Toward an Optimal Treatment for Childhood Anxiety Disorders

The Influence of ***Parental Psychopathology****,*
Selective Attention, and Cognitive Coping

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ISBN: 978-90-9024169-2
Cover design: Victor S. Legerstee
Layout: Danny Dijkstra
Printed by: Optima Grafische Communicatie, Rotterdam, The Netherlands

The study reported in this dissertation was performed at the Department of Child and Adolescent Psychiatry of ErasmusMC-Sophia Children's Hospital, Rotterdam and Leiden University Medical Center/Curium, Leiden, The Netherlands. This study was funded by the Netherlands Foundation for Mental Health, Utrecht, The Netherlands (project 2001-5484).

Rotterdam, 2009

Toward an Optimal Treatment for Childhood Anxiety Disorders:
The influence of parental psychopathology, selective attention, and cognitive coping

Naar een optimale behandeling van angststoornissen op de kinderleeftijd:
De invloed van ouderlijke psychopathologie, selectieve aandacht en cognitieve coping

Proefschrift

ter verkrijging van de graad van doctor aan de
Erasmus Universiteit Rotterdam
Op gezag van de rector magnificus

Prof.dr. S.W.J. Lamberts

en volgens het besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op
woensdag 17 juni 2009 om 9:45 uur

door

Jeroen Silvester Legerstee
geboren te Rotterdam

Promotiecommissie

Promotor:	Prof.dr. F.C. Verhulst
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General Introduction

General Introduction

Childhood Anxiety Disorders

Anxiety is an adaptive emotional response to danger or threat. All children experience anxiety as part of their normal development. Anxiety levels differ between children and depend upon children's stage of development. At some moments, children may experience excessive, exaggerated or disproportionate anxious feelings. These anxious feelings become a problem when they prevent children form enjoying their normal activities for a long period of time. The cardinal feature of anxiety disorders is that these anxious feelings interfere with daily life functioning. Anxiety disorders are categorized within the Fourth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; APA, 1994), including *specific phobia, social phobia, separation anxiety disorder, generalized anxiety disorder, panic disorder, agoraphobia, obsessive-compulsive disorder, acute stress disorder, and post-traumatic stress disorder.*

Childhood anxiety disorders have been associated with poor social and academic functioning, low self-esteem, deficient interpersonal skills, and developmental difficulties (Pine, 1997). Anxiety disorders are among the most common psychiatric disorders experienced by children and adolescents (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Essau, Conradt, & Petermann, 2000). Prevalence studies have reported rates of childhood anxiety disorder between 5% and 18 (Essau et al., 2000; Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998). Approximately 20% of all children will develop an anxiety disorder during their life (Bijl, Ravelli, & van Zessen, 1998). Anxiety disorders particularly become manifest between the age of 10 and 25 years (Michael, Zetsche, & Margraf, 2007), although age of onset differs between anxiety disorder subtypes. Separation anxiety disorder and specific phobia, for instance, generally have an earlier age of onset than social phobia, generalized anxiety disorder and panic disorder. Furthermore, anxiety disorders are twice as common among girls as among boys (Lewinsohn et al., 1998). Substantial comorbidity exists among anxiety disorders as well as between anxiety disorders and other psychiatric disorders (Bernstein, Borchardt, & Perwien, 1996; Lewinsohn, Zinbarg, Seeley, Lewinsohn, & Sack, 1997). Furthermore, childhood anxiety disorders tend to persist and with increasing age they often result in other psychiatric disorders, particularly in depressive disorders (Bittner et al., 2007; Cole, Peeke, Martin, Truglio, & Seroczynski, 1998; Costello et al., 2003; Essau, Conradt, & Petermann, 2002; Woodward & Fergusson, 2001).

Several child characteristics and environmental characteristics have been identified as risk factors for the development of childhood anxiety disorders. Child factors that have been related to the etiology of anxiety disorders are behavioral inhibition (Kagan, Reznick, & Gibbons, 1989; Perez-Edgar & Fox, 2005), anxiety sensitivity (Kearney, Albano, Eisen, Allan, & Barlow, 1997), attachment (Warren, Huston, Egeland, & Sroufe, 1997), information processing biases (Mathews & MacLeod, 2002; Watts & Weems, 2006), neurophysiological characteristics (Pine et al., 1998), and genetics (Smoller, Gardner-Schuster, & Misiaszek, 2008).

Environmental risk factors for the development of childhood anxiety disorders are life events (Boer et al., 2002), parenting (Bögels & Brechman-Toussaint, 2006; Gar & Hudson, 2008), and parental psychopathology (Schreier, Wittchen, Hofler, & Lieb, 2008). Anxiety disorders are thought to develop through a complex interaction between various child and environmental risk factors (e.g., Rutter, Moffitt, & Caspi, 2006).

Given the high prevalence of childhood anxiety disorders, their tendency to persist into adolescence and adulthood, and their association with psychosocial impairments, effective treatment is of great importance. In the last two decades considerable progress has been made as to the treatment of childhood anxiety disorders. The most efficacious, evidence-based, psychotherapeutic treatment for childhood anxiety disorders is Cognitive-Behavioral Therapy (CBT). CBT is a psychotherapeutic intervention consisting of several components, including: psycho education, exposure, cognitive restructuring, relaxation training, coping skills training, contingency management, relapse prevention, and homework assignments. Kendall (1994) conducted the first randomized controlled clinical trial on the efficacy of CBT for childhood anxiety disorders. More than 20 randomized-controlled studies have been executed since the first study of Kendall (1994). These studies have consistently shown that CBT is an efficacious treatment for childhood anxiety disorders in comparison to a waiting list or attention control condition (for comprehensive reviews see: Barrett, 1998; Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; Compton et al., 2004; In-Albon & Schneider, 2007; James, Soler, & Weatherall, 2005; Roblek & Piacentini, 2005; Scott, Mughelli, & Deas, 2005; Silverman, Pina, & Viswesvaran, 2008; Watson & Rees, 2008). Approximately 50% to 70% of anxiety-disordered children and adolescents are free of their primary anxiety diagnosis after the completion of CBT (In-Albon & Schneider, 2007). These treatment effects have been shown to maintain at long-term follow-up assessment of 5 to 7 years (Barrett, Duffy, Dadds, & Rapee, 2001).

Despite the proven efficacy of CBT, a substantial proportion of anxiety-disordered children and adolescents do not profit from CBT. Gaining insight in the differential characteristics of children who respond and do not respond to CBT as well as in the mechanism underlying treatment success are of clinical importance, since it may improve current treatment programs.

