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Maternal anxiety predicts favourable treatment outcomes in anxiety-disordered adolescents

Legerstee JS, Huizink AC, van Gastel W, Liber JM, Treffers PDA, Verhulst FC, Utens EMWJ. Maternal anxiety predicts favourable treatment outcomes in anxiety-disordered adolescents.

Objective: To determine the differential impact of maternal and paternal internalizing psychopathology on cognitive-behavioural treatment (CBT) outcome of anxiety-disordered children and adolescents.
Method: Participants consisted of 127 children and 51 adolescents with a primary anxiety diagnosis. Children were randomly assigned to a standardized group CBT or individual CBT; adolescents received individual CBT. Parents received four training sessions. Participants were evaluated at pre- and post-treatment with a clinical interview and with self- and parent-reported questionnaires. Lifetime anxiety and mood disorders in parents were obtained with a clinical interview.
Results: For children, no associations were found between maternal and paternal anxiety or mood disorders and treatment outcome. For adolescents, however, maternal lifetime anxiety disorders were positively associated with pre-post-treatment improvement in clinician severity ratings and with treatment success.
Conclusion: Lifetime maternal anxiety disorders were significantly associated with favourable treatment outcomes in adolescents. Paternal disorders were not associated with treatment response.

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Key words: anxiety disorders; children; adolescents; cognitive-behavioural treatment; maternal and paternal internalizing psychopathology

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Significant outcomes

- Maternal lifetime anxiety disorders predict favourable treatment outcomes in anxiety-disordered adolescents.
- Paternal lifetime anxiety and mood disorders are not associated with treatment response in children and adolescents.

Limitations

- Although the present results showed an association between maternal lifetime anxiety disorders and diagnostic outcome after treatment, no associations were found for self- and parent-reported questionnaires.
- Because of their low prevalence rate, current parental disorders could not be examined as regards the treatment outcome.
- The current study examined individual CBT and group CBT, both with separate parent sessions. Different associations may exist for other treatment modalities, such as family-focussed CBT or child-only CBT.

Introduction

Epidemiological studies have demonstrated that anxiety disorders are the most common mental disorders in children and adolescents (1). Childhood anxiety disorders are associated with significant impairment in academic and social functioning (2, 3), and if untreated, result in

mental disorders in adulthood, including anxiety disorders, substance abuse and major depression (4, 5). Fortunately, recent randomized controlled trials have demonstrated that approximately 70% of clinically anxious children show a substantial reduction of anxiety and comorbid depressive symptoms after cognitive-behavioural therapy (CBT; 6). However, studies directed to predictors of treatment outcome are scarce, while insight in such factors would enable clinicians to identify prior to treatment, which children would benefit most from CBT, and assign them to appropriate treatment approaches.

Parental internalizing psychopathology, especially parental anxiety, is a factor that is assumed to predict children's treatment outcome (7). Anxiety and depressive disorders are often found among parents of children with an anxiety disorder (8), and parental internalizing psychopathology seems to be involved in the development and maintenance of childhood anxiety (9). In their meta-analysis, Hettema et al. (10) found that the magnitude of familial aggregation of anxiety disorders is large, with odds ratios (ORs) ranging from about 4 to 6, depending on the anxiety disorder subtype. Parental internalizing psychopathology may influence children's treatment response through genetic, parental rearing and/or family climate factors. Empirical evidence demonstrates that these factors are all, to a different extent, related to childhood anxiety (10, 11).

The relatively few studies that have addressed parental anxiety as predictor of child's treatment response have found conflicting results. In four studies, evidence was found for the negative effects of parental self-reported internalizing psychopathology on child CBT outcome (12–15). Other recent studies did not find any association between parental internalizing psychopathology and treatment outcome (7, 16). Finally, two studies even demonstrated that anxious children with anxious mothers had more favourable treatment outcomes compared to children with non-anxious mothers (17, 18). These diverse findings between previous studies may be accounted for by different study methods, such as sample size, sample characteristics, treatment protocol, child anxiety assessment (e.g. questionnaires vs. clinical interviews), statistical procedures, child's treatment outcome measures and the under representation of fathers.

