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ORIGINAL PAPER

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Early traumatic life events, parental rearing styles, family history of mental disorders, and birth risk factors in patients with social anxiety disorder

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Abstract *Objective* Childhood traumatic experiences, rearing styles, familial mental disorders and birth risk factors have been associated with the development of social anxiety disorder. *Method* Patients with social anxiety disorder (n = 50) and healthy controls (n = 120) were investigated using a retrospective interview with 203 questions. *Results* The frequency of reports of traumatic childhood experiences was significantly higher in patients than in controls, including separation from parents, parents' marital discord, sexual abuse, familial violence, childhood illness, and other factors. On a 0–10 point 'severe trauma scale' patients had significantly higher mean scores (2.0; SD 1.28) than control subjects (0.82; SD 1.1; $p < 0.0001$). Only 6 (12 %) of the social phobic patients, but 63 (52.5 %) of the controls did not report any severe traumatic events at all ($\chi^2 = 24.0$; $p < 0.0001$). Compared to controls, patients described their parents' rearing styles as significantly more unfavourable. Patients reported higher rates of psychiatric disorders in their families in general, in particular anxiety disorders, depression, and suicidality. Birth risk factors did not differ between patients and controls. In a logistic regression model, the highest contribution was noted for familial anxiety disorders. Separation from parents also had a significant, but smaller influence. There was only a trend towards a significant contribution of childhood sexual abuse. Violence in the family, parental rearing styles and birth risk factors did not contribute significantly. *Conclusions* The present data suggest that the aetiology of social anxiety disorder is multifactorial and that familial mental disorders and separation experiences are the most important contributing factors.

Key words social phobia · social anxiety disorder · developmental trauma · parental rearing styles · genetic transmission

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Introduction

Social anxiety disorder is a common and often disabling condition, with an aetiology that has yet to be established. Childhood trauma, parental rearing styles, familial and genetic factors and neurobiological dysfunctions have been discussed as possible causes contributing to the development of social anxiety disorder.

The influence of developmental trauma has not yet been investigated exhaustively. Stein et al. (1996) compared childhood physical or sexual abuse in 125 anxiety patients, 55 of whom had social phobia, with a control group. They found higher rates of abuse in the anxiety patients, but the results were not reported separately for social phobia patients. Another comparison with a control group also reported higher rates of childhood trauma in anxiety patients, but the sample only included 13 patients with 'pure' social phobia (David et al. 1995). In a comparison to panic disorder patients, Safren et al. (2002) found significantly lower rates of past childhood physical or sexual abuse in patients with social anxiety disorder. They did not compare their results with a healthy control group. Mancini et al. (1995) found no difference in the rate of childhood sexual abuse in patients with social anxiety disorder, panic disorder, generalized anxiety disorder or obsessive-compulsive disorder. In a non-clinical

sample of subjects identified as having social phobia in a representative survey, higher rates of traumatic childhood experiences were observed (Chartier et al. 2001). Tweed et al. (1989) also investigated a non-clinical sample and did not find an association between social anxiety disorder and parental death or separation. To our knowledge, a sample of 'pure' social anxiety disorder patients has not yet been compared with a healthy control group with regard to childhood trauma.

Unfavourable parental rearing styles have been associated with a variety of psychiatric disorders. In a number of studies, patients with social anxiety disorder scored both their parents as less caring, rejective and as overprotective (Arrindell et al. 1983, 1989; Bruch and Heimberg 1994; Lieb et al. 2000; Parker 1979). It was also hypothesized that traumatic conditioning episodes (e. g. having been disgraced or embarrassed in a social-evaluative situation) may provoke social anxiety disorder (Stemberger et al. 1995).

Family and twin studies converge to support an underlying genetic component to the disorder (Stein et al. 2004). First-degree relatives of patients with social anxiety disorder had a much higher risk of the disorder in a number of studies (Fyer et al. 1993; Stein et al. 1998; Stemberger et al. 1995). Children of social-phobic parents had increased rates of anxiety disorders, including social anxiety disorder (Lieb et al. 2000; Mancini et al. 1996).

Personality traits may also be transmitted via model learning. Only twin studies may disentangle genetic from environmental factors. A higher concordance rate in monozygotic twins, as compared with dizygotic twins (whose genetic material is no more homogeneous than nontwin siblings) would suggest a biological causation independent of environmental factors. One twin study examined concordance rates in six different disorders, including social anxiety disorder. This study was interpreted as not supporting the inheritance of specific disorders, such as social anxiety disorder, but showing the heritability of a general neurotic syndrome (Andrews et al. 1990). In another twin study with only 13 twins, the prevalence of social anxiety disorder was equal in cotwins of anxiety and comparison probands (Skre et al. 1993). In a larger study, however, an increased concordance rate was found in monozygotic twins compared with dizygotic twins (Kendler et al. 1992). Kendler et al. (1999) expanded these findings and corrected for the unreliability of single lifetime assessments by interviewing 1708 female twins on 2 occasions, 8 years apart, and estimated the heritability for social anxiety disorder to be 51 %.