Objectives of the present dissertation

The objective of the present dissertation was twofold and consequently the present dissertation encompassed studies into two different areas. The first objective was to examine predictors and potential mediators of CBT success in anxiety-disordered children and adolescents (*'study on predictors and potential mediators of CBT success')*. Within this study, the predictive power of parental psychopathology and selective attention, respectively, on CBT success was examined. Additionally, changes in selective attention during CBT were studied in relation to CBT success.

The second objective of the present dissertation was to examine whether cognitive coping strategies should be addressed in CBT for childhood anxiety disorder. In order to address this, it must first be demonstrated that childhood anxiety disorders are associated with maladaptive cognitive coping responses. Therefore, anxiety-disordered children and adolescents and their nonanxious counterparts were compared as regards cognitive coping strategies *('study on cognitive coping')*. This particular study was executed to identify differences in cognitive coping strategies between anxiety-disordered and nonanxious children and adolescents, respectively.

Current knowledge on the main topics (parental psychopathology, selective attention, and cognitive coping) and the relevance to investigate these topics in relation to childhood anxiety disorders will be first outlined. Subsequently, the methods (i.e., inclusion, sample, instruments) will be described separately for the:

- 'Study on predictors and potential mediators of CBT success': parental psychopathology and selective attention
- 'Study on cognitive coping': cognitive coping strategies

Finally, the structure of the present dissertation will be outlined.

Study on predictors and potential mediators of CBT success

Parental psychopathology

It is well established that anxiety disorders aggregate within families (Connell & Goodman, 2002). Hettema and colleagues (2001) conducted a meta-analysis on the intergenerational aggregation of anxiety disorders. Children of anxiety-disordered parents appeared to be at a 4 to 6 times increased risk of developing an anxiety disorder than children of nonanxious parents. Such intergenerational aggregation has been documented for all anxiety disorder subtypes. Recently, Hirshfeld-Becker and colleagues (2008) combined all studies that have been conducted on familial aggregation of anxiety disorders, and showed that the rate of anxiety disorders in offspring of anxiety-disordered parents was 37% compared to 15% among offspring of nonanxious parents. The risk for developing an anxiety disorder in children is related to the number of parents affected. In a study of Merikangas and colleagues (1999), the prevalence rate of any anxiety disorder among offspring was 9% when both parents were nonanxious, compared to 34% and 68% when one parent or both parents, respectively, had an anxiety disorder. Vice versa, studies that examined parents of anxiety-disordered children also found evidence for the familiarity of anxiety disorders (Cooper, Fearn, Willetts, Seabrook, & Parkinson, 2006; Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991; Swartz et al., 2005; van Gastel, Legerstee, & Ferdinand, 2009). Parental depression is also associated with an increased risk of anxiety disorder among children (Lieb, Isensee, Hofler, Pfister, & Wittchen, 2002;

Nomura, Wickramaratne, Warner, Mufson, & Weissman, 2002; Weissman et al., 2005).

Relatively few studies have been conducted on the impact of parental anxiety on CBT outcome in their anxious children, with mixed and contradictory results. Some studies found that parental anxiety has a negative effect on children's CBT outcome (Berman, Weems, Silverman, & Kurtenis, 2000; Cobham, Dadds, & Spence, 1998; Creswell, Willetts, Murray, Singhal, & Cooper, 2008; Liber, van Widenfelt, Goedhart et al., 2008; Southam-Gerow, Kendall, & Weersing, 2001). Other researchers did not find any association between parental anxiety and children's treatment outcome (Crawford & Manassis, 2001; Victor, Bernat, Bernstein, & Layne, 2006; Wood, Piacentini, Southam-Gerow, Chu, & Sigman, 2006), while other even found a positive effect of parental anxiety on treatment outcome (Thienemann, Moore, & Tompkins, 2006; Toren et al., 2000). These diverse findings might be accounted for by different study methods, such as sample size, sample characteristics, treatment protocol, child anxiety assessment (e.g. questionnaires versus 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 mainly studied, whereas the role of paternal psychopathology was often neglected.

The present dissertation examined the specific contribution of maternal and paternal internalizing psychopathology on children's CBT success.

Selective attention

Recent experimental studies have shown that selective attentional processing is an underlying mechanism in the development of anxiety (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002; Mathews & Mackintosh, 2000). These results might implicate that reductions of selective attention are associated with diminished anxiety (Mobini & Grant, 2007).

Several experimental paradigms have been used to assess selective attention in anxiety-disordered children. The dot-probe task is considered the most effective measure to assess threat-related selective attention (Dalgleish et al., 2003). In this task, two pictures that differ in emotional valence (i.e., threat or neutral) are simultaneously shown on a computer screen (see figure 2). Immediately after the picture-pair disappears, a probe appears on the spatial location of one of the preceding pictures. Participants are instructed to press a button that corresponds to the spatial location of the probe (e.g., left or right).

Differences in response latencies for probes replacing threatening pictures versus probes replacing neutral pictures provide a score for selective attention (MacLeod & Mathews, 1988). Selective attention toward threat is indicated by faster responses to probes that appear on the spatial location of threatening pictures as compared to probes that appear on the spatial location of neutral pictures. Slower responses to probes that replace threatening pictures compared to probes that replace neutral pictures, indicate selective attention away from threat.

Studies in anxious children with the pictorial dot-probe task found both evidence for

selective attention toward threat (e.g., Monk et al., 2008; Roy et al., 2008) as well as for selective attention away from threat (e.g., Pine et al., 2005). These divergent findings might be caused by differences in the threat value of the stimuli. It has been suggested that selective attention toward high threat is common for all children, regardless of anxiety problems (Mathews & Mackintosh, 2000). High anxious children are assumed to display a greater selective attention toward mildly threatening stimuli than nonanxious children, as a result of their increased subjective arousal (Wilson & MacLeod, 2003).