The contribution of maternal internalizing psychopathology on treatment efficacy of children was mostly studied, whereas the role of paternal psychopathology was neglected. It is unfortunate that fathers' role has been neglected, as fathers play an important role in childhood anxiety. Even if fathers were incorporated in studies on children's treatment outcome, the data of mothers and fathers were combined. Mothers and fathers have different roles in the psychosocial development of their offspring. Fathers can influence children's anxiety for example by their play, involvement, attachment and transition to the outside world (19). Only one study investigated the differential impact of maternal and paternal psychopathology on child's CBT outcome in a sample of 61 referred children between 8 and 12 years old (14). They found paternal somatization, and not paternal and maternal anxiety, to be predictive of less favourable treatment outcomes in children with an anxiety disorder. Paternal internalizing psychopathology was only measured with a self-report questionnaire, and not with a structured clinical interview.

Another topic that needs more attention is the contribution of parental internalizing psychopathology on treatment outcome for children with different ages. Parental psychopathology may especially have an effect on children, relatively more than on adolescents, as children spend much time with their parents and are highly dependent on them. On the other hand, certain parenting behaviours can also impede the development of adolescents. It has been shown that parental control, involving less autonomy granting behaviour, less support for independence and parental overinvolvement, is associated with childhood anxiety (11). Excessive parental control might complicate the important transition to independent and autonomous functioning in adolescents. Consequently, parental internalizing psychopathology may particularly impede the treatment progress in adolescents. Berman et al. (12) examined the age effects on treatment response and found that the predictive power of parental psychopathology was less for children who were older; parental psychopathology appeared as a stronger negative factor in the treatment of young children as compared with adolescents.

Aims of the study

To investigate i) to what extent maternal and paternal lifetime anxiety and mood disorders were predictive of CBT success (i.e. diagnosis free) in anxiety-disordered children and adolescents, and ii) to what extent maternal and paternal lifetime anxiety and mood disorders were associated with anxious and depressive symptom improvement and anxiety severity improvement after CBT. In addition, it was explored whether gender of children and adolescents and treatment format modify these

associations. We hypothesized that both maternal and paternal internalizing psychopathology, especially parental anxiety disorders, were negatively associated with children's treatment outcome. We expected that the association between parental psychopathology and treatment would be different for children and adolescents. We further hypothesized that gender and treatment format would modify these associations.

Material and methods

Sample

Eligible for participation were children (aged 8–12) and adolescents (aged 12–16) consecutively referred between September 2002 and December 2005 to the anxiety and depression out-patient clinic of the Child and Adolescent Psychiatry Department, Leiden University Medical Centre and Erasmus Medical Centre, Sophia Children's Hospital. Children of 12 years of age were assigned to child vs. adolescent treatment depending on the type of school they attended, respectively, primary and secondary school. As part of the routine intake procedure, all children and their parents were interviewed with the Anxiety Disorders Interview Schedule, child and parent version (ADIS-C/P; 20).

Inclusion criteria. Children and adolescents had to be diagnosed with one of the following four anxiety disorders as primary diagnosis: namely separation anxiety disorder (SAD), generalized anxiety disorder (GAD), social phobia (SOP) or specific phobia (SP).

Exclusion criteria. An IQ below 85, poor command of the Dutch language, serious physical disease, substance abuse, pervasive developmental disorder, obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD) and acute stress disorder. Children and adolescents on medication for an anxiety disorder were withdrawn from medication before the start of treatment, if possible, or otherwise excluded. This criterion, however, did not apply to the present sample of anxiety-disordered children or adolescents, as none of them used anxiety medication at the time of intake and start of therapy. Children and adolescents who received medication for attention deficit/hyperactivity disorder (ADHD) were not excluded.

A total of 133 children and 51 adolescents, who met the inclusion criteria, gave informed consent and were enrolled in the present study (for a detailed description of the procedure; 21). Children were randomly assigned in sequences of six to receive either individual CBT (ICBT) or group CBT (GCBT). Data of six children were not included in statistical procedures, because two children and their parents refused to be treated in a group and four could not be randomized due to logistic reasons. The final 'intent-to-treat' sample consisted of 127 children and 51 adolescents ($n = 178$). For logistic and ethical reasons (i.e. to avoid a long waiting list for GCBT), all adolescents received ICBT. Of the 178 participants, lifetime anxiety and mood diagnoses were obtained from 153 mothers (86%) and 127 fathers (71%).