Moreover, cognitive dimensions central to the phenomenology of social anxiety disorder have been investigated in twin and family studies. For 'shyness' higher concordance rates were found in monozygotic twins (Rose and Ditto 1983; Torgersen 1979). Shyness in adopted infants was related to shyness in their biological, but not adoptive, mothers (Daniels and Plomin 1985). A higher concordance of 'behavioural inhibition', a temperamental style seen as a precursor to social anxiety disorder (Kagan et al. 1988; Rosenbaum et al. 1991; Schwartz et al. 1999) was found in monozygotic compared with dizygotic twins (Robinson et al. 1992). Parents of children with behavioural inhibition had higher rates of social anxiety disorder (Pollock et al. 1995). 'Negative evaluation fears' were found to be heritable in a twin study by Stein et al. (2002).

In a number of investigations, abnormalities of neurobiological parameters have been found in social anxiety disorder, which reflect changes in dopaminergic, serotonergic, noradrenergic and GABAergic (gamma-aminobutyric acid) neurotransmitter systems (Coupland 2001; Li et al. 2001; van Ameringen and Mancini 2004). Preliminary neuroimaging studies suggest a striatal dopaminergic dysfunction in social anxiety disorder (Schneier et al. 2000; Tiihonen et al. 1997) or an increased blood flow in brain regions subserving bodily defence reactions to threat, such as the amygdala or the hippocampus (Fredrikson and Furmark 2004). In summary, however, studies on the neurobiology and neuroanatomy of social anxiety disorder have been sparse and inconclusive up to now.

Organic brain lesions may also play a role in the aetiology of psychiatric disorders. To our knowledge, the influence of foetal, perinatal or postnatal brain damage has not yet been investigated in patients with social anxiety disorder.

The purpose of the present study was to investigate retrospective reports on a wide range of childhood traumatic experiences, parental rearing styles, familial mental disorders, and birth risk factors in patients with social anxiety disorder and healthy control subjects matched according to age and sex.

Complex interdependencies exist among the various risk factors. An association between risk factors and outcomes does not prove causation because these associations can sometimes be explained by latent, or mediator, variables (an example: alcohol abuse is highly correlated with lung cancer, but only through the mediator variable 'smoking', which is highly correlated with both alcohol drinking and lung cancer). To determine the relative contribution of the investigated risk factors, we performed a logistic regression analysis.

Patients and methods

Eighty-two patients with social anxiety disorder (DSM-IV) treated at the Department of Psychiatry and Psychotherapy at the University of Göttingen were mailed and asked to participate in the study. Of these, thirty-two could not be traced (n = 27) or refused to take part in the study (n = 5). The remaining 50 patients were interviewed in person after confirming the diagnoses by using the German Version SCID (Structured Clinical Interview for DSM-IV (First et al. 1996, 1997; Wittchen et al. 1997). Exclusion criteria were severe current medical illness or present (or a history of) other mental disorders, including major depression, bipolar disorder, panic disorder, generalized anxiety disorder, obsessive-compulsive disorder, posttraumatic stress disorder, substance abuse or personality disorders (with the exception of avoidant personality disorder).

One-hundred and twenty subjects who were free of mental disorders according to a SCID interview were taken from a pool of 155 healthy controls in order to match patients and control subjects for age and sex. Controls were recruited from visitors to official buildings (e. g. hospitals and city halls). The mean age of patients was 39.9 (SD 10.4), the mean age of controls 40.1 (SD 13.5); the difference was not significant (t-test, $t = 0.13$, $df = 168$, $p = 0.9$; N. S.). The percentage of women was 40 % in the patient group and 52.5 % in the control group; the difference was not statistically significant ($\chi^2 = 0.9$, $p = 0.86$).

The study was approved by the local ethics committee. After giving informed consent, subjects were interviewed in person or by telephone, using a standardized questionnaire with 203 questions already used in earlier studies with other diagnostic groups (Bandelow et al. 2002, 2004;). The interviewers were not blind to whether they were interviewing patients or controls. Four types of questions were employed: questions to be answered (1) by 'yes' or 'no', (2) on a 0–4 Likert scale, where 0 = 'none' or 'very bad', 1 = 'low' or 'bad', 2 = 'moderate', 3 = 'high' or 'good', 4 = 'very high' or 'very good', (3) by a number (e. g. months of hospitalization); (4) or in the subject's own words. The questionnaire contained items concerning (1) traumatic life events during childhood from the ages of 0–5, 6–10, and 11–15 (Table 1), (2) parental rearing styles and attitudes towards the subjects (Table 2), (3) psychiatric disorders in family members (Table 3), and (4) birth risk factors. Birth risk factors included age of mother > 35, Caesarean section, low birth weight, premature birth, or perinatal complications (e. g. asphyxia). Patients were asked to describe mental disorders in their family members as exactly as possible so that the interviewer could establish the diagnosis.

