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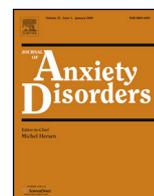
Temperament and parenting predicting anxiety change in cognitive behavioral therapy: The role of mothers, fathers, and children

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A R T I C L E   I N F O

A B S T R A C T

Objective: A considerable amount of children with anxiety disorders do not benefit sufficiently from cognitive behavioral treatment. The present study examines the predictive role of child temperament, parent temperament and parenting style in the context of treatment outcome.
Method: Participants were 145 children and adolescents (ages 8–18) with DSM-IV-TR anxiety disorders who received a 12-session CBT program and were assessed at pretreatment, posttreatment and three months follow-up. Multiple-regression analyses were used to evaluate the following pretreatment and posttreatment variables as potential predictors of treatment response at follow-up: baseline level of anxiety symptoms, child reported maternal and paternal rearing style (emotional warmth, rejection, and overprotection), parent reported child temperament traits (negative affect, effortful control, and extraversion), and mothers' and fathers' self-report temperament traits.
Results: More maternal negative affect and less emotional warmth as perceived by the child before treatment were related to less favorable treatment outcome (accounting for 29% of the variance in anxiety at follow-up). Furthermore, maternal negative affect and children's extraversion measured after treatment also predicted anxiety at follow-up (together accounting for 19% of the variance). Paternal temperament and parenting style were unrelated to treatment outcome, as were children's pretreatment temperament traits.
Conclusion: The results suggest that tailoring intervention to include strategies to reduce maternal negative affect and promote an emotional warm rearing style may improve treatment outcome.

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1. Introduction

Anxiety disorders are among the most common psychiatric disorders in children and adolescents. Recent epidemiological studies show that up to 9.9% of youths aged 9–16 suffer from anxiety that is severe enough to interfere with their daily functioning (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Cognitive behavioral therapy (CBT) is an efficacious intervention for child and adolescent anxiety disorders. However, one-third to half of the children in CBT research trials for anxiety disorders do not benefit sufficiently from treatment in terms of diagnostic recovery rates and anxiety symptom reduction (Silverman, Pina, & Viswesvaran, 2008). Therefore, there is a need to identify factors associated with

treatment success and failure, which can aid in improving intervention strategies. Both stable child characteristics and environmental (parent) factors are considered to be important in the etiology and maintenance of anxiety disorders (for a review see Degnan, Almas, & Fox, 2010). However, there is scant research on the role these factors may play in treatment outcomes for anxiety disorders.

1.1. Child temperament and childhood anxiety

Elucidating the role that individual differences play in children's response to treatment may help us to better understand pathways to effective treatment. Temperament is reflected in stable individual differences in reactivity and self-regulation, which respectively encompass emotionally driven responses to change in the environment (such as negative affect and extraversion), and modulation of these responses (such as effortful control) (Rothbart & Derryberry, 1981). However, little is known about the influence

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of temperament traits on treatment success in anxious children and adolescents.

Negative affect, comprising individual differences in frustration, fear, and behavioral inhibition to novelty (Capaldi & Rothbart, 1992), has frequently been linked to the development of later problems and disorders (see Rothbart & Bates, 2006). To the best of our knowledge only one study found one aspect of negative affect (behavioral inhibition) in anxious children to have a negative effect on treatment. Cognitive behavioral therapy outcome in 64 children, ages 4–7 was negatively predicted by behavioral inhibition, assessed with observational laboratory protocols (Hirshfeld-Becker et al., 2010). Apart from this study in the very young, negative affect has not been studied in relation to treatment effects in children or adolescents. However, negative affect is directly related to avoidant coping (Lengua & Long, 2002) and may thus play a role in susceptibility to treatment. Children's negative affect may bring about difficulties commencing and continuing exposure exercises in anxiety therapy. In addition, negative affect is positively related to threat appraisal (Lengua & Long, 2002). Children high in negative affect tend to have stronger core beliefs about threat (interpreting the external world as threatening) which may make them less susceptible to change through cognitive restructuring. Therefore, we expect that children's anxiety symptom levels after treatment (at follow up) are negatively predicted by high negative affect.

Other temperament traits may also influence treatment outcome, but there is little research on this topic. For example, effortful control is the ability to self-regulate emotions, attention and behavior. Internalizing problems are associated with low effortful control (Eisenberg et al., 2001; Sportel, Nauta, de Hullu, de Jong, & Hartman, 2011). High effortful control has been related to more active coping and lower adjustment problems later in development (Lengua & Long, 2002; Nigg, 2006; Rothbart, 2011). Effortful control is expected to have an advantageous effect on exposure exercises, since it encompasses the capacity to focus and shift attention according to the demands of the situation, and to perform an action when there is a strong tendency to avoid it. During treatment, these self-regulation capacities help to shift attention from anxiety related behavior to more task-relevant behavior, contributing to successful exposure exercises. Thus, we expect that high effortful control will predict lower anxiety symptom scores after treatment.

Extraversion (surgency) is related to assertiveness, positive emotions, and sociability, with high scores indicating a tendency toward experiencing pleasure in novelty (Rothbart, 2011). Therefore, it is possible that extraverts experience more pleasure in practicing exposure exercises, positively affecting treatment outcome. Additionally, extraverts are thought to be more open to experiencing positive affect (Watson & Clark, 1997), which may also enhance susceptibility to cognitive restructuring techniques. However, these proposed mechanisms are speculative and extraversion has never been empirically studied in relation to treatment effect. In our study, we expect that extraversion in children positively effects anxiety reduction through treatment.