Instruments

Child diagnostic assessment. The ADIS-C/P (20, 22) consists of two clinician administered semi-structured interviews: namely a child and parent interview. It is designed to assess anxiety and other childhood disorders in 7- to 18-year olds. In this study, the ADIS-C/P was used to assess the following DSM-IV diagnoses: GAD, SOP, SP, SAD, panic disorder (PAD), agoraphobia (AGP), OCD, PTSD, dysthymia (DYS), major depressive disorder (MDD) and ADHD. According to the ADIS-C/P manual (20), the interviewer gave an interference rating on a nine-point scale (i.e. 0 to 8), the clinician severity rating (CSR). The CSR was based on the combination of information about symptoms and interference from both the child and the parent(s). If the CSR was 4 or higher, a diagnosis was assigned. Several studies (23, 24) have shown that the interrater and test–retest reliability of the ADIS-C/P are good to excellent.

Child self-report measures. Information on self-reported child anxiety and depressive symptoms was obtained by administering the Dutch version of the Multidimensional Anxiety Scale for Children (MASC; 25, 26) and by the Dutch version of the Children's Depression Inventory (CDI; 27, 28). The total score was used in both measures. The MASC (25) is a self-report measure of general anxiety in children and includes 39 items. The internal reliability (Cronbach's alpha of 0.87 for boys and 0.88 for girls) of the total score and the test–retest reliability (intra-class correlation coefficient of 0.87 for the total score of children) are excellent (29, 30). Reliability analyses of the Dutch version revealed a Cronbach's alpha of 0.9 ($N = 299$; age 8–12) and a test–retest correlation of 0.8 ($n = 196$, age 8–12).

The CDI is a 27-item scale suited for monitoring changes in a child's mood (28). It has good internal

consistency [alphas ranging from 0.71 (out-patient group) to 0.89] and acceptable test–retest reliability (correlation of 0.75). For the Dutch translation, Cronbach's alpha was 0.8 for elementary school children ($N = 649$; age 8–12).

Parent-report measure. The Child Behaviour Checklist (CBCL; 31) is a 113-item questionnaire to obtain standardized parent's reports of behavioural and emotional problems in children aged 7–17 years. Parents rate their child's behaviour during the preceding 6 months on a three-point scale. Good validity and reliability of the CBCL have been established (31).

Parental diagnostic assessment. The CIDI 2.1 (32) is a fully structured and computerized diagnostic interview and was used to assess parental lifetime anxiety and mood disorders according to the criteria of the DSM-IV. In this study, seven lifetime clinical anxiety disorders were diagnosed: namely GAD, SOP, SP, PAD, AGP, OCD and PTSD. Furthermore, lifetime parental MDD and DYS were assessed. The reliability of the CIDI 2.1 has been demonstrated to be excellent, and the validity has been demonstrated to be adequate (33, 34).

Treatment

Participants were treated with the Dutch translation of the FRIENDS program (35–38). The FRIENDS program is a structured CBT, which comprises psychoeducation, relaxation and breathing exercises, exposure, problem-solving skills training, social-support training and cognitive-restructuring training. This program contains 10 child or adolescent sessions and four parent sessions. FRIENDS is probably efficacious for treatment of childhood anxiety disorders (39, 40).

Treatment success

Treatment success was defined as being free of any anxiety disorder diagnosed with the ADIS-C/P at post-treatment.

Procedure

During the intake procedure and 1-week post-treatment, children and adolescents, and their parents were separately interviewed with the ADIS-C/P (20). About 2 weeks pre-treatment and 1 week post-treatment, the MASC (25), CDI (28) and CBCL (31) were obtained.

At the start of FRIENDS, trained and supervised clinical psychology undergraduates interviewed the parents telephonically concerning lifetime anxiety and mood disorders with the computerized CIDI. These interviewers were blind to the diagnostic status of the child. Interviewers, who conducted the ADIS-C/P, did not conduct the CIDI, and vice versa.

Procedures complied with strict ethical standards in the treatment of human subjects and were approved by the Medical Ethical Committees of the Erasmus Medical Centre in Rotterdam and the Leiden University Medical Centre in Leiden.

Data analysis

For the intent-to-treat sample ($n = 178$), two types of analyses were performed to test the association between maternal and paternal lifetime anxiety and mood disorders, and treatment outcome. All analyses were performed separately for children and for adolescents. Because of the low prevalence rate of current maternal and paternal disorders, the statistical power was not sufficient to examine current parental disorders in relation to children's treatment outcome.