As to the predictor and moderator effect of selective attention on treatment success, studies in relatively small samples have generally shown that a predisposition to selectively attend to threat in anxious adults can be minimized or even eliminated by CBT (Devineni, Blanchard, Hickling, & Buckley, 2004; Foa & McNally, 1986; Lavy, van den Hout, & Arntz, 1993; Lundh & Öst, 2001; Mattia, Heimberg, & Hope, 1993; Watts, McKenna, Sharrock, & Trezise, 1986). As far as we know only one study has been conducted on changes of selective attention in children. Waters and colleagues (2008) investigated pre- versus posttreatment changes of selective attention in a sample of 19 anxiety-disordered children, aged between 8 to 12 years. In contrast to adults CBT studies, these researchers found that selective attention toward threat, assessed with the pictorial dot-probe task, did not decrease during the course of CBT in anxiety-disordered children. Due to the small samples sizes of these studies, the association between reductions of selective attention and concomitant anxiety reductions could not be sufficiently examined. Additionally, no prior study has examined whether selective attention is predictive of treatment success.

The present dissertation addressed these gaps in knowledge described above.

Present study

Inclusion criteria

Eligible for participation were children (aged 8-12) and adolescents (aged 12-16) consecutively referred between September 2002 and May 2007 to the outpatient clinics to one of both centers. As part of the routine intake procedure, all children and adolescent and their parents were interviewed with the Anxiety Disorders Interview Schedule for Children (ADIS-C; Siebelink & Treffers, 2001; Silverman & Albano, 1996). Children and adolescents who received an ADIS-C diagnosis of separation anxiety disorder, generalized anxiety disorder, social phobia, or specific phobia as primary anxiety diagnosis were included in the present study.

Exclusion criteria

Exclusion criteria were: an IQ below 85, poor command of the Dutch language, serious physical condition, substance abuse, selective mutism, pervasive developmental disorder, obsessive-compulsive disorder, schizophrenia, other psychotic disorders, panic disorder, posttraumatic stress disorder, and acute stress disorder. None of the anxiety-disordered children received medication for their anxiety disorder during treatment. Five children with co-morbid attention deficit/hyperactivity disorder (ADHD) received ADHD related medication; the dosage of this medication was held constant throughout the study.

Patient sample

A total of 133 children and 51 adolescents, who met the inclusion criteria, and their parents, gave written informed consent and these children and adolescents were enrolled in the larger treatment outcome study. Children were randomly assigned in sequence of six to receive either ICBT or GCBT. Data of 6 children were not included in the statistical procedures, because 2 children and their parents refused to be treated in a group and 4 children 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.

Treatment

Treatment comprised a standardized stepped-care CBT program for childhood anxiety disorders, consisting of two phases. Phase one consisted of the FRIENDS program (Barrett, Lowry-Webster, & Turner, 2000a, 2000b; Utens, Nijs de, & Ferdinand, 2001; Utens, Van Dam, & Ferdinand, 2001), a standardized CBT, which comprised psycho-education, relaxation and breathing exercises, exposure, problem solving skills training, social support training, and cognitive restructuring. FRIENDS comprised 10 child sessions and 4 separate parent sessions. Children up to 12 years of age were randomly assigned in sequences of 6 to receive either individual CBT (ICBT) or group CBT (GCBT). Children older than 12 years of age received ICBT. Children, who were not successfully treated after phase one, received supplementary CBT (i.e., phase two).

Phase two consisted of 10 standardized child-parent CBT sessions (Van Widenfelt, Franswa, Utens, Van der Toorn, & Liber, 2002). Parents were more actively involved than in phase one and participated in all sessions. The skills learned during phase one were further elaborated upon (e.g., cognitive restructuring, exposure and long-term relapse control). Furthermore, phase two was aimed to modify negative communication processes between parents as to anxiety, negative parent-child communication, cognitions of parents, and the impact of parental anxiety on the child's avoidant behavior and anxiety.

Instruments

At pretreatment assessment, the ADIS-C, Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997; Utens & Ferdinand, 2000), Children's Depression Inventory (CDI; Koot & Widenfelt van, 2000; Kovacs, 1992), Child Behavior Checklist (CBCL; Achenbach, 1991; Verhulst, Ende van der, & Koot, 1996), and the Probe-Detection Task (PDT) were obtained. After phase 1 CBT, the ADIS-C, MASC, CDI, CBCL were obtained. One-year after the start of CBT, the ADIS-C, MASC, CDI, CBCL, and PDT were obtained. During the standardized stepped-care CBT program, parents were interviewed with the Composite International Diagnostic Interview (CIDI 2.1; WHO, 1997) to assess lifetime and current anxiety and mood disorders.

Study on Cognitive coping

Cognitive coping strategies

Cognitive coping is defined as the cognitive way of managing the intake of emotionally arousing stimuli (Garnefski, Kraaij, & Spinhoven, 2001; Thompson, 1991). Cognitive coping has been studied mainly in children and adolescents from the general community. Both in children and adolescents, the use of specific cognitive coping strategies, after the experience of negative life events, has been related with emotional problems. Studies in adolescents have shown that the strategies rumination, catastrophizing and self-blame are positively associated with anxiety symptoms in adolescents (Garnefski et al., 2001; Garnefski, Legerstee, Kraaij, Van Den Kommer, & Teerds, 2002; Thompson, 1991). Other strategies were shown to be adaptive for psychological adjustment, such as positive reappraisal (Garnefski et al., 2001). Cognitive coping strategies have been recently examined in general community sample of nine to eleven year old children (Garnefski, Rieffe, Jellesma, Terwogt, & Kraaij, 2007). A considerable percentage of the variance in fearfulness could be explained by the use of specific cognitive coping strategies. In addition, the findings in children were comparable with those in adolescents. Self-blame, rumination and catastrophizing appeared to be positively related with fearfulness, whereas positive reappraisal appeared to be negatively related to fearfulness.

As cognitive coping strategies show such strong relationships with anxiety problems in the general community, it was considered worthwhile to examine cognitive coping strategies in anxiety-disordered children and adolescents. Knowledge on cognitive coping in anxiety-disordered children and adolescents may provide important direction for the treatments of childhood anxiety disorders.

Present study

The present study compared the use of cognitive coping strategies between anxiety-disordered and nonanxious children and adolescents, respectively. The present study encompassed 4 samples.

Clinical child sample

Eligible for participation were children (aged 9-11) consecutively referred between January 2005 and May 2008 to the Department of Child and Adolescent Psychiatry of the Erasmus Medical Center, Sophia Children's Hospital. Before intake, the kids version of the Cognitive Emotion Regulation Questionnaire (CERQ-k; Garnefski et al., 2007) was sent to the home addresses of 179 children. As part of the routine intake procedure, all children and their parents were interviewed with the ADIS-C. In total, 131 children fulfilled the criteria of an ADIS-C anxiety diagnosis.

