

## Features of childhood sexual abuse and the development of psychiatric and substance use disorders

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**Background** Childhood sexual abuse (CSA) is associated with an increased risk of subsequent psychiatric disorders.

**Aims** To explore the risk associated with features of CSA and examine whether specific associations exist between particular profiles of CSA and the development of specific syndromes.

**Method** In a population-based sample of adult female twins, we used logistic regression to explore the association between features of CSA (reported by the twin and her co-twin) and lifetime major depression, generalised anxiety disorder, bulimia nervosa, panic disorder and alcohol and drug dependence.

**Results** In univariate and stepwise multiple regressions, patterns of predictors differed, although not significantly, across diagnoses. Greater risk was associated with attempted or completed intercourse, the use of force or threats, abuse by a relative, and a negative response by someone who was told about the abuse. Similar patterns were observed with co-twin reports.

**Conclusions** Specific features of CSA differentially increase risk of later psychopathology; however, there do not appear to be unique predictive relationships between features of CSA and the emergence of specific psychiatric disorders.

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Population-based studies indicate that childhood sexual abuse (CSA) increases the risk for psychopathology (Browne & Finkelhor, 1986; Fergusson & Mullen, 1999). CSA appears to increase risk for a number of psychiatric and substance use disorders, rather than being selectively associated with any particular syndrome (Fergusson & Mullen, 1999). In the initial report from this population-based sample of female twins (Kendler *et al*, 2000), we found that self-reported CSA was associated with increased risk for six psychiatric and substance use disorders, even when controlling for background family factors, and that the odds ratios increased monotonically with severity of abuse. Moreover, in twin pairs that were discordant for CSA, the exposed twin was consistently at higher risk of illness. In the present study, focusing only on individuals who experienced some form of CSA, we explored the risk associated with a series of features of CSA experiences. We also examined whether any specific associations existed between particular profiles of CSA and the later development of specific syndromes, or if the effects were more consistent with CSA as a non-specific risk factor for later psychopathology.

### METHOD

#### Ascertainment and interviews

Participating twins came from an on-going investigation of the genetic and environmental risk factors for common psychiatric and substance use disorders in female–female twin pairs ascertained from the population-based Virginia Twin Registry. The ascertainment and follow-up in this sample have been outlined elsewhere (Kendler *et al*, 1992c; Kendler & Prescott, 1998; Kendler & Prescott, 1999). Briefly, the female–female twin pairs derived from two related samples, born from 1934 to 1974. Twin pairs became eligible to participate if both members had previously

responded to a mailed questionnaire, the response rate to which was 64%. Eighty-eight per cent of our sample was first interviewed face to face in 1987–1989 and has subsequently been the subject of three additional telephone interview waves. The last of these waves was completed in 1995–1997, an average of 92 (s.d.=7) months after their first assessment. The remainder of our female–female twin sample was first interviewed face to face in 1992–1994 and assessed a second time (with the same interview given to the rest of the sample in Wave 4) by telephone in 1996 and 1997.

Clinically experienced interviewers were trained for 40 hours and received regularly scheduled review sessions over the course of the study. Psychiatric and substance use disorders were diagnosed by personal interview using an adaptation of the Structured Clinical Interview for DSM–III–R (SCID) (Spitzer *et al*, 1988) and DSM–III–R criteria (American Psychiatric Association, 1987) with two exceptions. First, a 1-month rather than 6-month minimum duration of illness for generalised anxiety disorder (GAD) was used (Kendler *et al*, 1992a). Second, diagnostic hierarchies were not used. Our assessment of drug dependence individually examined seven substance classes: cannabis, sedatives, stimulants, cocaine, opiates, hallucinogens and other. Although we collected information on the lifetime diagnosis of phobic disorders in this sample, we do not report those here because the early onset of many of the phobias (Kendler *et al*, 1992b) makes a causal interpretation of observed associations with CSA problematic.

A number of psychiatric and substance use disorders were assessed multiple times in these twins. In these analyses, we utilised lifetime diagnoses of major depression, GAD and alcohol and drug dependence as assessed at the fourth interview. Lifetime panic disorder and bulimia nervosa were assessed only at the earlier interviews (Waves 1 and 3) and so those diagnoses were used here. Further details of the diagnostic algorithms and diagnostic reliability appear in the literature (Kendler *et al*, 1991, 1992a,c,d, 1993; Kendler & Prescott, 1999).