1.2. Parental temperament and childhood anxiety

Although parental factors also play an important role in the development and maintenance of childhood anxiety disorders, through shared genes, social interaction and learning experiences via modeling (Breinholst, Esbjørn, Reinholdt-Dunne, & Stallard, 2012; Bögels & Brechman-Toussaint, 2006; Murray, Creswell, & Cooper, 2009), there is little research on the influence of factors such as parental temperament on treatment outcome.

Parental negative affect represents parents' proneness to fear, sadness, discomfort, and frustration (Evans & Rothbart, 2007). To the best of our knowledge only one study examined parental negative affect as a risk factor for children's treatment outcome.

Cobham, Dadds, and Spence (1998) found that anxious children who had a parent prone to anxiety (i.e. scoring high on trait anxiety) responded less favorably to child-focused CBT compared with children whose parents were not trait anxious. However, at 3 year follow-up, this finding could not be replicated (Cobham, Dadds, Spence, & McDermott, 2010). More studies have linked current parental anxiety and depressive symptoms to higher levels of anxiety in offspring (Micco et al., 2009; Murray et al., 2009; Pilowsky et al., 2006). Furthermore, treatment outcome studies provide evidence that the presence of parental anxiety and depressive symptomatology is likely to be a barrier to child treatment outcome. Berman, Weems, Silverman, and Kurtines (2000) found that higher levels of maternal depressive symptoms and fear successfully differentiated a treatment failure group from positive responders. Southam-Gerow, Kendall, and Weersing (2001) reported that higher levels of maternal self-reported depressive symptoms were associated with a less favorable treatment response in anxious children. Rapee (2000) found that higher symptom levels of paternal anxiety but not maternal anxiety predicted worse treatment outcome at one year follow-up for youth ages 7–16. Liber et al. (2008) reported that higher levels of paternal anxiety and depressive symptoms predicted treatment failure in anxious children (ages 8–12). Thus, there is ample evidence that psychiatric symptoms of anxiety and depression in parents negatively affect children's treatment outcome. However, it is unclear if parental negative affect has a similar adverse effect on treatment outcome. Parents' proneness to anxiety affects the information that children receive in relation to threat, which enhances or maintains both avoidant behaviors and fear beliefs (Murray et al., 2009). Learned avoidance behaviors are contrary to the approach tendencies as advocated and practiced during CBT and therefore may hinder exposure. In addition, cognitive restructuring may be less effective when the fearful child cognitions are in concordance with parental beliefs. We therefore expect parental negative affect to have a negative effect on children's treatment outcome.

On the contrary, parents' capacity to regulate their own emotions, attention, and behavior (high effortful control), especially in anxiety provoking situations, may allow parents to help children face their fears and strengthen latent approach tendencies. Furthermore, parental effortful control could result in better treatment response in children through modeling of parental self-regulation (Breinholst et al., 2012; Murray et al., 2009). By modeling strategies such as effectively regulate negative emotions, handling a difficult situation through re-appraisal of the situation, and active problem solving, the child may be supported in developing effective and more appropriate coping strategies (Breinholst et al., 2012). Therefore, effortful control in parents is expected to have an advantageous effect on treatment outcome.

Extraversion in parents is associated with sociability, positive affect, and high intensity pleasure (Evans & Rothbart, 2007). Extraversion in parents is related to positive and supportive parenting, such as displaying positive affection and encouraging independence (Losoya, Callor, Rowe, & Goldsmith, 1997). It can therefore be speculated that extraverted parents are better able to guide their offspring in encountering and tackling challenging circumstances. Parental expressed anxiety is related to anxiety and avoidance in children via modeling (Bögels & Brechman-Toussaint, 2006; Murray et al., 2009). Accordingly, parental expressed sociability, and pleasure in novelty might also be modeled by their offspring. This might make extraverted parents stimulating models during exposure oriented CBT. However, research has not yet focused on the role of parental extraversion in predicting treatment outcome in anxious children. It can be expected that high parental extraversion predicts a positive treatment outcome in children.

1.3. Parenting

For decades, theoretical models have hypothesized that parenting plays an important role in the development and maintenance of child anxiety. In their review, McLeod, Wood, and Weisz (2007) note that studies investigating parenting and child anxiety are mostly cross-sectional, reporting overall modest associations. Parental rejection (withdrawal, aversiveness, lack of warmth) and parental control (over-involvement and low autonomy-granting) accounted for only 4% and 6% of the variance in child anxiety.

However, parenting styles may especially be of influence when trying to *change* children's anxiety. Some studies have found that maternal over-involvement and paternal rejection are related to a less favorable treatment outcome in anxious children and adolescents (Creswell, Willetts, Murray, Singhal, & Cooper, 2008; Liber et al., 2008). Rejecting or overprotective parenting is likely to discourage independence, directly limiting opportunities for a child to develop a repertoire of coping skills and a sense of self-competence and mastery in dealing with challenges (Chorpita & Barlow, 1998; Rapee, 1997). These parenting styles are thus hypothesized to aggravate children's insecure, avoidant, and anxious behavior, which may hinder the effect of CBT. Lack of parental warmth is assumed to affect child anxiety by negatively influencing the beliefs that children hold about themselves and the environment (Bögels & Brechman-Toussaint, 2006). The persistence of these negative cognitions (often related to threat and low self-worth) may influence CBT success. Experienced parental warmth, on the other hand, may provide the safe environment a child needs when practicing new behaviors and approach fear-provoking situations. However, this has never been studied. We therefore expect rejecting and overprotective parenting to have an adverse effect, and parental emotional warmth to have a positive effect on children's treatment outcome.