First, binary logistic regression analyses were performed to predict treatment outcome, yielding ORs, the Cox & Snell R^2, the Nagelkerke R^2 and the 95% confidence intervals (CI). Predictors were lifetime maternal anxiety disorders, lifetime maternal mood disorders, lifetime paternal anxiety disorders and lifetime paternal mood disorders. These predictor variables were first entered separately into a univariate logistic regression model (step 1). Predictor variables, which proved significant in step 1, were then entered simultaneously in the next model (step 2). In this next model, for each significant predictor variable, an interaction term was included with gender, and for children also with treatment format.

Secondly, a repeated measures multivariate analysis of variance (MANOVA) was conducted to examine pre-post-treatment improvement of self-reported anxiety and depressive symptoms (i.e. MASC and CDI) and parent-reported anxiety and depression (i.e. CBCL). If significant multivariate effects were found, *post hoc* univariate ANOVA's were conducted. Furthermore, pre-post-treatment improvement of the CSR scores (i.e. CSR of the ADIS-C/P) was analysed separately with a repeated measure ANOVA. Lifetime maternal anxiety disorders, lifetime maternal mood disorders, lifetime paternal anxiety disorders and lifetime paternal mood disorders, gender and treatment format (only for children) were included as between-subject factors. The two assessments (pre-treatment and post-treatment) were analysed

as within-subjects factors. Missing values of the dependent variables were substituted with the corresponding overall mean if there were less than 10% missing data. Only for the father-reported CBCL, more than 10% of the data was missing. Consequently, father-rated anxiety and depression was excluded from analyses.

Results

Descriptive analyses

Table 1 provides descriptive information about the child and adolescent sample. Sixty-two children (36 boys and 26 girls) participated in the GCBT and 65 children (35 boys and 30 girls) received ICBT. All adolescents received ICBT (22 boys and 29 girls). The mean age of children was 10.1 years (SD = 1.3), and of adolescents 13.9 years (SD = 1.1). There were no significant differences between children and adolescents with regard to gender, treatment centre and social economic status (SES). SES was coded using the classification of the Dutch Central Bureau of Statistics (41).

Children and adolescents significantly differed as to the type of diagnosis. Significantly more children had a SAD ($\chi^2 = 6.79$, $P = 0.01$, OR = 0.40, 95% CI: 0.20–0.80), whereas adolescents had significantly more SOP ($\chi^2 = 10.02$, $P = 0.00$, OR = 2.89, 95% CI: 1.48–5.65) and DYS ($\chi^2 = 4.36$, $P = 0.05$, OR = 3.21, 95% CI: 1.02–10.07) than children.

The response rate of mothers and fathers did not significantly differ between children and adolescents. Table 2 shows the rate of lifetime and current anxiety and mood disorders among mothers and fathers. No significant differences emerged between children and adolescents with respect to the rate of maternal and paternal lifetime and current anxiety and mood disorders.

The most prevalent lifetime maternal disorder was MDD, while the most prevalent current maternal disorder was SP. The most prevalent lifetime paternal disorder was MDD. MDD was also the most prevalent current disorder among fathers along with SP. SP was the most prevalent anxiety disorder, both lifetime and current, in mothers and fathers.

The number of anxiety and/or depressive disorders was significantly more prevalent among mothers (51.9%) than fathers (26.4%) for the sample of children ($\chi^2 = 4.04$, $P = 0.04$, OR = 0.37, 95% CI: 0.14–0.99). The rate of anxiety and mood disorders did not significantly differ between mothers (53.3%) and fathers (27.8%) for the sample of adolescents.

Treatment evaluation

Of the anxiety-disordered children, 45% was treated successfully; i.e. was anxiety diagnosis free at post-treatment. Forty-eight per cent was successfully treated with ICBT and 43% with GCBT

Table 1. Demographic characteristics and pre-treatment diagnoses in children and adolescents