Our Wave 2 interview asked the twins whether they would be willing to answer questions about CSA and, if so, by which method they would prefer this information to be gathered. Only 0.8% of the women said they would not cooperate with such a survey. Of the 1337 twins who stated a clear preference on mode of assessment,

108 (8.1%) preferred face-to-face interview, 229 (17.1%) a phone interview and 1000 (74.8%) a postal questionnaire. Therefore, we assessed CSA by postal questionnaire as part of the Wave 4 assessment.

### Definition of CSA

Our assessment was based on the questionnaire developed by Mullen and colleagues (Martin *et al*, 1993). The precise wording of our initial item was:

"Before you were 16, did any adult, or any other person older than yourself, involve you in any unwanted incidents like:

- (a) inviting or requesting you to do something sexual;
- (b) kissing or hugging you in a sexual way;
- (c) touching or fondling your private parts;
- (d) showing their sex organs to you;
- (e) making you touch them in a sexual way;
- (f) attempting or having sexual intercourse."

In this report, we include the 412 women who were classified as having experienced 'broad' CSA, which includes a positive response to any of the above items.

### Definitions of specific CSA-related predictors

The predictor variables that we used were: (a) age at time of first abuse/intercourse (a dichotomous variable including attempted or completed intercourse *v.* other forms of abuse); (b) the number of perpetrators (one *v.* more than one); (c) age of perpetrator; (d) gender of perpetrator (male *v.* female or both); (e) whether the perpetrator was a relative (biological or step) or non-relative; (f) the use of force or threats; and (g) a seven-point scale reflecting how much the incident affected the victim at the time. For those individuals who did report the abuse, we created a variable called 'negative response', which reflected whether the person she told did not believe, did not support, or punished her. Finally, for those individuals who did report, we coded whether reporting put a stop to the abuse.

### Co-twin report

For a subset of predictor variables, we also had co-twin report on the experiences of CSA in her twin. The variables that were available from co-twin report were: intercourse (a dichotomous variable including attempted or completed intercourse *v.* other forms of abuse), number of perpetrators (one *v.* more than one), gender of perpetrator (male *v.* female or both), whether

perpetrator was a relative *v.* non-relative, the use of force or threats.

### Analyses

We examined the association between specific features of CSA and individual psychiatric and substance use disorders using univariate logistic regression. To correct for the correlated structure of the data (i.e. twin pairs), we utilised the GEE option as operationalised in the SAS routine GENMOD (SAS Institute, 1989, 1996). Odds ratios and their associated confidence intervals (CIs) were obtained. To examine the relation between specific features of CSA and comorbidity, we predicted, in logistic regression, the risk for having two or more of the six individual diagnoses (Kendler *et al*, 2000). We then conducted a series of stepwise multiple regressions to examine the relative importance of the various features of CSA in predicting the different diagnostic outcomes. For these analyses, we set the criteria for entry and retention in the regression equation at 0.05.

In order to determine whether the odds ratios differed significantly across the six diagnostic categories, we computed two logistic regressions – one which estimated the regression coefficients separately for each diagnostic category and one which estimated one common regression coefficient. We then compared the difference between the two models using the 2 log likelihood as a  $\chi^2$  goodness-of-fit test. This allowed us to determine whether there was a significant improvement in fit when separately estimating the regression coefficients. No improvement in fit indicates the lack of significant differences in the odds ratios across diagnostic categories.

We then calculated the agreement between twin and co-twin report of the features of CSA in those twins for whom reports were available from both twins. In addition, we conducted a series of logistic regressions using the same procedures outlined above using co-twin data as predictors of psychopathology in the abused twin.