1.4. Focus of the present study

As described above, our knowledge about the relationship between childhood anxiety and child and parent factors primarily comes from cross-sectional and longitudinal epidemiological studies. The evidence, though sparse, indicates that parenting and temperament are possible predictors of treatment outcome in anxious children.

Research into predictors of treatment outcome should take three additional aspects into account. First, persistence of the unhelpful parental variables *after* treatment may especially be important when trying to change anxiety at follow-up. For example, parents with an anxious child may be overprotective (before their child starts treatment), but continued overprotection after treatment may especially be salient for long-term outcome. After treatment, therapists are no longer available to focus on independent and approach behavior, and to work on cognitive restructuring if fearful beliefs come up again. Therefore, this study includes posttreatment predictors that may be most influential on longer term follow-up.

Second, although research has predominantly focused on mothers, interest in the differential roles of fathers in the etiology and treatment of child anxiety is on the increase (e.g. Bögels & Phares, 2008). Far less is known about the role of fathers in the treatment of childhood anxiety disorders. Some studies suggest a relationship between paternal functioning and treatment outcome for anxious youth. For example, father's self-reported somatic complaints negatively predicted child-rated anxiety after treatment (Crawford & Manassis, 2001). Podell and Kendall (2011) found that both father and mother attendance and engagement in family CBT sessions predicted improved child outcome. Furthermore, Rapee (2000) and Liber et al. (2008) found that higher levels of paternal (but not maternal) rejection, and anxiety and depressive symptoms

predicted worse treatment outcome. Due to the limited number of studies focusing on both fathers' and mothers' differential role in children's anxiety treatment and their mixed results (Bögels & Brechman-Toussaint, 2006), research is needed on this topic.

Third, developmental factors may moderate the influence of parental factors on treatment outcome. For example, younger children may be more susceptible to parental temperament and parenting style than older children. Indeed, Berman et al. (2000) found mothers' fear and depressive symptoms to be less predictive in older children, suggesting that parents influence in child treatment is more extensive in younger children. Similarly, Barrett, Dadds, and Rapee (1996) found that younger children responded better to CBT treatment than older children when family management was added. Therefore, it is important to include age as a predictor of treatment outcome, as well as interaction effects between age and other predictor variables.

The purpose of the present study was to examine (1) parenting, parents' temperament and child temperament, measured both at pretreatment and at posttreatment, (2) parenting and temperament separately for fathers and mothers, and (3) the interaction between these predictors and the child's age. Based on previous research it was hypothesized that high levels of parent and child extraversion, effortful control, and parental emotional warmth have a beneficial effect on treatment outcome. Furthermore, high levels of parent and child negativity, and parental rejection and overprotection were hypothesized to have an adverse effect.

2. Method

2.1. Participants

Participants were 145 children and adolescents aged 8–18 years (M = 12.5, SD = 2.8, 56.6% girls) who met criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*) for a principal anxiety disorder (separation anxiety, social phobia, generalized anxiety disorder, specific phobia, or panic disorder). Exclusion criteria included suicidal ideation, psychosis, selective mutism, an IQ below 80, drug or alcohol abuse, CBT treatment in the past half year or current SSRI (Selective Serotonin Reuptake Inhibitor) treatment. Children and their parents were referred to the outpatient departments of Child and Adolescent Psychiatry of the University of Amsterdam (De Bascule (n = 49)) and the University Center for Child and Adolescent Psychiatry in Groningen (Accare (n = 96)). Sites were comparable with regard to specialization in anxiety treatment and children's pretreatment anxiety symptom levels (t(142) = 0.14, p = .89). Almost all children (99.3%), mothers, and fathers (both 97.9%) were of Dutch nationality. Most children were living in two-parent families (83.4%). The Medical Ethical Committee of the Amsterdam Medical Center approved the study. The present study, using pretreatment, posttreatment, and follow-up data, was part of a larger study into the effect of CBT on childhood anxiety disorders (Hogendoorn et al., submitted for publication).

Primary diagnoses were social phobia (n = 49, 33.8%), separation anxiety disorder (n = 17, 11.7%), specific phobia (n = 33, 22.8%), generalized anxiety disorder (n = 32, 22.1%), and panic disorder with or without agoraphobia (n = 14, 9.6%). Eighty-six children (59.3%) had one or more comorbid disorders, including an additional anxiety disorder (n = 59), mood disorder (n = 6), a combination of anxiety and mood disorder (n = 16), or a combination of anxiety, mood and externalizing disorder (n = 5). The total number of diagnoses per child ranged from 1 to 6 (M = 2.23, SD = 1.33). Mean ADIS-IV Clinical Severity Rating (CSR) score for the primary diagnosis was 6.31 (SD = 1.05, range 4–8).

2.2. Measures

2.2.1. Inclusion

2.2.1.1. Anxiety Disorder Interview Schedule for Children – Child and Parent versions (revised ADIS-IV-C/P). The revised ADIS-IV (Silverman & Albano, 1996) is a widely used, reliable, and valid semi-structured interview that assesses the prevalence and severity of DSM-IV disorders in youth (ages 6–18), with a main focus on anxiety disorders. Children and parents were interviewed separately by experienced and trained (post-master) clinicians. Each diagnosis was rated by the interviewer on severity (Clinician Severity Ratings, CSRs), ranging from 0 to 8, with a scoring of four or higher on either child or parent interview indicating a disorder (Silverman & Albano, 1996). Diagnoses were generated following the ADIS C/P manual: for each diagnosis, the highest CSR was taken.