	Children (n = 127)	Adolescents (n = 51)	χ^2	P
Gender				
Boys	71 (56)	22 (43)	2.38	0.12
Girls	56 (44)	29 (57)		
Centre				
Leiden	41 (32)	16 (31)	0.01	0.91
Rotterdam	86 (68)	35 (69)		
SES				
Low	18 (14)	4 (8)	0.03	0.87
Middle	59 (47)	24 (47)		
High	50 (39)	23 (45)		
Anxiety diagnosis				
SAD	62 (49)	14 (28)	6.79	0.01
GAD	60 (47)	30 (59)	1.95	0.16
SP	44 (35)	12 (24)	2.09	0.15
SOP	42 (33)	30 (59)	10.02	0.00
PAD	0 (–)	1 (2)	2.50	0.29
AGP	2 (2)	1 (2)	0.03	1.00
Comorbid diagnosis				
MDD	2 (2)	3 (6)	2.47	0.14
DYS	6 (5)	7 (14)	4.36	0.05
ADHD	13 (10)	1 (2)	3.33	0.12

Values are given as n (%).

SAD, separation anxiety disorder; GAD, generalized anxiety disorder; SP, specific phobia; SOP, social phobia; PAD, panic disorder; AGP, agoraphobia; MDD, major depressive disorder; DYS, dysthymia; ADHD, attention deficit/hyperactivity disorder.

Table 2. Lifetime and current diagnoses in mothers and fathers

	Mothers (n = 153)		Fathers (n = 127)	
	Lifetime	Current	Lifetime	Current
Any AD	51 (33.3)	24 (15.7)	20 (15.7)	9 (7.1)
Any MD	55 (35.9)	15 (9.8)	20 (15.7)	7 (5.5)
Any AD and/or MD	80 (52.3)	32 (20.9)	34 (26.8)	14 (11.1)
GAD	5 (3.3)	1 (0.7)	2 (1.6)	0 (–)
SP	26 (17.0)	16 (10.5)	11 (8.7)	7 (5.5)
SOP	8 (5.2)	1 (0.7)	5 (3.9)	0 (–)
PAD	18 (11.8)	4 (2.6)	6 (4.7)	1 (0.8)
AGP	10 (6.5)	3 (2.0)	5 (3.9)	2 (1.6)
OCD	3 (2.0)	2 (1.3)	0 (–)	0 (–)
PTSD	8 (5.2)	2 (1.3)	1 (0.8)	0 (–)
MDD	53 (34.6)	14 (9.2)	18 (14.2)	7 (5.5)
DYS	8 (5.2)	2 (1.3)	5 (3.9)	1 (0.8)

Values are given as n (%).

AD, anxiety disorder; MD, mood disorder; GAD, generalized anxiety disorder; SP, specific phobia; SOP, social phobia; PAD, panic disorder; AGP, agoraphobia; OCD, obsessive-compulsive disorder; PTSD, post-traumatic stress disorder; MDD, major depressive disorder; DYS, dysthymia.

Table 3. Logistic regression results for predictors of treatment outcome in anxiety-disordered children and adolescents

Predictor variable	OR (CI)	*P*
Children (step 1)		
Maternal anxiety disorder	1.30 (0.53–3.20)	0.57
Maternal mood disorder	0.94 (0.39–2.29)	0.89
Paternal anxiety disorder	0.52 (0.16–1.64)	0.26
Paternal mood disorder	0.89 (0.26–3.07)	0.85
Adolescents (step 1)		
Maternal anxiety disorder	6.30 (1.30–30.53)†	0.02
Maternal mood disorder	1.69 (0.38–7.52)	0.49
Paternal anxiety disorder	0.92 (0.07–11.58)	0.95
Paternal mood disorder	0.34 (0.03–3.38)	0.35
Adolescents (step 2)		
Maternal anxiety disorder	6.36 (1.30–31.11)†	0.02
Maternal anxiety disorder*	0.84 (0.03–20.27)	0.91
Interaction: maternal anxiety disorder X gender		

†Cox and Snell R^2 = 0.15; Nagelkerke R^2 = 0.21; percentage correct = 74%.
OR, odds ratio; CI, confidence interval.

(21). Of the anxiety-disordered adolescents, 36% was free of an anxiety disorder after CBT. The difference in percentage successfully treated between adolescents and children was not significant ($\chi^2 = 1.45$, $P = 0.23$).

Lifetime maternal and paternal internalizing psychopathology as predictors of CBT outcome

In step 1 for children (Table 3), none of the variables appeared to be a significant predictor of treatment outcome. Therefore, subsequent step 2 analyses were not performed. Additional separate logistic regression analyses were performed for children who received ICBT and GCBT. These analyses revealed that maternal and paternal internalizing disorders were not related to children's treatment outcome, irrespective of group assignment.