## RESULTS

### Characteristics of CSA

Table 1 presents the characteristics of the CSA experienced by the 412 female twins who are the subject of this report. Age at the time of first CSA ranged from under 5 to 15 years, with the majority of individuals being between 12–15 years old. We

dichotomised severity of CSA based on the presence of attempted or completed intercourse (28%) *v.* all other forms of abuse. Approximately one-third of respondents reported more than one perpetrator and approximately 10% reported either female only or both male and female perpetrators. The age of perpetrators also varied considerably, with the majority of twins reporting being victimised by individuals between 25–49 years of age. Perpetrators who were related to the victim were identified in 52% of cases and 35% reported that force or threats were involved with the abuse. How much the abuse affected the victims at the time ranged widely from no effect at all (12%) to being affected a great deal (18%). Respondents were asked to characterise the nature of the response of people to whom they reported the abuse. Whereas the majority of individuals reported being believed and supported, 15.7% reported being either disbelieved, not supported or punished (negative response). Of those who told someone, about 71% claimed that reporting effectively stopped the abuse.

### Univariate predictors of psychiatric and substance use disorders

Table 1 presents the odds ratios and significance levels for the univariate logistic regressions predicting the six disorders from the individual CSA characteristics. Although results differed somewhat across diagnoses, a few patterns emerged. In general, the presence of attempted or completed intercourse, the use of force and threats, how strongly the victims were affected at the time, and a negative response by someone they told were associated with increased risk of psychopathology. Likewise, if telling someone effectively stopped the abuse, reduced risk of psychopathology was observed.

### Stepwise multiple regressions

In order to determine the most parsimonious set of predictor variables for each diagnostic category, we performed a series of stepwise multiple regressions including as predictor variables age at time of abuse, attempted or completed intercourse, more than one perpetrator, age of perpetrator, gender of perpetrator, abuse by a relative, whether forced or threatened, a negative response, and whether reporting was effective in stopping the abuse. In these analyses, no significant predictors were retained for alcohol dependence.

**Table 1** Odds ratios (and 95% confidence intervals) from univariate logistic regressions to predict diagnoses from childhood sexual abuse (CSA) items (n=412)

Item	Major depressive disorder (n=215)	Generalised anxiety disorder (n=109)	Bulimia nervosa (n=13)	Panic disorder (n=67)	Alcohol dependence (n=61)	Drug dependence (n=45)	Two disorders (n=141)	SUM <sup>1</sup>	$\chi^2$ , P d.f.=5
Age at time of abuse	0.92** (0.87–0.98)	0.98 (0.92–1.05)	0.86* (0.74–0.99)	0.96 (0.89–1.04)	1.02 (0.94–1.11)	0.99 (0.90–1.09)	0.97 (0.91–1.03)	0.89	9.02, 0.11
Attempted or completed intercourse v. other forms of CSA	2.07** (0.31–3.26)	1.76** (1.13–2.74)	3.16* (1.05–9.55)	1.69 (0.94–3.03)	1.61 (0.91–2.87)	2.44** (1.28–4.66)	2.89*** (1.87–4.43)	1.47***	2.23, 0.82
More than one perpetrator	1.67** (1.11–2.50)	1.39 (0.88–2.19)	1.28 (0.41–3.97)	0.93 (0.51–1.68)	1.18 (0.67–2.10)	0.96 (0.49–1.88)	1.31 (0.86–1.99)	1.15	4.35, 0.50
Age of perpetrator									
Under 15 years	1.19 (0.77–1.85)	1.12 (0.69–1.83)	1.87 (0.61–5.78)	1.16 (0.65–2.08)	1.05 (0.56–1.97)	0.92 (0.45–1.88)	1.03 (0.66–1.60)	1.07	1.43, 0.92
15–18 years	1.37 (0.89–2.11)	1.08 (0.68–1.70)	1.36 (0.49–4.51)	0.94 (0.50–1.75)	0.71 (0.36–1.41)	1.45 (0.74–2.86)	1.34 (0.88–2.04)	1.07	3.91, 0.86
19–24 years	0.86 (0.48–1.53)	0.97 (0.52–1.80)	1.31 (0.78–6.04)	0.50 (0.18–1.38)	2.33* (1.12–4.85)	1.92 (0.82–4.54)	1.66 (0.94–2.94)	1.10	9.69, 0.08
25–40 years	1.04 (0.68–1.58)	1.25 (0.79–1.98)	0.57 (0.15–2.12)	0.99 (0.56–1.77)	1.15 (0.64–2.04)	0.98 (0.47–2.01)	1.14 (0.74–1.77)	1.04	2.00, 0.85
Gender of perpetrator(s)									
Male v. female or both	0.49* (0.25–0.97)	0.91 (0.43–1.92)	1.33 (0.17–10.25)	1.38 (0.54–3.51)	0.96 (0.41–2.28)	0.52 (0.25–1.10)	0.74 (0.38–1.44)	0.87	7.03, 0.22
Abuse by a relative	1.69** (1.14–2.51)	1.64* (1.01–2.65)	1.54 (0.50–4.77)	1.13 (0.65–1.97)	1.23 (0.69–2.18)	1.73 (0.89–3.47)	1.85** (1.19–2.88)	1.26**	2.13, 0.83
Relative v. non-relative or stranger									
Forced or threatened	1.64* (1.08–2.49)	1.39 (0.90–2.15)	4.33* (1.31–14.31)	2.33** (1.39–3.92)	1.54 (0.91–2.63)	2.24** (1.19–4.22)	1.91** (1.27–2.87)	1.40***	5.86, 0.32
How affected at the time	0.81*** (0.74–0.90)	0.84** (0.75–0.94)	0.86 (0.66–1.11)	0.83** (0.72–0.95)	0.97 (0.84–1.09)	0.81* (0.68–0.96)	0.82*** (0.74–0.91)	0.70***	4.34, 0.50
Negative response by someone they told	1.46 (0.81–2.63)	2.14** (1.19–3.85)	1.64 (0.43–6.22)	2.70** (1.38–5.27)	2.20* (1.10–4.38)	3.65*** (1.69–7.87)	2.37* (1.13–4.10)	1.55***	4.64, 0.46
If told, did abuse stop?	0.35** (0.16–0.72)	0.35** (0.17–0.70)	0.41 (0.08–2.11)	0.61 (0.26–1.41)	0.79 (0.35–1.79)	0.61 (0.23–1.63)	0.29*** (0.14–0.58)	0.67**	4.68, 0.46

\* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

1. Odds ratio from common regression model.

2.  $\chi^2$  goodness of fit comparing logistic regression of common estimate across diagnoses with logistic regression of separate estimates across diagnoses.

For major depressive disorder, the only variable that remained in the equation was whether intercourse was attempted or completed ( $\chi^2=5.41$ , d.f.=1,  $P=0.02$ ). For GAD, someone having a negative response was the only variable that remained in the model ( $\chi^2=8.47$ , d.f.=1,  $P=0.004$ ). For bulimia nervosa and panic disorder the patterns of results were the same with the only significant predictor being the use of force or threats ( $\chi^2_{BN}=4.15$ , d.f.=1,  $P=0.04$ ;  $\chi^2_{Panic}=7.53$ , d.f.=1,  $P=0.006$ ). For drug dependence, whether someone had a negative response ( $\chi^2=9.83$ , d.f.=1,  $P=0.002$ ) remained in the regression equation. Finally, having two or more diagnoses was significantly predicted by whether intercourse was attempted or

completed ( $\chi^2=11.1$ , d.f.=1,  $P=0.0009$ ) and whether someone had had a negative response ( $\chi^2=8.32$ , d.f.=1,  $P=0.004$ ).

### Specificity of estimates

We then compared two separate logistic regression models to determine whether there was a significant improvement in fit when separately estimating the regression coefficients. The first model included all of the disorders in a common regression coefficient and the second model included regression coefficients estimated separately for each disorder. As can be seen in the last column of Table 1, there were no significant differences observed for any of the CSA variables between the two regression

models. The final summary odds ratios indicate significantly elevated risk across all disorders associated with attempted or completed intercourse, abuse by a relative, the use of force or threats, how affected the victim was at the time, and negative response. There was a significant protective effect when reporting was effective in stopping the abuse.

### Co-twin reports of features of CSA

Pairwise data were available on a variable number of twin pairs (between 100 and 226 individuals), depending on whether the co-twin responded to any given CSA item regarding the experiences of her co-twin. For example, a co-twin might have

responded 'yes' to a gate question regarding whether her twin had ever been abused, but either not responded or responded 'don't know' to the more detailed questions about the perpetrator and whether force was used. 'Don't know' responses were coded as missing. We calculated the agreement between twin and co-twin report on the five variables that were common to the two assessments. Although most associations between the twin and co-twin report were significant, the level of agreement varied considerably (Table 2).