2.2.2. Treatment outcome

2.2.2.1. Revised Child Anxiety and Depression Scale – Child version (RCADS). The RCADS is a reliable and construct valid 47-item child report questionnaire that measures symptoms of DSM-IV anxiety disorders and depression (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000; Chorpita, Moffitt, & Gray, 2005). The RCADS consists of six subscales: separation anxiety disorder (SAD), social phobia (SP), generalized anxiety disorder (GAD), obsessive compulsive disorder (OCD), panic disorder (PD) and major depressive disorder (MDD). Items were rated on a 4-point scale (0 = never, 1 = sometimes, 2 = often, 3 = always). In the current study, the total anxiety score composed of those four subscales that correspond to the primary anxiety disorders of the children was used (SAD, SP, GAD, and PD, 31 items), with higher scores reflecting more symptoms (Cronbach's alpha = .93). Treatment outcome is defined as the RCADS score at follow-up.

2.2.3. Predictors of treatment outcome

2.2.3.1. Egna Minnen Beträffande Uppfostran – Child Version (EMBU). This shortened version of the EMBU (Markus, Lindhout, Boer, Hoogendijk, & Arrindell, 2003) assesses children's present perception of parental rearing practices. In the current study, three reliable and construct valid factors were used: emotional warmth (19 items), rejection (17 items), and overprotection (12 items) (Markus et al., 2003). Items were rated for fathers and mothers separately on a 4-point scale (1 = no never, 2 = yes, sometimes, 3 = yes, often, 4 = yes, almost always). Emotional warmth consists of items about giving special attention, praising for approved behavior, unconditional love, being supportive and affectionately demonstrative. Rejection is characterized by hostility, punishment (physical or not, abusive or not), derogation, and blaming of the child. Overprotection represents fear and anxiety for the child's safety, guilt engendering and intrusiveness. Cronbach's alphas for emotional warmth, rejection and overprotection were 0.94, 0.80, and 0.67 for fathers and 0.93, 0.78, and 0.67 for mothers.

2.2.3.2. Early Adolescent Temperament Questionnaire–Revised (EATQ). The EATQ (Capaldi & Rothbart, 1992; Oldehinkel, Hartman, De Winter, Veenstra, & Ormel, 2004) is a valid and reliable parent report questionnaire used to assess three child temperament factors: (1) Effortful Control, consisting of the scales Activation Control (the capacity to perform an action when there is a strong tendency to avoid it), Inhibitory Control (the capacity to plan, and to suppress inappropriate responses) and Attention (the capacity to focus attention as well as to shift attention when desired); (2) Negative Affect, consisting of Fear (unpleasant affect related to anticipation of distress), Frustration (negative affect related to interruption of ongoing tasks or goal blocking), and Shyness (behavioral inhibition to novelty and challenge, especially social), and (3) Surgency, consisting of one scale High Intensity Pleasure

(the pleasure derived from activities involving high intensity or novelty). Items were rated on a 5-point scale (1 = almost never true; 3 = sometimes true, sometimes not true; 5 = almost always true). Cronbach's alphas for the present sample were 0.76 (Negative Affect), 0.83 (Effortful Control), and 0.72 (Extraversion).

2.2.3.3. Adult Temperament Questionnaire (ATQ). The ATQ (Evans & Rothbart, 2007) is a reliable and construct valid 77-item self-report questionnaire for adults developed to assess Effortful Control, Negative Affect, Extraversion/Surgency, and Orienting Sensitivity. Items were rated on a 7-point scale (1 = extremely untrue; 4 = neither true nor false; 7 = extremely true). Subscales Effortful Control, Negative Affect, and Extraversion were used in the present study, with current Cronbach's alphas of 0.83, 0.83, and 0.69 respectively.

2.3. Design and procedure

After the intake evaluation at the outpatient clinic, written informed consent was obtained from both parents and children. In the larger study, children were randomly assigned to either an immediate, active 12 week CBT treatment condition, or an 8 week waitlist condition, followed by CBT treatment. For the present study, we used data of the ADIS and RCADS at pretreatment, posttreatment, and at 3 months follow up. Predictor variables were assessed by children (EMBU) and parents (ATQ and EATQ) at pretreatment and posttreatment. Fig. 1 presents the flow of participants through the study.

2.4. Treatment

Children were treated by experienced and trained clinicians (Hogendoorn et al., submitted for publication), using the Dutch translation and adaptation (Nauta, Scholing, Emmelkamp, & Minderaa, 2003) of Kendall's Coping Cat program (Kendall, 1990). This 12-session cognitive behavioral treatment program includes education, coping skills training (identifying physical reactions to anxiety, recognizing and changing fearful self-talk, developing problem solving skills, and rewarding adaptive coping responses), and graded exposure exercises, coupled with a workbook used for in-session and homework activities. The treatment included parent sessions after sessions 2 and 7, aiming at increasing parental cooperation in the treatment in general, and in children's exposure exercises in particular. Therapists attended two-weekly peer supervision sessions. To assess treatment adherence, reports of 95 sessions were reviewed by 2 raters (a child psychologist and a child psychiatrist). A scale was developed to assess achievement of treatments goals per session with 1 (not obtained), 2 (a bit), 3 (satisfactory), and 4 (good). Treatment goals were largely obtained (M = 3.42, SD = 0.64), and interrater agreement was satisfactory with a kappa of .75 (Hogendoorn et al., submitted for publication).