Clinical adolescent sample

Eligible for participation were adolescents (aged 12-16) consecutively referred between February 2004 and June 2007 to the Department of Child and Adolescent Psychiatry of the Erasmus Medical Center, Sophia Children's Hospital. Before intake, 179 adolescents were sent the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001) to their home addresses. As part of the routine intake procedure, all adolescents and their parents were interviewed with the ADIS-C. In total, 159 adolescents fulfilled the criteria of an ADIS-C anxiety diagnosis.

General community child sample

A general community sample was recruited from 11 primary public schools. The same standardized recruitment procedures were used at the 11 schools. Children were included if they were between 9 and 11 years old. Seven hundred seventeen children filled out the CERQ-k and the Dutch version of the Revised Fear Survey Schedule for Children (FSSC-R; Ollendick, 1983; Oosterlaan, Prins, & Sergeant, 1995). We refer to Garnefski et al. (2007) for a full description of the sample.

Children were selected from this general community sample that were nonanxious based on the FSSC-R. The final nonanxious child sample consisted of 452 children.

General community adolescent sample

A general community sample was recruited from 3 different state schools, with adolescents attending the second and third grade. Adolescents were included if they were between 12 and 16 years of age. Five hundred ninety-seven adolescents filled out the CERQ (Garnefski et al., 2001) and the Symptom Checklist (SCL-90; Derogatis, 1977). We refer to Garnefski et al. (2002) for a full description of the sample. Adolescents were selected from this general community sample that were nonanxious based on the SCL-90. The final nonanxious adolescent sample consisted of 370 adolescents.

Structure of the present dissertation

In chapter 2 of this dissertation, the predictive value of maternal and paternal psychopathology on children and adolescents' CBT success was examined. In chapter 3, it was investigated whether selective attention is predictive of phase 1 CBT success in anxiety-disordered children and adolescents. In chapter 4, the association between changes of selective attention and anxiety reductions during standardized stepped-care CBT was examined. In chapter 5, anxiety-disordered children were compared with nonanxious children as regards cognitive coping. In chapter 6, the use of cognitive coping strategies was compared between anxiety-disordered and nonanxious adolescents. Finally, chapter 7 provides a general discussion of the present dissertations' results.

2

Maternal anxiety predicts favorable treatment outcomes in anxiety-disordered adolescents

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Acta Psychiatrica Scandinavica 2008, 117: 289–298

Abstract

Objective: To determine the differential impact of maternal and paternal internalizing psychopathology on cognitive-behavioral 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 favorable treatment outcomes in adolescents. Paternal disorders were not associated with treatment response.

Key words: anxiety disorders, children, adolescents, cognitive-behavioral treatment, maternal and paternal internalizing psychopathology

Introduction

Epidemiological studies have demonstrated that anxiety disorders are the most common mental disorders in children and adolescents (Verhulst, van der Ende, Ferdinand, & Kasius, 1997). Childhood anxiety disorders are associated with significant impairment in academic and social functioning (Ialongo, Edelsohn, Werthamer-Larsson, Crockett, & Kellam, 1995; Pine, 1997), and if untreated, result in mental disorders in adulthood, including, anxiety disorders, substance abuse, and major depression (Kendall, Safford, Flannery-Schroeder, & Webb, 2004; Woodward & Fergusson, 2001). 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-behavioral therapy (CBT; In-Albon & Schneider, 2007). 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 (Victor et al., 2006). Anxiety and depressive disorders are often found among parents of children with an anxiety disorder (Cooper et al., 2006), and parental internalizing psychopathology seems to be involved in the development and maintenance of childhood anxiety (Rapee, 1997). In their meta-analysis, Hettema et al. (2001) found that the magnitude of familial aggregation of anxiety disorders is large, with odds ratios ranging from about four to six, 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 (Hettema et al., 2001; MacLeod, Wood, & Weisz, 2007).

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 (Berman et al., 2000; Cobham et al., 1998; Crawford & Manassis, 2001; Southam-Gerow et al., 2001). Other recent studies did not find any association between parental internalizing psychopathology and treatment outcome (Victor et al., 2006; Wood et al., 2006). Finally, two studies even demonstrated that anxious children with anxious mothers had more favorable treatment outcomes compared to children with nonanxious mothers (Thienemann et al., 2006; Toren et al., 2000). 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 versus 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 (Bögels & Phares, 2008). 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 to 12 years old (Crawford & Manassis, 2001). They found paternal somatization, and not paternal and maternal anxiety, to be predictive of less favorable 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 behaviors can also impede the development of adolescents. It has been shown that parental control, involving less autonomy granting behavior, less support for independence, and parental over involvement, is associated with childhood anxiety (MacLeod et al., 2007). 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 and colleagues (Berman et al., 2000) 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 stronger negative factor in the treatment of young children as compared with adolescents.

The aim of the present study was to investigate (1) 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 2) 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 outpatient clinic of the Child and Adolescent Psychiatry Department, Leiden University Medical Center and Erasmus Medical Center, Sophia Children's Hospital. Children 12 years of age were assigned to child versus 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; (Silverman & Albano, 1996).

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), Posttraumatic 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 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: Liber, van Widenfelt, Utens et al., 2008). Children were randomly assigned in sequences of 6 to receive either individual CBT (ICBT) or group CBT (GCBT). Data of 6 children were not included in statistical procedures, because 2 children and their parents refused to be treated in a group and 4 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 (Siebelink & Treffers, 2001; Silverman & Albano, 1996) 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 the present study, the ADIS-C 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 Attention Deficit/Hyperactivity Disorder (ADHD). According to the ADIS-C manual (20), the interviewer gave an interference rating on a 9-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 (Lyneham, Abbott, & Rapee, 2007; Silverman, Saavedra, & Pina, 2001) have shown that the interrater and test-retest reliability of the ADIS-C 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; March et al., 1997; Utens & Ferdinand, 2000) and by the Dutch version of the Children's Depression Inventory (CDI; Koot & Widenfelt van, 2000; Kovacs, 1992). The total score was used in both measures. The MASC (March et al., 1997) is a self-report measure of general anxiety in children and includes 39 items. The internal reliability (Cronbach's alpha of .87 for boys and .88 for girls) of the total score is excellent and the test-retest reliability (intra class correlation coefficient of .87 for the total score of children) are excellent (March et al., 1997; March & Sullivan, 1999). Reliability analyses of the Dutch version revealed a Cronbach's alpha of .9 (*N*= 299; age 8-12) and a test-retest correlation of .8 (*n*=196, age 8-12).