To determine whether not only single events, but rather a combination of multiple severe traumatic life events was associated with social anxiety disorder, scoring was listed on the following 0–10 point "severe trauma scale", with each of the items below receiving one point:

(1) Separation from the natural mother, due to death of mother, long absence of the mother due to illness (>100 days), adoption, up-bringing in a foster home, up-bringing by other family kin or non-related persons, or long absence due to divorce or separation of parents
(2) Separation from the natural father, due to death of father, long absence of the father due to illness (>100 days), adoption, up-bringing in a foster home, up-bringing by other family members or non-related persons, long absence of the father due to war service or war imprisonment, absence due to separation or divorce of parents, or absence due to imprisonment
(3) Separation from parents due to illness of the proband (>100 days)
(4) Severe physical handicap of the subject during childhood
(5) Severe physical handicap of sibling
(6) Parents' marital problems, degree 3 or 4 on a 0–4 scale
(7) Alcohol addiction of one or both parents, degree 3 or 4 on a 0–4 scale
(8) Severe mental illness of mother or father (other than alcohol dependence), degree 3 or 4 on a 0–4 scale
(9) Violence in the family, degree 3 or 4 on a 0–4 scale
(10) Sexual molestation or abuse, including non-genital (indecent exposure, public masturbation by others, attempts to undress the respondent, unwanted sexual propositions or lewd suggestions) and genital activities (sexual fondling, attempted or completed vaginal, oral or anal intercourse)

Logistic regression was performed to determine which possible aetiological factors were most strongly associated with social anxiety disorder. Based on assumptions in the literature, the degree to which the following seven factors may contribute to the development of social anxiety disorder was analyzed:

(1) Separation from one or both parents (as defined above)
(2) Childhood sexual abuse
(3) Violence in family
(4) Birth risk factors
(5) Unfavourable parental rearing styles
(6) 1st degree relatives with a history of anxiety disorders, including panic disorder, generalized anxiety disorder, and social anxiety disorder.

Statistical calculations were done using the SAS 8.2 (SAS® Institute, Heidelberg 2001). Categorical data comparisons were made using Fisher's exact test, ordinal data were analyzed using the Wilcoxon-Mann-Whitney test, and normally distributed data using Student's t-test after applying a test for homogeneity of variances (Folded F method). Two-tailed statistical tests were used throughout. Logistic regression was performed using the PROC LOGISTIC procedure of SAS 8.2. For better clarity, also for ordinal data, the central tendencies, i. e. means, and standard deviations are shown in the tables.

In order not to further increase the number of statistical tests, results were not calculated separately for women and men.

Results

Only the significant differences between social anxiety disorder patients and healthy controls in the rates or severity of traumatic life events are listed in Table 1. The following reliability coefficients (internal consistency; Cronbach's α) were found for the different parts of the questionnaire: traumatic childhood events, 0.89, parental attitude and rearing styles, 0.81, mental disorders in the family, 0.82, and birth risk factors, 0.75. Cronbach's α of the "severe trauma scale" was found to be 0.76.

Traumatic childhood events

Separation from mother during childhood

In the patient group, hospitalizations of the mother during the subject's childhood were significantly more frequent (Table 1). Also, the duration of hospitalization, the duration of a prolonged illness preceding hospitalizations and the mean age of the child at the beginning of hospitalizations of the mother were significantly higher than in the control group.

No significant differences between patients and controls were found with regard to the percentage of probands who lost their mother during childhood, the percentage of probands who had a stepmother, age at first contact with the stepmother in months, and the relationship to the stepmother (as measured on a 0–4 scale).

Separation from father during childhood

Significantly more social anxiety disorder patients reported that their father was frequently absent (Table 1). Also, the duration of absence of the father, as rated on a 0–4 scale, was longer in the patient group.

No significant differences were found with regard to death of the father, the percentage of probands who had a stepfather, age at first contact with the stepfather in months, relationship to the stepfather (0–4 scale), frequency of hospitalization of the father, age at time of a major hospitalization in months, duration of hospitalizations in days. Absence due to war service (e. g. World War II, war in Yugoslavia etc.) or imprisonment was not significantly different either.