2.5. Statistical analysis

2.5.1. Missing data analyses

All children with at least one assessment (n = 148) were included in the analyses following the intent-to-treat approach. Missing data were imputed using multiple imputation, which is the most evidence-based method in psychiatric and developmental research when conducting analyses with limited knowledge of specific reasons for nonresponse (Croy & Novins, 2005; Rubin, 1996). The imputation included all of the variables used in the regression analyses as suggested by Rubin (1996), plus additional important variables (age, parent and child reported anxiety diagnoses and symptom scores on all points in time) in SPSS 18. In this study, missing values were imputed 40 times (Croy & Novins, 2005; Rubin,
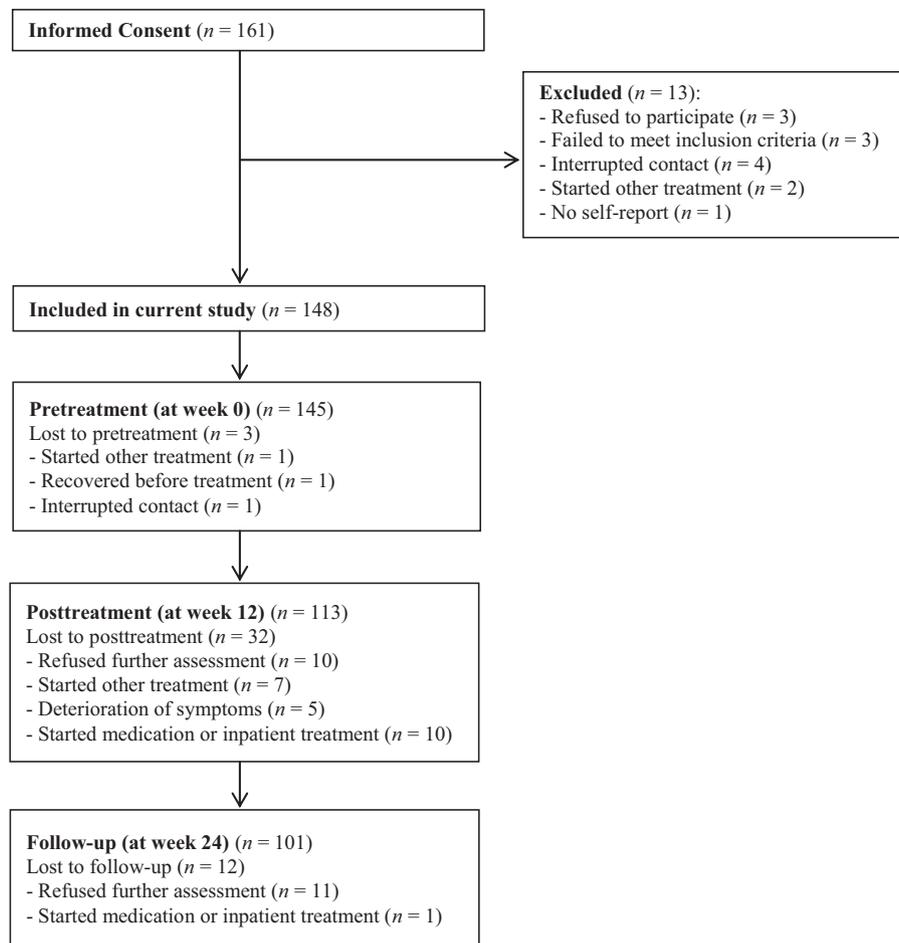
Fig. 1. Flowchart of inclusion and attrition of participants.

1996; Shafer, 1997) to generate an adequate number of imputed values to replace the missing data. These 40 complete datasets were then analyzed, and the results combined to obtain a pooled score that takes into account the uncertainty due to the missing values.

2.5.2. Exploratory analyses: age as predictor

To select putative predictors of treatment outcome, separate multiple regression analyses were performed on each predictor variable (mother, father, and child temperament and child perception of maternal and paternal parenting style), entering baseline anxiety, age, predictor and predictor × age simultaneously. Since the age range of the children was broad (8–18 years old), and it is plausible that age would modify the associations studied, age was included as an interaction effect (along with its main effect). Age and predictor variables were centered following the recommendations by Aiken and West (1991).

2.5.3. Predictors of treatment outcome

First, we calculated partial correlations between predictor variables (assessed pre- and posttreatment) and anxiety symptoms (RCADS) at follow-up, controlling for pretreatment anxiety. In order to avoid type II errors, correlations associated with $p < .10$ were kept in subsequent analyses. Simultaneous multiple-regression analyses were used to assess (a) whether *pretreatment* variables predicted anxiety symptoms at follow-up, (b) whether *posttreatment* variables predicted anxiety symptoms at follow-up, and

(c) to estimate the proportion of variance that was explained by these variables. More specifically, after entering pretreatment anxiety, predictor variables were simultaneously placed in the model, using forced entry. Any variables that were non-significant ($p > .05$) were excluded one by one from the final model (Field, 2009).

3. Results

3.1. Preliminary analyses

3.1.1. Descriptive statistics

Means, standard deviations, and test statistics for children's and parents' pretreatment and posttreatment predictor variables and anxiety symptoms (RCADS) are presented in Table 1. Parent predictor variables were stable over treatment. Child anxiety, negative affect and effortful control changed over the course of treatment. Child baseline anxiety was unrelated to children's temperamental characteristics (with correlations for negative affect, effortful control, and extraversion being $r = .06, -.10$, and $-.07$, respectively).