In step 1 for adolescents (Table 3), only maternal lifetime anxiety disorders appeared to be a significant and positive predictor of treatment success (OR = 6.30, 95% CI: 1.30–30.53, $P = 0.02$). In step 2, maternal lifetime anxiety disorders and the interaction between maternal lifetime anxiety disorders and gender of adolescents were entered simultaneously. The interaction term between maternal lifetime anxiety disorders and gender was not significant in step 2. Maternal lifetime anxiety disorders, however, remained significant and accounted between 15% (Cox and Snell R^2) to 21% (Nagelkerke R^2) for the total variance of post-treatment anxiety disorders. It appeared that 60% of the adolescents with a mother with a lifetime anxiety disorder was free of an anxiety diagnosis after treatment compared with 22% of the non-anxious mothers.

Association between lifetime maternal and paternal internalizing psychopathology and pre-post-treatment changes in CSR

Repeated measure ANOVA for children showed that there were neither significant main effects nor interaction effects with the time of maternal and paternal lifetime anxiety and mood disorders. Additionally, gender and treatment format were not related to the association between maternal and paternal lifetime anxiety and mood disorders and pre-post-treatment changes in CSR.

For adolescents, a significant interaction effect between maternal lifetime anxiety disorders and time ($F_{1,24} = 5.45$, $P = 0.03$) was found. Figure 1 shows that the nature of this interaction consisted of a faster decline of CSR scores in adolescents with a lifetime anxiety-disordered mother compared to those with a non-anxious mother. Gender was not related to this association. No other main or interaction effects with time were found for maternal and paternal lifetime anxiety and mood disorders or gender.

Both for children ($F_{1,76} = 20.88$, $P = 0.001$) and adolescents ($F_{1,24} = 25.71$, $P = 0.001$), a significant main effect of time on CSR was found. It appeared that the CSR scores significantly decreased over time.

Association between lifetime maternal and paternal internalizing psychopathology and pre-post-treatment changes in anxiety and depressive symptoms

Repeated measure MANOVAs for children showed no significant main or interaction effects with the time of maternal and paternal lifetime anxiety and

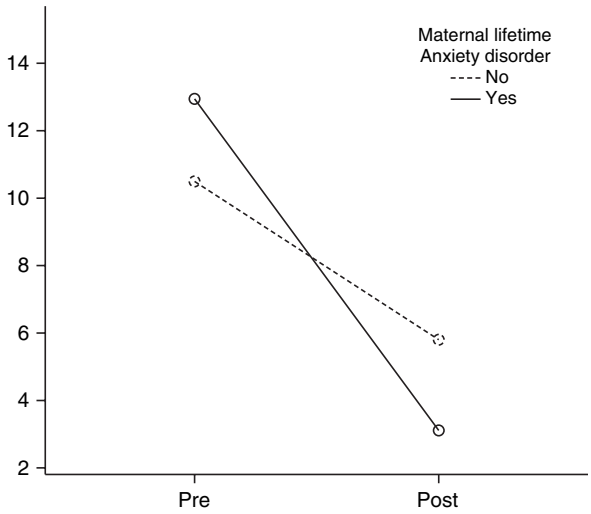

Fig. 1. Mean pre- and post-treatment scores on the clinician severity rating (CSR) for adolescents with lifetime anxiety-disordered mothers and non-anxious mothers.

mood disorders on changes in anxiety and depressive symptoms. Additionally, gender and treatment format were not related to the association between maternal and paternal lifetime anxiety and changes in anxiety and depressive symptoms.

For children, a significant main effect of time on changes in anxiety and depressive symptoms was found ($F_{3,76} = 6.41$, $P = 0.001$). *Post hoc* univariate *F*-tests indicated that the scores on the CBCL ($F_{1,76} = 16.98$, $P = 0.001$), but not on the MASC and CDI, reduced significantly over time.

Repeated measure MANOVAS for adolescents showed a significant main effect of maternal lifetime mood disorders on changes in anxiety and depressive symptoms ($F_{3,22} = 4.64$, $P = 0.01$). *Post hoc* univariate *F*-tests revealed that the scores of adolescents were overall significantly higher on the CBCL ($F_{1,24} = 6.01$, $P = 0.02$), but not on the MASC and CDI, for those with a lifetime mood-disordered mother compared to adolescents with a mother without a lifetime mood disorder (see Fig. 2). Gender was not related to this association. No other significant main or interaction effects on time were found for maternal and paternal lifetime anxiety and mood disorders. Gender was also not related to the association between maternal and paternal lifetime anxiety and mood disorders and changes in anxiety and depressive symptoms.