Table 1 Traumatic life events, significant differences between patients with social anxiety disorder (n = 50) and control subjects (n = 120). Due to missing values, percentage is given as percent of all respondents and not o all subjects

Item	Mean/CT (SD), or Number (%)		Statistic	p
	Patients	Controls		
Separation from mother				
Mother hospitalized n (%)	22 (44 %)	33 (27.50 %)	$\chi^2 = 4.4$	p = 0.048
Duration of hospitalization in days (SD)	31.7 (SD 23.6)	8.1 (SD 23.5)	U = 2290	p = 0.015
Child's age at time of major hospitalization of mother in months (SD)	37.5 (SD 51.3)	15.4 (SD 34.4)	U = 2377	p = 0.033
Duration of illness before hospitalization in days (SD)	114.3 (SD 204.90)	2.0 (SD 12.17)	U = 2588	p = 0.0009
Separation from father				
Age at death of father in months (SD)	100.8 (SD 84.7)	6.5 (SD 27.6)	U = 373	p < 0.0001
Father frequently absent n (%)	44 (89.80 %)	16 (13.45 %)	$\chi^2 = 88.1$	p < 0.0001
Father frequently absent, degree 0–4, CT (SD)	2.50 (SD 1.33)	1.77 (SD 1.48)	U = 5109	p = 0.004
Separation from both natural parents				
Mostly raised by other persons, e. g. aunt, grand-parents n (%)	17 (34 %)	6 (5 %)	$\chi^2 = 25.4$	p < 0.0001
Raised in a foster home n (%)	6 (12 %)	1 (0.83 %)	$\chi^2 = 11.2$	p = 0.003
Parents' marital problems, separation, divorce				
Marital problems, 0–4, CT (SD)	1.88 (SD 1.27)	1.15 (SD 1.38)	U = 5068	p = 0.0009
Age at separation of parents in months	122.4 (SD 35.4)	16.6 (SD 43.1)	U = 408	p < 0.0001
Age at divorce of parents in months	136.4 (SD 42.4)	15.6 (SD 43.7)	U = 409	p < 0.0001
Childhood illness				
Duration of hospitalization in days (SD)	13.9 (SD 10.8)	11.1 (SD 24.4)	U = 7693	p = 0.045
Employment of parents				
Unemployment of mother n (%)	23 (46 %)	36 (30 %)	$\chi^2 = 4.0$	p = 0.05
Age of subject in months at mother's unemployment	82.9 (SD 51.9)	29.0 (SD 66.2)	U = 933	p < 0.0001
Negative impact of mother's unemployment on family life, 0–4, CT (SD)	1.84 (SD 1.33)	0.80 (SD 1.25)	U = 5149	p < 0.0001
Violence in the family				
Violence by any family member n (%)	11 (22.45 %)	8 (6.67 %)	$\chi^2 = 8.68$	p = 0.006
Severe violence by any family member (> 2 on a 0–4 scale) n (%)	10 (22 %)	8 (6.67 %)	$\chi^2 = 6.63$	p = 0.01
Father beats child n (%)	25 (50 %)	35 (29.2 %)	$\chi^2 = 6.71$	p = 0.01
Degree of violence by father 0–4, CT (SD)	0.94 (SD 1.20)	0.45 (SD 0.78)	U = 4834	p = 0.007
Father beats mother n (%)	9 (18 %)	3 (2.50 %)	$\chi^2 = 12.9$	p = 0.001
Degree of violence by father against mother 0–4, CT (SD)	0.48 (SD 1.16)	0.06 (SD 0.42)	U = 4653	p = 0.0005
Degree of violence by mother 0–4, CT (SD)	0.70 (SD 1.07)	0.51 (SD 0.75)	U = 4393	p = 0.5
Mother beats father n (%)	4 (8 %)	2 (1.67 %)	$\chi^2 = 4.16$	p = 0.06 (Trend)
Degree of violence by mother against father 0–4, CT (SD)	0.24 (SD 0.89)	0.03 (SD 0.29)	U = 4386	p = 0.046
Violence by siblings n (%)	13 (26 %)	6 (5 %)	$\chi^2 = 15.68$	p = 0.0002
Degree of violence by siblings 0–4, CT (SD)	0.46 (SD 0.85)	0.06 (SD 0.27)	U = 4646	p < 0.0001
Sexual abuse				
Sexual abuse in total n (%)	5 (10 %)	6 (5 %)	$\chi^2 = 54.0$	p < 0.0001
Intrusion of personal space by adult n (%)	5 (10 %)	6 (5 %)	$\chi^2 = 54.0$	p < 0.0001
Forced sexual acts	5 (10 %)	0 (0 %)	$\chi^2 = 85.0$	p < 0.0001
Age at onset of sexual abuse in months (SD)	103.2 (SD 32.4)	4.3 (SD 21.8)	U = 396	p < 0.0001
Total duration of sexual abuse period in months	10.0 (SD 17.3)	0.80 (SD 6.7)	U = 322	p < 0.0001

n number; *0–4* 0–4 point Likert scale; *CT* central tendency; *SD* standard deviation; χ^2 chi-squared (Fisher's exact test); *U* statistic for Wilcoxon/Mann-Whitney test; *p* probability score

Separation from both parents

Significantly more patients than controls reported that they were brought up by persons other than their own parents (e. g. aunts or grandparents), or had grown up in a foster home (Table 1).