Of the 145 participating children, 116 completed the treatment and posttreatment assessment (80%), 106 also completed the follow-up assessment (73%). Comparison of completers and dropouts at both posttreatment and follow-up revealed no significant differences in baseline variables (children's gender, age in years, self-reported anxiety symptoms, mothers' education, fathers' education).

Table 1
Means and standard deviations on all measures at pretreatment and posttreatment, and t-tests for differences between pretreatment and posttreatment.

	Pretreatment			Posttreatment			t
	N	M	(SD)	N	M	(SD)	
Child							
Anxiety Symptoms	144	29.73	(18.40)	108	18.95	(13.97)	8.24**
Negative Affect	127	36.07	(7.69)	90	33.40	(7.24)	3.06**
Effortful Control	127	52.39	(10.31)	89	57.55	(10.77)	−4.09**
Extraversion	127	24.86	(7.10)	90	25.13	(7.27)	−0.22
Mother							
Emotional Warmth	138	62.02	(10.22)	105	61.59	(10.71)	0.32
Rejection	134	27.42	(4.56)	104	27.67	(5.29)	0.39
Overprotection	136	21.01	(4.92)	104	20.40	(4.83)	1.42
Negative Affect	123	105.36	(16.46)	84	101.97	(17.39)	−0.04
Effortful Control	123	88.05	(14.97)	84	91.27	(13.49)	−1.02
Extraversion	127	69.10	(10.58)	85	70.02	(11.65)	−0.86
Father							
Emotional Warmth	133	57.96	(12.86)	101	58.58	(12.93)	−1.16
Rejection	130	27.42	(4.56)	99	27.80	(5.67)	0.24
Overprotection	132	21.01	(4.92)	99	19.10	(4.58)	−0.07
Negative Affect	99	91.92	(18.80)	75	92.62	(16.70)	−0.54
Effortful Control	100	87.98	(13.72)	75	89.46	(13.18)	−0.06
Extraversion	103	70.44	(14.18)	75	72.01	(12.04)	−1.43

Note: Anxiety symptoms at follow-up total sample ($n = 99$), Mean = 16.12, SD = 13.47.

** $p < .01$.

3.1.2. Treatment efficacy

At pretreatment, posttreatment and follow-up, anxiety diagnoses were assessed with the ADIS interview. In line with the ADIS manual, Clinician Severity Ratings (CSRs) were assigned by the interviewer on a 0–8- scale with a scoring of four or higher being indicative of a disorder. Children were free of all diagnoses when they had a CSR of <4 on both the parent and child interview. After treatment, 56.9% of the children were free of all diagnoses as assessed by the ADIS interview. At follow-up, this figure was 63.2% (see Hogendoorn et al., submitted for publication).

On symptom level, children's self-reported anxiety (RCADS) reduced significantly ($F(1, 134) = 56.55$, $p < .001$), with significant reductions between pre-posttreatment ($F = 54.62$, $p < .001$, $d = 0.681$), pre-follow-up ($F = 71.64$, $p < .001$, $d = 0.844$), and post-follow-up ($F = 9.80$, $p < .005$, $d = 0.197$).

3.2. Predictors of treatment outcome

3.2.1. Exploratory analyses

Age was not significantly associated with follow-up anxiety, over and above baseline anxiety (pretreatment $B = 0.29$, $SE\ B = 0.30$, $Beta = .07$, $p > .05$; posttreatment $B = 0.60$, $SE\ B = 0.31$, $Beta = .15$, $p > .05$). Also, adding interactions between predictor variables and age to the models had no additive predictive effect. Therefore, age and interaction variables were further left out of the analyses.[7]

3.2.2. Correlations

Table 2 shows the partial correlations between follow-up anxiety and both pretreatment and posttreatment predictor variables, controlling for pretreatment anxiety. Pretreatment low parental emotional warmth, high maternal negative affect, and low maternal effortful control were significantly associated with follow-up anxiety ($p < .10$).

Posttreatment higher levels of children's effortful control and extraversion, as reported by parents, correlated with lower anxiety at follow-up. Children who reported their parents as emotionally warm after treatment reported less anxiety at follow-up. Posttreatment higher maternal negative affect and lower effortful control

were also related to follow-up anxiety. Then, correlations between all significant predictor variables were computed (Table 3).

3.2.3. Regression analyses

The regression model (Table 4) explained 29.3% of the variation in children's anxiety at follow-up, with pretreatment anxiety, pretreatment maternal emotional warmth, and negative affect accounting significantly ($p < .05$) for variance in anxiety outcome.

Predictor variables at posttreatment (Table 5) accounted for 19.4% of the follow-up variance in anxiety scores, with pretreatment anxiety, posttreatment child extraversion and maternal negative affect explaining significant ($p < .05$) amounts of variance.

Table 2
Pooled partial correlations between anxiety at follow-up and child, mother, and father predictor variables at pre- and posttreatment, controlling for baseline anxiety.

	Pretreatment predictors correlated with anxiety at follow-up	Posttreatment predictors correlated with anxiety at follow-up
Child predictors		
Effortful Control	−.05	**−.18***
Negative Affect	.08	.12
Extraversion	.01	**−.22***
Mother predictors		
Emotional Warmth	**−.33***	**−.19***
Rejection	−.07	−.03
Overprotection	−.11	.12
Negative Affect	**.36***	**.21***
Effortful Control	**−.22***	**−.14§**
Extraversion	−.09	−.10
Father predictors		
Emotional Warmth	**−.22***	**−.18***
Rejection	−.02	.07
Overprotection	−.05	.12
Negative Affect	.06	−.04
Effortful Control	−.13	−.05
Extraversion	.06	.13

Note: Partial correlations with $p < .10$ are displayed in bold.