For adolescents a significant main effect of time on changes in anxiety and depressive symptoms was found ($F_{3,22} = 5.13$, $P = 0.01$). *Post hoc* univariate *F*-tests indicated that the scores on the CBCL ($F_{1,24} = 6.95$, $P = 0.01$), MASC ($F_{1,24} = 7.82$, $P = 0.01$) and CDI ($F_{1,24} = 8.57$, $P = 0.01$) reduced significantly over time.

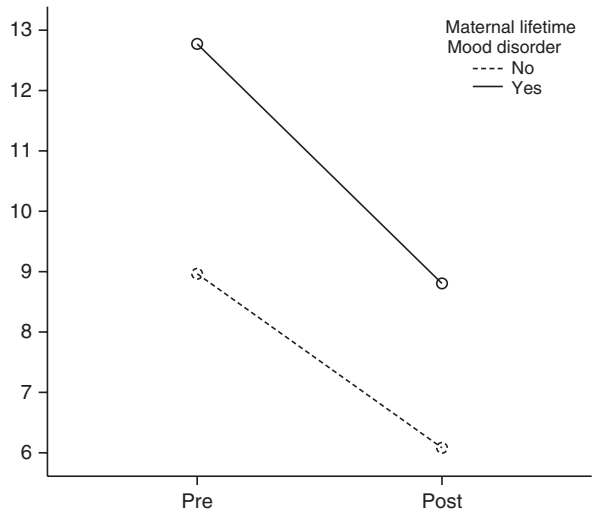

Fig. 2. Mean pre- and post-treatment scores on the Child Behaviour Checklist (CBCL) for adolescents with lifetime mood-disordered mothers and mothers without a lifetime mood disorder.

Discussion

The results of this study showed that, for children, neither maternal nor paternal lifetime internalizing psychopathology was predictive of treatment success after CBT. For adolescents, however, it was found that maternal lifetime anxiety disorders were positively associated with treatment success. More specifically, 60% of the adolescents with a lifetime anxiety-disordered mother was free from any anxiety disorder after CBT compared with 22% of the adolescents with a non-anxious mother. Maternal lifetime anxiety disorders explained a large (42) amount of variance in treatment outcome. Furthermore, it appeared that the clinician-rated severity rating based on a clinical interview declined significantly faster from pre- to post-treatment for adolescents with a mother with a lifetime anxiety disorder than for adolescents with a non-anxious mother. For both children and adolescents, however, maternal and paternal internalizing psychopathology did not appear to be predictive of pre-post-treatment improvement of anxiety and depressive symptoms based on self and parent-reported questionnaires. No modifying effects of treatment format (i.e. ICBT vs. GCBT) and gender were found.

This is the first study that reports a positive association between maternal lifetime anxiety disorders and treatment success assessed by a clinical interview. Other studies that incorporated clinical child interviews to assess treatment outcome found negative associations (12, 13, 15). The two previous studies (17, 18) that reported positive associations used dimensional anxiety questionnaires to assess treatment outcome. On the dimensional questionnaires, however, this study did not find any association between paternal and maternal internalizing psychopathology and pre–post changes in anxiety and depressive symptoms.

The self- and mother-reported questionnaires (i.e. CDI, MASC and CBCL) might not be clinically sensitive enough to detect changes in anxiety and depressive symptomatology during treatment, as suggested by other authors (e.g. 43). The assessment of clinicians with a standardized interview may be more accurate, because they integrate the information of both parents and the child, who generally differ in their reports (44). Additionally, clinicians are trained to adequately rate the severity of the anxiety problems in relation to the child's emotional developmental stage. We found that both at pre- and post-treatment, the

adolescents with a lifetime mood-disordered mother had significantly more mother-reported anxiety and depressive symptoms on questionnaires compared to adolescents with a mother without a lifetime mood disorder. This suggests that mothers with a mood disorder tend to report more problems in their offspring than healthy mothers (45, 46) and therefore may be biased in their report. This reporter bias is also supported by the fact that the level of anxiety and depressive symptoms reported by the adolescents themselves, did not differ whether they had a lifetime mood-disordered mother or not.

