphasise depression as an outcome of traumatic stress in the younger age group. Finally, psychopathological outcomes other than PTSD and major depressive disorder were not investigated. Other important sequelae of childhood traumatisation (e.g. alcohol and drug misuse, anxiety disorders, borderline personality disorder) would be worth following up in a similar age-stratified study design.

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CLINICAL IMPLICATIONS

- People with a history of childhood or adolescent trauma may develop not only post-traumatic stress disorder (PTSD) but also major depression, either alone or in combination with PTSD.
- In patients with persistent major depression, clinicians should also enquire about traumatic experiences in childhood in order to obtain a comprehensive record of possible aetiological factors.
- The probability of developing PTSD after exposure to a traumatic event varies with other epidemiological findings, from about 4% after serious accidents to about 50% after rape experienced in adolescence.

LIMITATIONS

- The sample was entirely female, and it has been previously shown that the psychiatric sequelae of trauma differ between the genders.
- The retrospective nature of the trauma report may affect the reliability of the study.
- The low response rate of less than 40% limits the generalisability of results.

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