§ $p < .10$.
* $p < .05$.
** $p < .01$.

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[7] Results can be obtained from the first author.

Table 3
Pooled correlations among predictor variables.

	1	2	3	4	5	6	7	8	9	10
1.Emotional Warmth Mother pre	–									
2. Negative Affect Mother pre	−.21[*]	–								
3. Effortful Control Mother pre	.09	−.59[**]	–							
4. Emotional Warmth Father pre	.70[**]	−.19[*]	.13	–						
5. Effortful Control Child post	.02	−.13	.22[*]	.04	–					
6. Extraversion Child post	.18[*]	−.16	.17	.07	.21[*]	–				
7. Emotional Warmth Mother post	.67[**]	−.25[**]	.11	.51[**]	.01	.09	–			
8. Negative Affect Mother post	−.20[*]	.54[**]	−.26[**]	−.21[*]	−.19[*]	−.10	−.24[**]	–		
9. Effortful Control Mother post	.06	−.35[**]	.55[**]	.02	.36[**]	.17[*]	.09	−.47[**]	–	
10. Emotional Warmth Father post	.50[**]	−.20[*]	.10	.67[**]	.07	.07	.69[**]	−.29[**]	.13	–

Note: Pre = pretreatment, post = posttreatment.

[*] p < .05.
[**] p < .01.

Table 4
Simultaneous multiple-regression analyses of anxiety at follow-up on pretreatment temperament and parenting variables, controlling for baseline anxiety (imputed data, N = 148).

Predictor variables	B	SE B	β
(Constant)	6.28	8.74	
Baseline Anxiety	0.19	0.05	.30[**]
Emotional Warmth Mother	−0.29	0.09	−.25[**]
Negative Affect Mother	0.21	0.06	.29[**]

Note: $R^2 = .29$ (p < .001). The variables Emotional Warmth Father and Effortful Control Mother did not contribute significantly to the explained variance, hence were excluded from the model.

[**] p < .01.

4. Discussion

The aim of the study was to identify predictors of treatment outcome in children and adolescents with anxiety disorders. We chose parents' and children's temperament and parental rearing as candidates for predicting treatment success both because of their relation with childhood anxiety in epidemiological research and because of initial evidence suggesting their role in treatment outcomes (Murray et al., 2009). As argued, previous research on the role of temperament and child rearing style in treatment outcome for childhood anxiety disorders has been very limited. The present study addressed this gap in the literature by studying the effect of multiple temperament traits and rearing styles simultaneously and focusing on both child, paternal and maternal factors. Moreover, we included a large sample of clinically referred children and adolescents, took the broad age range into account, and appropriately handled missing data in the analyses. The main findings of the current study consist of treatment outcome (i.e. anxiety symptoms at follow-up) being predicted by maternal high negative affect, low maternal emotional warmth, and high extraversion in children, over and above children's pretreatment anxiety. Treatment efficacy in this study (as assessed by a clinical interview) was

Table 5
Simultaneous multiple-regression analyses of anxiety at follow-up on posttreatment temperament and parenting variables, controlling for baseline anxiety (imputed data, N = 148).

Predictor variables	B	SE B	β
(Constant)	3.71	7.99	
Baseline Anxiety	0.20	0.05	.33[**]
Extraversion Child	−0.36	0.15	−.19[*]
Negative Affect Mother	0.15	0.06	.18[*]

Note: $R^2 = .19$ (p < .001). The variables Emotional Warmth Father, Emotional Warmth Mother, Effortful Control Mother, and Effortful Control Child did not contribute significantly to the explained variance, hence were excluded from the model.

[*] p < .05.
[**] p < .01.

comparable to other findings (see Silverman et al., 2008), with 63.2% of treated children demonstrating remission of all anxiety diagnoses at follow-up.

Maternal emotional warmth predicted reductions in anxiety in children of all ages. There are a number of reasons why this might be the case. For example, one could speculate that mothers who are perceived by their child as being supportive and affectionate may provide the safe context that optimizes the effect of homework (exposure) exercises during treatment. Alternatively, in the supportive and affectionate environment associated with maternal warmth, children may more easily adopt positive cognitions (for example related to self-confidence or trust in things working out all right). This finding suggests the possible benefit of encouraging parents to engage their children with emotional warmth (Breinholst et al., 2012).

The predictive value of maternal negative affect, both before and after treatment, suggests that a mother's high tendency toward anxious and depressed feelings might maintain a child's anxiety, hindering a favorable treatment response for children of all ages. This finding suggests the importance of treating the psychological distress of parents of anxious children. A recent study provides some support for the idea that mothers should be a focus of treatment (Wickramaratne et al., 2011). In this study, the treatment of maternal depression was related to decreases in children's psychiatric symptoms and this benefit was independent of the direct effects of treatment for the child. This finding implies the need for parental interventions, addressing parents' (anxious) behavior, thoughts and feelings as part of children's anxiety treatment. It should be noted, however, that parental treatment findings are mixed, with some studies reporting positive effects (Barrett et al., 1996; Podell & Kendall, 2011), and others reporting no additional benefits from such interventions (Bodden et al., 2008; Nauta et al., 2003; and see meta analyses by Breinholst et al., 2012; In-Albon & Schneider, 2006; Silverman et al., 2008). The null findings should be interpreted with caution, however, as these studies did not report whether the interventions were successful in reducing the parents' psychological distress by changing parents' (anxious) behaviors, thoughts and feelings (Breinholst et al., 2012; Ginsburg, 2009). Therefore, future research would benefit from ensuring that parental interventions are efficacious before firm conclusions can be drawn regarding the benefit of such interventions for the anxiety of their children.