The number of children who had been adopted or grew up in a foster family was not different.

Parents' marital problems, separation, or divorce

Patients reported significantly more frequently that their parents had had marital discord. Although separations or divorces were not different, the mean age of the child at the time of parent's separations was much higher in the patient group (Table 1).

Siblings

The number of siblings or the number of subjects being the only child were not different between the groups. No

differences were found with regard to a prolonged illness or death of a sibling.

Childhood illness

Major illnesses of the subjects during childhood occurred with the same frequency in both groups (Table 1). The number of hospitalizations did not differ, but the duration of illness was significantly longer in the social anxiety disorder group. The severity and age at onset of illness was not different.

Physical handicaps

The number of handicapped subjects or handicapped family members was not different.

Social environment

In the control group, there was a higher rate of unemployment of the mother. However, the unemployment of the mother was rated more negatively by the patients, and the children were older when their mother was unemployed.

The rate for unemployment of the father did not differ. None of the fathers in the patient group was reported to have been unemployed. The average social class and the global perception of the social environment as positive or negative was not different.

Violence in families

In general, violence by family members was significantly more common and more severe in the patients' families (Table 1). In particular, violence by the father and the siblings was more frequent. There was a higher degree of violence and a trend towards more frequent violence of the mother against the father (but not against the child) in the patient group.

Violence by other persons occurred with equal frequency in both groups.

Sexual abuse

Non-genital sexual abuse was reported in both groups with the same frequency. However, genital childhood sexual abuse occurred in five cases in the patient group, in contrast to none in the control group. In these cases, the perpetrator was the father in one case, a neighbour in one case and stranger in three cases. The age at onset of sexual abuse and the total duration of the sexual abuse period was higher in the social anxiety disorder group.

Age period

A separate evaluation of traumatic events relevant during the three age periods 0–5, 6–10, 11–15 years did not reveal any patterns in the direction that events at a certain age period (e. g. 0–5 years) were more likely to be distinguished between patients and controls. Due to limited space, the results for the three age periods are not presented separately.

Parental attitude and rearing styles

Punishment by parents was rated more severe and more frequent than appropriate by the patients (Table 2). They rated their father higher in the domain of being dominant and giving insufficient love and care and their mother as having a weak character, restricting autonomy and giving insufficient love and care. There was a trend towards describing the father as being short-tempered, restricting the child's autonomy and having a weak character.

No differences were found with regard to the follow-

Table 2 Reports on parental rearing styles (0–4 Likert scale), significant differences between patients with social anxiety disorder and controls

Item	Central Tendency (SD)		U	p
	Patients	Controls		
Punishment by parents, severity; 0–4 (SD)	2.04 (SD 1.32)	1.45 (SD 1.02)	U = 4979	p = 0.01
More frequent than appropriate; 0–4 (SD)	1.22 (SD 1.42)	0.73 (SD 1.05)	U = 4809	p = 0.04
Father short-tempered; 0–4 (SD)	1.41 (SD 1.55)	0.90 (SD 1.19)	U = 4554	p = 0.096 (Trend)
Father had a weak character; 0–4 (SD)	1.22 (SD 1.42)	0.81 (SD 1.17)	U = 4534	p = 0.08 (Trend)
Mother had a weak character; 0–4 (SD)	1.48 (SD 1.30)	0.81 (SD 1.14)	U = 5231	p = 0.0006
Father dominant; 0–4 (SD)	2.31 (SD 1.60)	1.38 (SD 1.35)	U = 5060	p = 0.0005
Restriction of autonomy by mother; 0–4 (SD)	1.66 (SD 1.48)	1.04 (SD 1.30)	U = 5026	p = 0.007
Restriction of autonomy by father; 0–4 (SD)	0.96 (SD 1.10)	0.91 (SD 1.14)	U = 4193	p = 0.7 (Trend)
Sufficient love and care by mother; 0–4 (SD)	2.40 (SD 1.43)	3.08 (SD 0.95)	U = 3535	p = 0.0086
Sufficient love and care by father; 0–4 (SD)	2.08 (SD 1.43)	2.61 (SD 1.19)	U = 3505	p = 0.02
Uninhibited sexual education; 0–4 (SD)	1.40 (SD 1.37)	1.83 (SD 1.35)	U = 3729	p = 0.06 (Trend)
Parents had sex in presence of the child; 0–4 (SD)	0.04 (SD 0.29)	0.23 (SD 0.59)	U = 3764	p = 0.01

SD standard deviation; *U* statistic for Wilcoxon/Mann-Whitney test; *p* probability score

ing characterizations: inappropriate punishment and strictness (both parents), short-temperedness and dominance (mother), restriction of autonomy (father), and insufficient loving care by other persons.