The CDI is a 27-item scale suited for monitoring changes in a child's mood (Kovacs, 1992). It has good internal consistency (alphas ranging from .71 (outpatient group) to .89) and acceptable test-retest reliability (correlation of .75). For the Dutch translation Cronbach's alpha was .8 for elementary school children (*N*= 649; age 8-12).

Parent-report measure

The Child Behavior Checklist (CBCL; Achenbach, 1991) is a 113-item questionnaire to obtain standardized parent's reports of behavioral and emotional problems in children aged 7-17 years. Parents rate their child's behavior during the preceding six months on a 3-point scale. Good validity and reliability of the CBCL have been established (Achenbach, 1991).

Parental diagnostic assessment

The CIDI 2.1 (WHO, 1997) 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 (Andrews & Peters, 1998; Wittchen, 1994).

Treatment

Participants were treated with the Dutch translation of the FRIENDS program (Barrett et al., 2000a, 2000b; Utens, Nijs de et al., 2001; Utens, Van Dam et al., 2001). The FRIENDS program is a structured CBT, which comprises psycho-education, relaxation and breathing exercises, exposure, problem solving skills training, social support training, and cognitive restructuring training. This program contains ten child or adolescent sessions and four parent sessions. FRIENDS is probably efficacious for treatment of childhood anxiety disorders (Shortt, Barrett, & Fox, 2001; WHO, 2004).

Treatment success

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

Procedure

During the intake procedure and one-week post treatment, children and adolescents, and their parents were separately interviewed with the ADIS-C. About two weeks pre treatment and one week post treatment, the MASC, CDI, and CBCL 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, 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 Center in Rotterdam and the Leiden University Medical Center 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.

Firstly, binary logistic regression analyses were performed to predict treatment outcome, yielding odds ratios (OR), the Cox & Snell R square, the Nagelkerke R square, 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 an 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 Clinician Severity Rating scores (i.e. CSR of the ADIS-C) was analyzed 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 analyzed 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 Group CBT (GCBT) and 65 children (35 boys and 30 girls) received Individual CBT (ICBT). Adolescents all 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 center, and social economic status (SES). SES was coded using the classification of the Dutch Central Bureau of Statistics (2003).

Table 1. Demographic characteristics and pretreatment diagnoses in children and adolescents.

	Children (*n*=127)		Adolescents (*n*=51)		χ^2	*p*
	n	(%)	*n*	(%)		
Gender					2.38	.12
Boys	71	(56)	22	(43)		
Girls	56	(44)	29	(57)		
Center					0.01	.91
Leiden	41	(32)	16	(31)		
Rotterdam	86	(68)	35	(69)		
SES					0.03	.87
Low	18	(14)	4	(8)		
Middle	59	(47)	24	(47)		
High	50	(39)	23	(45)		
Anxiety Diagnosis						
SAD	62	(49)	14	(28)	6.79	.01
GAD	60	(47)	30	(59)	1.95	.16
SP	44	(35)	12	(24)	2.09	.15
SOP	42	(33)	30	(59)	10.0	.00
PAD	0	(--)	1	(2)	2.50	.29
AGP	2	(2)	1	(2)	0.03	1.00
Comorbid Diagnosis						
MDD	2	(2)	3	(6)	2.47	.14
DYS	6	(5)	7	(14)	4.36	.05
ADHD	13	(10)	1	(2)	3.33	.12

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.

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

Table 2. Lifetime and current diagnoses in mothers and fathers.

	Mothers (*n*=153)				Fathers (*n*=127)			
	Lifetime		Current		Lifetime		Current	
	n	(%)	*n*	(%)	*n*	(%)	*n*	(%)
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)

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: Posttraumatic Stress Disorder; MDD: Major Depressive Disorder; DYS: Dysthymia

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 specific phobia. The most prevalent lifetime paternal disorder was MDD. MDD was also the most prevalent current disorder among fathers along with specific phobia. Specific phobia 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 (χ^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 (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 (χ^2: 1.45, p= 0.23).

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)[a]	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)[a]	0.02
Interaction: Maternal anxiety disorder X gender	0.84	(0.03 - 20.27)	0.91

[a] Cox and Snell R^2= 0.15; Nagelkerke R^2= 0.21; Percentage correct = 74%

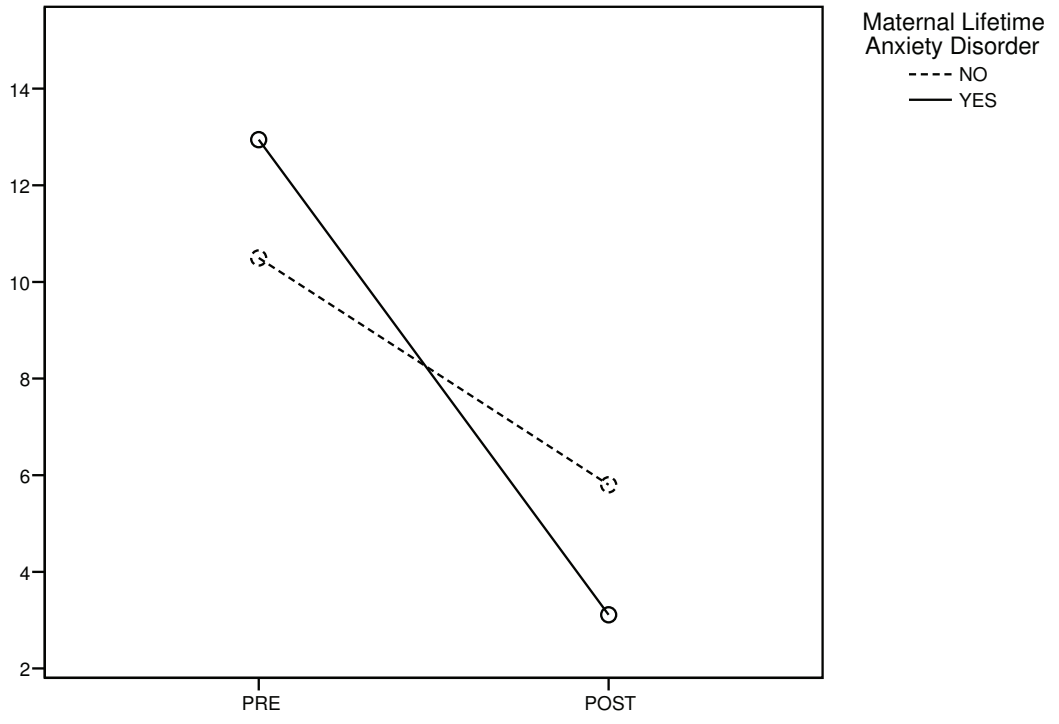
OR = Odds Ratio, CI = Confidence Interval

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 square) to 21% (Nagelkerke R square) 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 nonanxious mothers.