Finally, we calculated the odds ratios for the six disorders and comorbid condition (at least two of the six diagnoses) as predicted by the five variables in the co-twin report (data not shown). Given that the effective sample size for some of the comparisons was quite low, we were unable to conduct stepwise multiple regressions or explore the specificity of estimates as we had done with the twin self-report data. In this reduced set of predictors, however, attempted or completed intercourse and being forced or threatened were associated with the highest odds ratios for psychopathology in the twin. Abuse by a relative significantly increased risk only for GAD.

## DISCUSSION

### Characteristics of CSA

The nature of CSA reported by this sample suggests that the majority of individuals were abused by male perpetrators, ranging in age from under 15 to over 60 years, that intercourse was attempted or completed in approximately one-quarter of cases, and that both multiple perpetrators and the use of force or threats occurred in approximately one-third of cases. These characteristics are broadly consistent with prior epidemiological investigations (Fergusson & Mullen, 1999), with one notable exception. In the present sample, 52% of women reported CSA by a relative, which is considerably higher than the reported weighted average of 10.4% across other population-based investigations (Fergusson & Mullen, 1999). These rates may vary depending on the interpretation of the term relative. In our study, biological relatives as well as step-relatives would be included in this category, which may have contributed to our high rates.

In the initial report from this series (Kendler *et al*, 2000), we reported that CSA increased the risk of developing later

**Table 2** Agreement between twin and co-twin report on features of childhood sexual abuse

Variable	$\chi^2$ or FET <sup>1</sup>	P	Contingency coefficient	$\kappa$ (95% CI)
Attempted or completed intercourse	31.96	<0.0001	0.35	0.33 (0.18 to 0.47)
More than one perpetrator	8.77	0.003	0.29	0.30 (0.10 to 0.49)
Gender of perpetrator	FET	0.35	0.04	-0.04 (-0.19 to 0.11)
Abuse by a relative	41.67	<0.0001	0.52	0.60 (0.45 to 0.75)
Forced or threatened	2.69	0.10	0.12	0.11 (-0.03 to 0.24)

1. Values are Fisher's exact test (FET) when cell sizes are less than 5.

psychiatric disorders and that the effect appeared to be largely non-specific. In the present study, we narrowed our focus of inquiry by examining only those women who had experienced some form of sexual abuse and asking: (a) whether certain facets of CSA are more strongly associated with later psychopathology; and (b) whether a specific relationship can be observed between aspects of CSA and the later development of certain psychiatric syndromes.

### Severity of abuse associated with greater risk for psychopathology

Prior investigations suggest that severe abuse involving attempted or completed penetration, longer duration of abuse, physical restraint or violence and incestuous relationship with the abuser were associated with the development of greater adjustment difficulties (Mullen *et al*, 1993; Romans *et al*, 1994, 1995; Spaccarelli, 1994; Spaccarelli & Kim, 1995; Fergusson, 1996; Dinwiddie *et al*, 2000). Our findings confirmed these results. The risk of psychopathology was greater in the present sample if intercourse was attempted or completed, if the perpetrator was related to the victim, if force or threats were used, and if someone the victim told about the abuse either did not believe her, did not support her or punished her for the abuse. We observed no increased risk of later psychopathology related to the age at which an individual was first abused, the number of, or the gender of the perpetrators.

### Factors that are protective against the development of psychopathology

Prior investigations have also shown that supportive family environments can reduce the risk of negative outcomes in individuals who are victims of CSA (Romans *et al*,

1995; Spaccarelli & Kim, 1995). In the present study, one variable that conferred protection against the development of psychiatric disorders in individuals who had been abused was whether reporting was effective in putting an end to the abuse. Endorsement of this variable indicates first that the victim chose to report and second, that the individual to whom they reported was both supportive and active in ending the abusive relationship. The second feature that served a protective effect was how strongly the individual was affected at the time of the abuse. Being less adversely affected at the time was protective; however, it is important to note that the degree to which one is affected is likely to be a function of several of the above measures that are indicators of severity of abuse, as well as other pre-existing variables that contribute to positive mental health such as strong family relationships or robust self-esteem.

This pattern of findings, together with previous studies, highlights the importance of not conceptualising CSA as a universally and homogeneously traumatic event, but rather recognising that both the nature and impact of CSA vary along several continua and that the long-term impact of CSA-related events is affected both by characteristics of the CSA as well as the presence of protective events such as the response of others to the reporting of the abuse experience.