An uninhibited sexual education was reported to be more common in the families of the control persons. Controls also reported more often that their parents had sex in the presence of the child.

Mental disorders in the family

Subjects with social anxiety disorder reported a wide range of psychiatric morbidity in their parents, in particular anxiety disorders.

A higher frequency of a number of psychiatric disorders, including social anxiety disorder, panic disorder, generalized anxiety disorder, and severe other neuroses (but not including schizophrenia) was reported for the parents and siblings of the social anxiety disorder patients (Table 3). Also, the severity of these disorders was higher, with the exception of severe other neuroses in the father.

Suicidality was more frequent in the families of the social anxiety disorder subjects. More family members had talked about suicidal ideas. This was perceived as more threatening by the patients. Two family members in the social anxiety disorder group and none in the control group had committed suicide; there was only a trend towards statistical significance ($p = 0.085$). One family member in the social anxiety disorder group and none in the control group had attempted suicide (not significant).

The degree of alcohol abuse by the father was higher in the families of social anxiety disorder patients, whereas no differences were found for the degree of alcohol abuse of the mother, or the percentage of moderate to severe alcohol abuse of mothers or fathers or of both parents.

Table 3 Reports on family history of psychiatric disorders in patients with social anxiety disorder: significant differences between patients and controls

Item	Mean/CT (SD), or Number (%)		Statistic	p
	Patients	Controls		
Familial psychiatric disorders				
1st degree relatives with any psychiatric disorder n (%)	38 (76 %)	19 (15.8 %)	$\chi^2 = 57.3$	$p < 0.0001$
1st degree relatives with any anxiety disorder n (%)	31 (62 %)	3 (2.5 %)	$\chi^2 = 78.1$	$p < 0.0001$
1st degree relatives with panic disorder n (%)	16 (32 %)	2 (1.67 %)	$\chi^2 = 34.3$	$p < 0.0001$
1st degree relatives with social phobia n (%)	4 (8 %)	0 (0 %)	$\chi^2 = 9.8$	$p = 0.007$
1st degree relatives with generalized anxiety disorder n (%)	29 (58 %)	3 (2.50 %)	$\chi^2 = 71.2$	$p < 0.0001$
1st degree relatives with depression n (%)	28 (56 %)	14 (11.7 %)	$\chi^2 = 37.3$	$p < 0.0001$
1st degree relatives with severe other neuroses n (%)	8 (16 %)	3 (2.50 %)	$\chi^2 = 10.6$	$p = 0.003$
1st degree relatives with severe other psychiatric disorders n (%)	15 (30 %)	6 (5 %)	$\chi^2 = 20.4$	$p < 0.0001$
Severity of mother's panic disorder; 0–4 (SD)	0.58 (SD 1.18)	0.07 (SD 0.52)	$U = 4845$	$p < 0.0001$
Severity of mother's generalized anxiety disorder; 0–4	1.32 (SD 1.42)	0.07 (SD 0.43)	$U = 5661$	$p < 0.0001$
Severity of mother's depression; 0–4 (SD)	1.04 (SD 1.48)	0.27 (SD 0.88)	$U = 5151$	$p < 0.0001$
Severity of mother's severe other neuroses; 0–4 (SD)	0.32 (SD 0.82)	0.03 (SD 0.28)	$U = 4639$	$p = 0.0003$
Severity of mother's other psychiatric disorders; 0–4 (SD)	0.56 (SD 1.25)	0.15 (SD 0.70)	$U = 4635$	$p = 0.007$
Severity of father's panic attacks; 0–4 (SD)	0.06 (SD 0.32)	0 (SD 0)	$U = 4234$	$p = 0.03$
Severity of father's generalized anxiety disorder; 0–4 (SD)	0.53 (SD 0.98)	0 (SD 0)	$U = 4883$	$p < 0.0001$
Severity of father's depression; 0–4 (SD)	0.41 (SD 0.91)	0.04 (SD 0.27)	$U = 4579$	$p = 0.0003$
Severity of father's other mental disorders; 0–4 (SD)	0.39 (SD 1.11)	0.03 (SD 0.28)	$U = 4446$	$p = 0.001$
Severity of sibling's panic attacks; 0–4 (SD)	0.36 (SD 1.01)	0 (SD 0)	$U = 4281$	$p = 0.0001$
Severity of sibling's generalized anxiety disorder; 0–4 (SD)	0.53 (SD 1.08)	0 (SD 0)	$U = 4579$	$p < 0.0001$
Severity of sibling's depression; 0–4 (SD)	0.36 (SD 0.90)	0	$U = 4400$	$p < 0.0001$
Severity of sibling's neurosis; 0–4 (SD)	0.06 (SD 0.32)	0	$U = 4043$	$p = 0.026$
Severity of sibling's other mental disorders; 0–4 (SD)	0.38 (SD 1.09)	0.04 (SD 0.38)	$U = 4235$	$p = 0.003$
Suicidality in family				
1st degree relatives with suicidality n (%)	12 (24 %)	11 (9.2 %)	$\chi^2 = 7.69$	$p = 0.01$
Family member talking about suicidal ideas n (%)	12 (24 %)	10 (8.3 %)	$\chi^2 = 7.69$	$p = 0.01$
Suicidality of a family member experienced by the child as threatening n (%)	12 (24 %)	6 (5 %)	$\chi^2 = 13.5$	$p = 0.0006$
Suicides of family member n (%)	2 (4 %)	0 (0 %)	$\chi^2 = 4.85$	$p = 0.085$ (Trend)
Mother talked about suicide; 0–4 (SD)	0.45 (SD 0.98)	0.11 (SD 0.52)	$U = 4617$	$p = 0.0024$
Perceived as threatening by the child; 0–4 (SD)	0.65 (SD 1.41)	0.12 (SD 0.61)	$U = 4082$	$p = 0.0014$
Sibling talked about suicide; 0–4 (SD)	0.31 (SD 0.97)	0.02 (SD 0.13)	$U = 4286$	$p = 0.01$
Perceived as threatening by the child; 0–4 (SD)	0.30 (SD 0.95)	0 (SD 0)	$U = 3702$	$p = 0.0013$
Sibling's attempted suicide; 0–4 (SD)	0.21 (SD 0.72)	0.02 (SD 0.13)	$U = 4178$	$p = 0.01$
Alcohol abuse in family				
Degree of father's alcohol abuse; 0–4 (SD)	1.76 (SD 1.30)	1.01 (SD 1.12)	$U = 1944$	$p = 0.008$