Figure 1. Mean pre treatment and post treatment scores on the Clinician Severity Rating (CSR) for adolescents with lifetime anxiety-disordered mothers and nonanxious mothers.



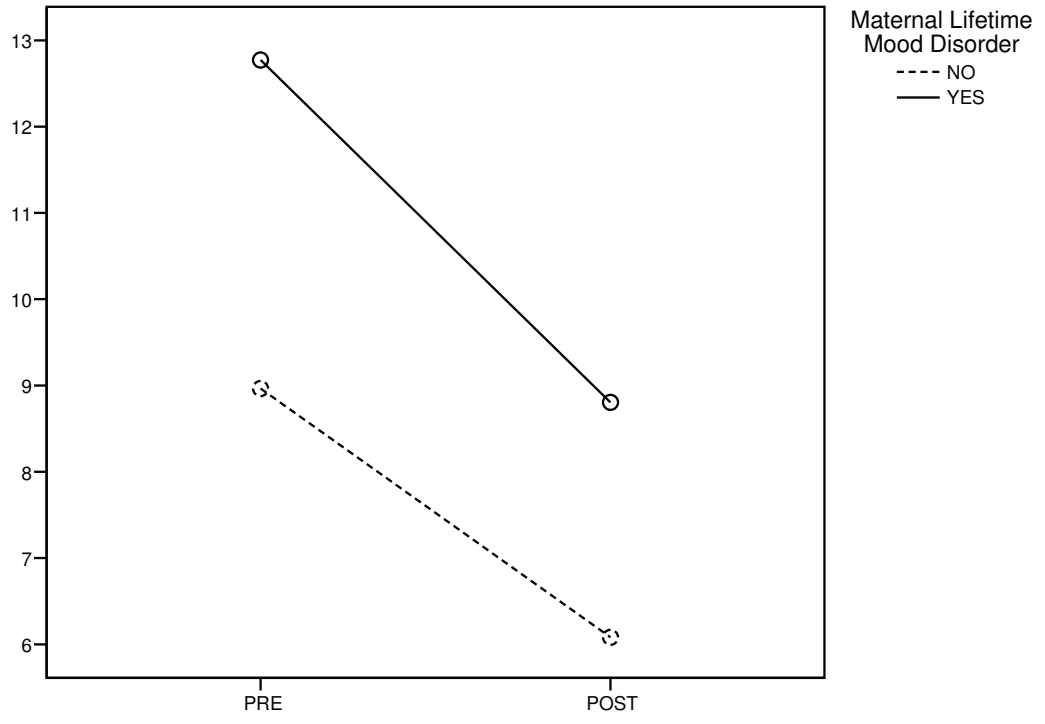
Association between lifetime maternal and paternal internalizing psychopathology and pre-post treatment changes in Clinician Severity Rating

Repeated measure ANOVA for children showed that there were neither significant main effects nor interaction effects with 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 nonanxious 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.

Figure 2. Mean pre treatment and post treatment scores on the CBCL for adolescents with lifetime mood-disordered mothers and mothers without a lifetime mood disorder.



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

Repeated measure MANOVA's for children showed no significant main or interaction effects with time of maternal and paternal lifetime anxiety and 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 MANOVA's 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 (Figure 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.

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 nonanxious mother. Maternal lifetime anxiety disorders explained a large amount of variance in treatment outcome (Cohen, 1988). 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 nonanxious 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 versus 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 (Berman et al., 2000; Cobham et al., 1998; Southam-Gerow et al., 2001). The two previous studies (Thienemann et al., 2006; Toren et al., 2000) 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 (Dadds, Spence, Holland, Barrett, & Laurens, 1997). 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 (Choudhury, Pimentel, & Kendall, 2003). 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 (Chilcoat & Breslau, 1997; Comer & Kendall, 2004) 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. Firstly, 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 (Cobham et al., 1998). Additionally, other studies have demonstrated that parental psychopathology often improves over the course of CBT of their children (Crawford & Manassis, 2001), 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 with 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 focused on communication, contingency management and psycho education. 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 nonanxious parents (Ballash, Leyfer, Buckley, & Woodruff-Borden, 2006; MacLeod et al., 2007; Whaley, Pinto, & Sigman, 1999). 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 (Ballash et al., 2006). Autonomous functioning is an important emerging developmental need for adolescents (Steinberg, Elmen, & Mounts, 1989) 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 favorable 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-focused CBT, child-only CBT,

and parent-only CBT). 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 (2002) have demonstrated that maternal psychopathology is more closely associated with the presence of internalizing problems in children than paternal psychopathology. Additionally, controlling behavior of mothers is more closely related to adolescent's psychological functioning than that of fathers (Eastburg & Johnson, 1990). 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 (In-Albon & Schneider, 2007). In multiple studies treatment success is defined as being free of the primary anxiety diagnosis after treatment (e.g., Thienemann et al., 2006). In the present study we defined treatment success as being free of any anxiety disorder posttreatment, which is a stricter criterion. 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 versus 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.

Acknowledgements

The researchers thank Adelinde van der Leeden of Leiden University Medical Center/ Curium for her conscientious help in the assembling of treatment data. This study has been made possible due to financial aid of the Netherlands Foundation for Mental Health, situated in Utrecht (project 2001-5484).

3

Threat-related selective attention predicts treatment success in childhood anxiety disorders

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Journal of the American Association of Child and Adolescent Psychiatry 2009, 48:196-205

Abstract

Objective: The present study examined whether threat-related selective attention was predictive of treatment success in anxiety-disordered children and whether age moderated this association. Specific components of selective attention were examined in treatment responders and nonresponders.
Method: Participants consisted of 131 anxiety-disordered children (aged 8-16 years), who received standardized cognitive-behavioral therapy (CBT). At pretreatment, a pictorial dot-probe task was administered to assess selective attention. Both at pretreatment and posttreatment, diagnostic status of the children was evaluated with a semi-structured clinical interview (the Anxiety Disorders Interview Schedule for Children).
Results: Selective attention for severely threatening pictures at pretreatment assessment was predictive of treatment success. Examination of the specific components of selective attention revealed that nonresponders showed difficulties to *disengage* their attention away from severe threat. Treatment responders showed a tendency not to *engage* their attention toward severe threat. Age was not associated with selective attention and treatment success.
Conclusion: Threat-related selective attention is a significant predictor of treatment success in anxiety-disordered children. Clinically anxious children with difficulties disengaging their attention away from severe threat profit less from CBT. For these children, additional training focused on learning to disengage attention away from anxiety-arousing stimuli may be beneficial.