Three important questions arise with respect to the association between parental internalizing psychopathology and treatment outcome. First, why are maternal lifetime anxiety disorders positively, and not negatively, related to treatment outcome? Especially for lifetime anxiety-disordered mothers, the parent-training sessions might enhance the quality of the parent–child relationship and/or enhance the parenting practices. These positive changes along with improvements during child CBT may have a synergetic effect on treatment response. The beneficial effects of a parent training on treatment success of children have also been found in other studies, especially for anxious parents (13). Additionally, other studies have demonstrated that parental psychopathology often improves over the course of CBT of their children (14), which can also have positive effects on treatment response in children.

Secondly, why is maternal lifetime anxiety disorders related to treatment outcome in adolescents, and not in children? An explanation might be that the type of child and/or parent diagnoses influences the relationship between maternal anxiety and treatment outcome in children and adolescents. It appeared that the rate of some anxiety disorder subtypes differed significantly between children and adolescents in our sample. Children had more SAD, while adolescents experienced significantly more SOP and DYS. It is important that future studies differentiate between childhood anxiety disorders in relation to parental internalizing psychopathology and treatment outcome.

Another explanation for our findings for adolescents, in contrast to those for children, may lie in the content of the four parent sessions, which were predominantly focussed on communication, contingency management and psychoeducation. Several studies have demonstrated that anxious parents are less likely to acknowledge and respect the child's view or to encourage the child to think independently, and that parents tend to excessively regulate their child's activities compared with non-anxious parents (11, 47, 48). Typically, parental control tends to decrease after middle childhood, whereas in anxious parents, parental control is hypothesized to be stable regardless of a child's age (47). Autonomous functioning is an important emerging developmental need for adolescents (49) and may have less significance to children. Parental control may particularly impede autonomous development in their children and might have a maintaining or facilitating effect on adolescents' anxiety level. The parent-training sessions may have helped anxious mothers to grant their adolescents more autonomy and to promote independent functioning. These possible alterations in the mother–adolescent relationship may have resulted in a dramatic improvement in anxiety. For children on the other hand, other parental and family factors may be more important for favourable treatment outcomes, such as attachment, sibling relationships, marital conflict and family functioning. The current four parent sessions may not be sufficient to alter these factors, and positive changes may only be obtained with a more intensive parent training. Further research is needed to examine the association between parental internalizing psychopathology and treatment outcome in relation to the level of parental involvement in treatment (e.g. family-focussed, child-only and parent-only CBTs). Additionally, further research is needed to elucidate the mechanisms through which maternal internalizing psychopathology affects treatment response.

Thirdly, why is maternal and not paternal lifetime anxiety disorders related to treatment outcome? Mothers are frequently the main caregivers, and changes in parenting skills in mothers may have more effect on child development than changes in fathers. Moreover, Connell and Goodman (50) have demonstrated that maternal psychopathology is more closely associated with the presence of internalizing problems in children than paternal psychopathology. Additionally, controlling behaviour of mothers is more closely related to adolescent's psychological functioning than that of fathers (51). Another reason for this finding might be that mothers participated more often in the parent-training sessions than fathers, and as a consequence mothers' parenting skills were more targeted than fathers'.

In the current study, treatment success was considerably lower than the efficacy reported for most CBT protocols (6). In multiple studies, treatment success is defined as being free of the primary anxiety diagnosis after treatment (e.g. 17). In the present study, we defined treatment success as being free of any anxiety disorder

post-treatment, which is a stricter criterion. Moreover, the children and adolescents in this study were clinically referred to a specialized department of a university hospital, whereas many other studies investigated a self-referred population of children and adolescents.

Because of the low rate of current anxiety and mood disorders among parents, we were not able to consider the impact of current disorders on treatment outcome in this study. The examined association between lifetime parental disorders and treatment outcome also included current disorders. Unfortunately, we were not able to examine the relative contribution of lifetime vs. current disorders on children's treatment outcome.

Clinical implications

Our results underscore the importance of clinicians to examine parental psychopathology both at intake and during the treatment of children and adolescents. Treatment-effectiveness in adolescents may be enhanced when a limited number of parent sessions are given to anxiety-disordered mothers supplementary to the individual CBT.

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