n number; *CT* central tendency; *SD* standard deviation; χ^2 chi-squared (Fisher's exact test); *U* statistic for Wilcoxon/Mann-Whitney test; *p* probability score

Birth risk factors

There were no significant differences between the two groups regarding birth risk factors including age of mother or father over 35 years at childbirth, premature birth, low birth weight, Caesarean section, perinatal complications or congenital defects.

Multiple traumatisation

On a 0–10 point "severe trauma scale" patients had significantly more severe traumatic events (mean score 2.0; SD 1.28) than control subjects (0.82; SD 1.1; $U = 5882$; $p < 0.0001$). Only 6 (12%) of the social anxiety disorder patients, but 63 (52.5%) of the controls did not report any severe traumatic events at all ($\chi^2 = 24.0$; $p < 0.0001$).

Logistic regression

In the logistic regression model, the highest odds ratio was found for familial anxiety disorders (Table 4). Separation from one or both parents also had a significant but smaller influence. There was only a trend towards a statistically significant contribution of childhood sexual abuse. Violence in the family, unfavourable parental attitudes and birth risk factors did not contribute significantly.

Discussion

Although social anxiety disorder is very common, a sample of 'pure' social anxiety disorder patients has not yet been compared with a healthy control group with regard to developmental trauma. This is surprising, as many theories on the aetiology of social anxiety or shyness have been based on the influence of environmental factors. A treatment modality which is based an detection and compensation of early developmental trauma can only be regarded as rational if investigations show that the impact of early traumatic events is substantial. Furthermore, investigation of the influence of early trauma on later psychopathology may have implications for the prevention of mental disorders.

In summary, our data an developmental trauma revealed higher rates of separations from parents, marital problems, violence and sexual abuse in the families of social anxiety disorder patients.

However, the validity of these data depends on accurate reporting of events many years in the past. For example, the interview method used in this survey may have led to possible underreporting of sexual abuse (Dill et al. 1991). It is possible that childhood sexual abuse was not reported due to repression (banishing unacceptable thoughts from consciousness), although repression is not held to be a common phenomenon (Loftus et al. 1998). On the other hand, false memories of abuse may have emerged in psychotherapy in some cases (Frankel 1993).

Parental rearing styles were rated as more unfavourable by the social anxiety disorder patients, which confirmed the results of earlier studies. However, the subjects' opinion on their parents' rearing styles may have been distorted by subjective interpretations. Socially anxious subjects may be oversensitive to those parental behaviours like rejection and criticism. Furthermore, social anxiety disorder patients who seek explanations for their psychological problems may more readily attribute their problems to parental attitudes and behaviour, just as the general public tend to attribute mental disorders to environmental factors rather than to genetic or biological causes (Jorm et al. 1997). Also, shy children may provoke overprotective rearing styles in their parents. Moreover, in some patients, psychotherapy may have triggered an increased occupation with parental attitudes and rearing styles.