Moreover, children's extraversion after treatment predicted less anxiety at follow-up. Actively seeking out and enjoying seeking out (anxiety provoking) stimuli and situations seems to be key ingredient for longer term success. This relation was found for extraversion assessed at posttreatment but not pretreatment. This may indicate that extraversion is difficult to assess by parents pretreatment, or may in fact change in the midst of high anxiety states, right before treatment.

Congruent with previous findings, children's pretreatment anxiety severity contributed significantly to the prediction of post-treatment anxiety scores (e.g. Liber, Widenfelt, Leeden, Goedhart, Utens, & Treffers, 2010). However, the related child temperament trait of negative affect did not add to the prediction of treatment outcome. Given its well-known relationship with outcome, pre-treatment anxiety was entered first in the regression model, before entering additional predictors. One may argue that if negative affect is highly related to baseline anxiety, it could not have additional predictive value. However, a post hoc check of the validity of this argument revealed no significant bivariate correlations between negative affect and baseline anxiety or outcome in our sample ($r = .06$, $p = .49$, and $r = .09$, $p = .27$, respectively). This anomalous result could be due to a restriction of range, with many high scoring individuals on both measures. In addition, (stable) temperament and (momentary) anxiety were assessed by different informants (parent and child respectively), which usually yields substantially lower correlations. Alternatively, although unexpected, the finding that children's baseline negative affect does not influence treatment outcome may simply be true.

Interestingly, no association was found between paternal characteristics and treatment outcome. Although other studies reported that the role of fathers in upbringing is underestimated (Bögels & Phares, 2008; Liber et al., 2008) this was not confirmed in the present study. Cross-sectional research linking child and parent psychopathology found stronger associations of maternal than paternal psychopathology with internalizing problems in children (for a review see Connell & Goodman, 2002). In treatment studies, children's treatment outcome has been positively associated with paternal attendance and engagement in session (Podell & Kendall, 2011), and negatively associated with paternal rejection, and somatic, anxiety and depressive symptoms (Crawford & Manassis, 2001; Liber et al., 2008; Rapee, 2000). One possible explanation for why paternal factors were not predictive in our study is that maybe fathers were less involved in the child's problems or treatment progress. A post hoc check of which parent completed the ADIS interview and filled out the questionnaires was consistent with this hypothesis, with mothers more often completing child-related assessments than fathers at pretreatment (80.5% vs. 14.5%), posttreatment (71.3% vs. 14.9%), and follow-up (73.1% vs. 7.7%). However, parent engagement in treatment sessions has not been measured.

Several other variables that we considered as possible candidates for treatment success were unrelated to outcome. First, similar to other treatment studies (Berman et al., 2000; Kendall, Flannery-Schroeder, Panichelli-Mindel, Southam-Gerow, Henin, & Warman, 1997; Treadwell, Flannery-Schroeder, & Kendall, 1995) age was not found to be related to treatment outcome. Moreover, age did not interact with other predictor variables. Second, neither parental nor childhood effortful control was found to predict treatment success. Although we outlined possible self-regulating mechanisms by which parental and childhood effortful control may benefit from treatment response, and indeed found some evidence for this from bivariate correlations, the association became nonsignificant when other relevant predictors were accounted for. Likewise, parental extraversion did not predict treatment effect. Third, although mothers' rejecting and overprotective parenting styles have been linked to children's anxiety (Bögels & Brechman-Toussaint, 2006) and were hypothesized to predict treatment outcome, no associations were found. One potential reason for these null results is that maternal rejection and overprotection at the start of treatment may be a common maternal response to their child's high anxiety levels, which thus has no relation with treatment outcome.

This study has a number of limitations. First, dropout rates in this study were comparable to previous studies (22.1–30.3%;

Hogendoorn et al., submitted for publication; Kendall et al., 1997). However, studies in the Netherlands reported attrition rates as low as 3% for individual CBT (Bodden et al., 2008; Nauta et al., 2003). Second, we did not include a control group. Therefore, we cannot firmly conclude that the predictors found in our study predict treatment outcome instead of the regular course of anxiety over time. Third, this study did not include observational data. Some variables were measured through informant report (i.e. parenting style reported by child and child temperament reported by parent). Anxious children may have a biased perception of their parents' rearing. However, comparing parent report with home or lab observations, Rothbart and Bates (2006) conclude that parents are in a good position to observe a wide range of child's temperament-related behaviors on multiple occasions, with a fair degree of objective validity. Fourth, the internal consistency of the Overprotection subscale was only 0.67. Although previous studies concluded that this alpha coefficient is acceptable (Markus et al., 2003), one should take some caution when interpreting the absence of associations with overprotection.

In conclusion, this study is the first to demonstrate that mothers' negative affect and emotional warmth are independently associated with treatment success, and that maternal negative affect and child's extraversion after treatment predict anxiety at follow up. Future studies should investigate ways to tailor interventions to include strategies to reduce maternal negative affect and promote warm parenting. Furthermore, future studies need to explicate the conditions under which it may be most helpful to include parents in treatment and in what capacity. Mechanisms through which child and parent factors might be associated with treatment outcome need to be modeled and tested to gain more insight in how to enhance treatment.

Acknowledgements

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