### Specificity of the effects of CSA

The issue of specificity of CSA has not been widely examined. Although clinical studies of homogeneous populations (e.g. patients with eating disorders or substance abuse) have consistently reported greater prevalence of CSA in individuals with those disorders in comparison to the general population (Briere & Runtz, 1988; Bushnell *et al*, 1992; Mullen *et al*, 1993; Romans *et al*, 1995; Fergusson *et al*, 1996; Wonderlich

*et al*, 1997), epidemiological studies suggest that CSA acts more as a non-specific risk factor for psychiatric disorders, possibly by lowering the threshold for expression of traits to which an individual is predisposed by other genetic and/or environmental risk factors. Our initial report (Kendler *et al*, 2000) was consistent with a non-specific risk factor hypothesis in that the odds ratios for psychiatric disorders varied somewhat in magnitude; however, the confidence intervals were generally overlapping across diagnoses.

### Are certain patterns of abuse uniquely predictive of specific disorders?

Given that the effect of CSA appears to be non-specific, we embarked on a more detailed analysis to address whether specific features of a CSA experience might be uniquely predictive of the form of later psychopathology (e.g. might abuse at a young age predispose to depression or anxiety whereas abuse in the teenage years might increase the risk of developing a substance use disorder?). Although the univariate analyses suggested differences in patterns of predictors across diagnoses, there was no evidence that the odds ratios for any of the CSA-related variables differed significantly across diagnostic categories. Thus, not only does CSA taken as a global construct appear to have a non-specific effect on the development of psychopathology, but specific aspects of CSA do not appear to uniquely predict specific psychiatric disorders.

These findings argue against the existence of a unified post-CSA syndrome with an identifiable symptom profile. Rather, CSA tends to function more as a non-specific risk factor that is associated with increased later risk for a range of psychiatric and substance use syndromes. The magnitude of risk can be modified by protective factors both intrinsic and extrinsic to the victim. Moreover, there is no evidence that certain patterns of abuse are uniquely associated with the later emergence of specific psychiatric syndromes.

Conversely, it is unlikely that the presence of various psychiatric disorders predisposed the victims to experience CSA as we have previously shown that the onset of depression and alcohol dependence occurred either during the same year or subsequent to the experience of CSA in

### CLINICAL IMPLICATIONS

- Certain forms of childhood sexual abuse (CSA) are particularly detrimental, most notably attempted or completed intercourse, the use of threats or force, abuse by a relative, and negative response by someone who is confided in about the abuse.
- A supportive response that effectively stops the abuse appears to be protective against later psychopathology.
- There does not appear to be a specific 'sexual abuse syndrome'. CSA in general poses a non-specific risk for the development of psychiatric disorders and there are no characteristic profiles of CSA that uniquely predict certain psychiatric disorders.

### LIMITATIONS

- The conclusions drawn from this investigation are limited to female victims of CSA.
- The information collected on features of CSA was entirely retrospective and for many participants this required recall of events that may have occurred over two decades prior. Memory decay, elaboration of events and 'working through' of the CSA experience may have, in different ways, affected the reliability of reporting of CSA-related events.
- In this study, we did not explore the temporal relation between CSA and the onset of psychopathology.

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95.6 and 100% of the cases, respectively (Kendler *et al*, 2000).

### Co-twin report

In a subset of twins, co-twin report was available regarding the abuse experiences of their twin. In addition to missing reports and co-twins who responded 'don't know' to many of the items, agreement between twin and co-twin report was variable. In our previous report, we indicated that there was only modest agreement (contingency coefficient=0.50) between twin and co-twin report on whether CSA had occurred (Kendler *et al*, 2000). The present results indicate that as one explores the details of the CSA experience, agreement becomes even more precarious. This pattern of results is to be expected. Whereas a twin might confide in a co-twin regarding the experience of

abuse, and that piece of information might be readily recalled by the co-twin, details and specifics about the experience might either be less likely to be divulged or less likely to be recalled. None the less, the co-twin data confirmed that attempted or completed intercourse and the use of force or threats were associated with higher risk for lifetime psychopathology in the abused twin.

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