Key words: anxiety disorders, children, selective attention, threat, dot-probe task

Introduction

Anxiety disorders are the most prevalent psychiatric disorders among children and adolescents (Verhulst et al., 1997), are associated with considerable impairments in social and academic functioning (Pine, 1997), and constitute a risk factor for the development of other psychiatric disorders in adolescence and adulthood (Bittner et al., 2007). Several randomized controlled trials have demonstrated that 50% to 70% of anxiety-disordered children are free of their primary anxiety diagnosis after cognitive-behavioral therapy (CBT) (In-Albon & Schneider, 2007). A substantial minority of anxiety-disordered children, however, does not show a clinically significant improvement after CBT. Gaining insight in the differential characteristics of children who respond and do not respond to CBT may aid in improving current treatment programs.

Biased attentive processing, along with other distorted cognitive information processes, is hypothesized to be involved in the etiology and maintenance of anxiety disorders (Watts & Weems, 2006). Indeed, studies in both clinical and community samples have shown with different experimental paradigms that anxious children tend to selectively allocate their attention toward threatening information in the context of other non-threatening information, although this trend is not apparent in nonanxious children (Martin, Horder, & Jonges, 1992; Roy et al., 2008; Taghavi, Dalgleish, Moradi, Neshat-Doost, & Yule, 2003; Vasey, Daleiden, Williams, & Brown, 1995; Vasey, el-Hag, & Daleiden, 1996). Selective attention toward threat in children is specific for anxiety disorders and not for other psychiatric disorders, such as major depression (for a comprehensive review see Puliafico and Kendall, 2006). Selective attention toward threat can reflect a quick orientation (i.e., vigilance) toward threatening stimuli and/or a difficulty to disengage attention away from threatening stimuli (Posner & Petersen, 1990). Research in adults has shown that selective attention toward threat reflects attention disengagement difficulties rather than vigilance to threat (Koster, Crombez, Verschuere, & De Houwer, 2004; Salemink, van den Hout, & Kindt, 2007). These specific components of selective attention have not been examined in anxious children.

Selective attention toward threat has been demonstrated particularly in studies with written words as target stimuli. Performance on experimental tasks on selective attention with lexical stimuli, however, can be influenced by differences in individuals' reading abilities and by familiarity with specific threat-related words (McNally, Riemann, & Kim, 1990). Additionally, the ecological validity of words is questionable (Schippell, Vasey, Cravens-Brown, & Bretveld, 2003). The pictorial dot-probe paradigm is considered to be the most effective measure to assess selective attention (Dalgleish et al., 2003). In the pictorial dot-probe task, two pictures that differ in emotional valence (i.e., threat or neutral) are simultaneously presented for a short time on a computer screen. Subsequently, the picture pair disappears, after which a probe appears on the spatial location of one of the preceding pictures. Participants are asked to press a button that corresponds to the spatial location of the probe (i.e., left or right), and the RL is recorded. It is assumed that anxious individuals selectively attend to threat-related information and

therefore will respond faster to probes that appear on the spatial location of threatening picture as compared with probes that appear on the spatial location of neutral pictures.

The scarce number of studies that have used a pictorial dot-probe task in anxious children found mixed and contradictory results. In general community samples, an association has been consistently found between selective attention and childhood anxiety, although the type of selective attention (i.e., toward or away from threat) differed (Heim-Dreger, Kohlmann, Eschenbeck, & Burkhardt, 2006; Kallen, Ferdinand, & Tulen, 2007; Watts & Weems, 2006). Such divergent findings have also been reported in relatively small clinical samples of anxiety-disordered children (Pine et al., 2005; Waters, Lipp, & Spence, 2004). These divergent findings on the pictorial-dot-probe task in children may have resulted from age differences. Several executive functioning processes, which are believed to shape selective attention, develop considerably throughout childhood and adolescence (Luna, Garver, Urban, Lazar, & Sweeney, 2004). Through development, children become progressively more able to use strategic and controlled attentional processes (Brodeur, 2004). Additionally, differences in threat intensity of the pictures may have accounted for these divergent findings. It has been suggested that selective attention toward high threat is common to all children, regardless of anxiety problems (Mathews & Mackintosh, 2000; Waters et al., 2004). High anxious children are assumed to display a greater attention toward mildly threatening stimuli than nonanxious children, as a result of their increased subjective arousal. Previous studies have indeed indicated that anxious adults display a greater tendency than nonanxious adults to initiate increased attentional allocation toward intermediate levels of threat (Wilson & MacLeod, 2003). If left untreated, tendencies to selectively allocate attention toward intermediate levels of threat might maintain or enhance anxiety.

Studies in relatively small samples of anxiety-disordered adults have generally shown that a predisposition to selectively attend toward threat can be minimized or even eliminated by CBT (Foa & McNally, 1986; Lavy et al., 1993; Lundh & Öst, 2001; Mattia et al., 1993; Watts et al., 1986). This finding was, however, not replicated by a recent study in anxiety-disordered children (Waters, Wharton et al., 2008). Reductions of threat-related selective attention might facilitate anxiety improvement during the course of therapy (Mobini & Grant, 2007). Changes in visuospatial attentional processing during CBT might, on the other hand, by a direct by-product of anxiety changes during treatment (Mobini & Grant, 2007). Although no causal conclusions can be drawn as to the association between changes of selective attention and anxiety changes during CBT, the type (i.e., selective attention toward or away from threat) and level of threat-related selective attention at pretreatment may have predictive value for treatment success. Individual differences in visuospatial attentional processing of threatening stimuli exist between anxiety-disordered children. Anxiety-disordered children might respond differently to CBT as a function of their specific tendency to selectively allocate their attention to threatening stimuli at pretreatment.