According to the psychoanalytic literature, traumatic events at the age of 0–5 were considered to be more important than events occurring in later life (Freud 1910). In particular, social anxiety disorder was seen as a disorder caused by traumatization very early in life. However, in the present study, there was no evidence of a particular importance of a certain age period within the range of 0–15 years.

It is possible that not only specific single emotional stress events, but rather multiple ones are responsible for the development of anxiety disorders. An analysis of combinations of multiple severe traumatic events demonstrated significantly higher scores in the patients' group.

Not only adverse environments, but also a family history of mental disorders, in particular anxiety disorders,

Table 4 Logistic regression. Risk factors associated with social anxiety disorder

Variable	Odds Ratio	Confidence Intervals	p
1st degree relatives with anxiety disorder	127.6	28.0–581.3	< 0.0001
Separation from parents	3.5	1.8–6.7	0.0001
Childhood sexual abuse	4.3	0.8–23.8	0.092 (Trend)
Violence in family	3.8	0.6–24.3	0.16 (N. S.)
Unfavourable parental rearing styles	1.00	0.9–1.1	0.76 (N. S.)
Birth risk factors	1.23	0.6–2.5	0.56 (N. S.)

p probability score; *N. S.* not significant

were associated with social anxiety disorder according to our data, thus confirming earlier related studies. However, this study was not conducted by interviewing the other family members directly. It is questionable whether the subjects were fully informed about their relatives' psychiatric problems, and how reliable the interviewers' classifications of the family members' mental disorders were on the basis of the patients' reports.

If the parents of patients with social anxiety disorder had also suffered from pathological shyness, this may have been transmitted genetically, but also by means of model learning (Bandura 1971). Family studies cannot sort out the relative contributions of genetic and environmental influences. Bruch and Heimberg (1989) found that patients with social anxiety disorder perceived their parents as showing more social fears, which could support a transmission via model learning. Caster et al. (1999), however, who found that adolescents reporting higher levels of social anxiety also perceived their parents as socially anxious, interviewed the parents of their subjects. They observed that parent perceptions of child-rearing styles and family environment did not differ between parents of socially anxious and nonsocially anxious adolescents. Rapee and Melville (1997) also investigated the agreement of the reports of patients with panic disorder or social anxiety disorder and the reports of their mothers. The mothers provided mixed results, disagreeing on a more standard measure, but showing agreement on a more operationalized measure. Thus, model learning does not seem to be the only reason why social anxiety disorder runs in families. Nevertheless, the twin studies cited above have demonstrated a genetic factor in social anxiety disorder.

The logistic regression method may be able to identify the "true" contribution of a certain risk factor to a certain outcome by partialising out mediator variables. An example: a father is an alcoholic, beats his child, is frequently absent from home, and has marital discord. When his son develops social anxiety disorder, is that mainly due to the alcoholism of his father, familial violence, frequent separation from the father, parents' marital discord, or simply because the child has inherited social anxiety disorder from his father (the reason why his father started to drink)? lt becomes clear that risk factors should not be examined independently, but rather in an integrative model (Kraemer et al. 2001).

Familial anxiety disorders were identified as by far the most relevant risk factor in the logistic regression model. However, the rate of anxiety disorders in relatives reported by our healthy control persons is very low when compared to the general population (Kessler et al. 1994). This may have increased the relative contribution of this risk factor. Separation from parents also showed a significant, but much weaker contribution. For childhood sexual abuse, only a trend towards a statistically significant association could be found. Parental rearing styles, although showing significant differences in the separate comparisons, did not demonstrate any significant contribution in the logistic regression model. Violence in the family and birth risk factors were not significantly associated with the diagnosis of social anxiety disorder either.

In related studies, we have investigated patients with panic disorder and borderline personality disorder with the same questionnaire (Bandelow et al. 2001, 2002, 2004). In panic disorder patients, a family history of anxiety disorders also played the most important role, followed by severe traumatic events during childhood (including sexual abuse). Borderline personality disorder patients reported a very high rate of childhood sexual abuse and other severe traumatic childhood experiences. However, having a relative with a neurotic spectrum disorder had a higher prognostic value than developmental trauma in the logistic regression model.

For statistical reasons the results of this investigation have to be considered with caution. As many statistical comparisons have been performed, the risk has increased that significant results are obtained just by chance. These results can only be seen in a descriptive manner and have to be treated as hypothesis-generating, but not as confirmative results.

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