The aim of the present study was to examine whether pretreatment selective attention is predictive of treatment outcome in a clinical sample of 131 anxiety-disordered children aged

between 8 and 16 years. The effect of age and the predictive power of different threat intensities on CBT outcome were investigated. Furthermore, specific components of selective attention (e.g., vigilance and disengagement difficulties) were examined in treatment responders and nonresponders. A pictorial dot-probe task and standardized CBT were used. We hypothesized that threat-related selective attention is predictive of treatment success in children. As selective attention toward threat tends to diminish during the course of CBT (Devineni et al., 2004; Foa & McNally, 1986; Lavy et al., 1993; Lundh & Öst, 2001; Mattia et al., 1993; Watts et al., 1986), we expected that CBT is more effective for children that show a selective attention toward threat as opposed to children that tend to selectively attend away from threat at pretreatment. Previous studies have shown that nonanxious and anxious adults differ in their allocation of attention toward mild threat as compared with severe threat (Mathews & Mackintosh, 2000; Waters et al., 2004). Because selective attentional processing of different threat intensities has never been examined in relation to treatment outcome, no hypotheses were formulated as to the effect of selective attention for mildly and severe threatening stimuli. Additionally, no specific hypotheses were formulated for the effect of age, because it might be argued that older children have more attentional control and might therefore profit more from CBT. On the other hand, older children might profit less from CBT as most of them have a more long-lasting pattern of anxiety problems than younger children.

Method

Sample

Eligible for participation were children (aged 8-16) consecutively referred between May 2003 and December 2005 to the departments of Child and Adolescent Psychiatry of the Leiden University Medical Center and the Erasmus Medical Center, Sophia Children's Hospital in Rotterdam. As part of the routine intake procedure, all children and their parents were interviewed with the Anxiety Disorders Interview Schedule for Children (ADIS-C; Silverman & Albano, 1996).

Inclusion criteria

Children with a separation anxiety disorder, generalized anxiety disorder, social phobia, or specific phobia as primary anxiety diagnoses were included.

Exclusion criteria

Exclusion criteria were as follows: an IQ below 85, poor command of the Dutch language, serious physical disease, substance abuse, pervasive developmental disorder, obsessive-compulsive disorder, posttraumatic stress disorder, and acute stress disorder. Substance abuse and pervasive developmental disordered were determined by a standard psychiatric examination during the intake procedure. IQ was determined with the Wechsler Intelligence Scale for Children- Third Edition (Wechsler, 1991). None of the anxiety-disordered children used anxiety medication during treatment. Children who received medication for comorbid ADHD were not excluded (N=5). Dosage of ADHD medication was held constant throughout the study.

The present study is part of a larger study into the effect of CBT on childhood anxiety disorders (for details see: Legerstee et al. (2008) and Liber et al. (2008)). A total of 154 children, who met the inclusion criteria, and their parents, gave written informed consent and were enrolled in the larger treatment outcome study. Children younger than 12 years of age were randomly assigned in sequences of six to receive either individual CBT (ICBT) or group CBT (GCBT). For logistic reasons (i.e., to avoid a long waiting list for GCBT), children aged between 12 and 16 years received ICBT. Data of 6 children were not included in the larger treatment outcome study (2 children refused GCBT and 4 could not be randomized due to logistic and practical reasons). As anxiety-disordered children with a comorbid depressive disorders typically do not show selective attention to threatening stimuli (Puliafico & Kendall, 2006), 10 children with a comorbid affective disorder were excluded from the present study. The experimental task was not completed in 7 children, because one child did not start with CBT, and for 6 children, it was not possible to complete the experimental task because of practical and logistic reasons.

The final sample consisted of 131 children. The characteristics of the final sample are presented in table 1. Of the 131 children, 75 children (57%) had one anxiety disorder, 40 children (31%) had two anxiety disorders, and 16 children (12%) had more than two anxiety disorders.

Table 1. Sample characteristics.

	Anxiety-Disordered Children (n = 131)
Age (SD), years	11.1 (2.0)
IQ	102.5 (12.3)
Sex, female	50%
SES,	
Low	13%
Middle	41%
High	46%
Treatment,	
ICBT	69%
GCBT	31%
Anxiety diagnosis,	
SP	32%
SOP	37%
SAD	42%
GAD	43%
PAD	1%

Note. IQ: intelligence quotient; SES: socioeconomic status; ICBT: individual cognitive-behavioral therapy; GCBT: group cognitive-behavioral therapy; SP: specific phobia; SOP: social phobia; SAD: separation anxiety disorder; GAD: generalized anxiety disorder; PAD: panic disorder.

Instruments

Anxiety Disorders Interview Schedule for Children

The ADIS-C (Siebelink & Treffers, 2001; Silverman & Albano, 1996) was used to assess the following DSM-IV diagnoses: generalized anxiety disorder, social phobia, specific phobia, separation anxiety disorder, panic disorder, agoraphobia, obsessive-compulsive disorder, posttraumatic stress disorder, dysthymia, major depressive disorder, and attention deficit/hyperactivity disorder. The ADIS-C consists of a child and parent interview. If the minimal requirements for a DSM-IV diagnosis were met, the parent or the child was asked to indicate on a 9-point scale (i.e., 0–8) to what extent the symptoms interfered with the child's daily life.

Subsequently, the interviewer gave an interference rating (Clinician Severity Rating, [CSR]), on the same 9-point scale, for the child and parent interview, separately. If the CSR was 4 or higher, a diagnosis was assigned. Several researchers (Lyneham et al., 2007; Silverman et al., 2001) have shown that the interrater and test-retest reliability of the ADIS-C are good to excellent.

Experienced and trained postdoctoral clinicians administered the ADIS-C at pretreatment. Clinicians of both institutions met several times to ensure that the procedures and decision making were alike. Master-level students conducted the ADIS-C at posttreatment. The master-level students were trained by observing live and videotaped interviews and completed an examination to prove acceptable administration of the interview. Postdoctoral psychologists reviewed, supervised, and discussed the interview reports of the master-level students during the conduct of the research project to ensure that administration, scoring, and reporting would be congruent. Interviewers were blind to pretreatment diagnoses and to the performance on the experimental task.

Treatment

Treatment consisted of the FRIENDS program (Barrett et al., 2000a, 2000b; Utens, Nijs de et al., 2001; Utens, Van Dam et al., 2001), a structured CBT, which comprises psychoeducation, relaxation, breathing exercises, exposure, problem-solving skills training, social support training, and cognitive restructuring training. FRIENDS has been found to be "probably" efficacious for the treatment of childhood anxiety disorders (Shortt et al., 2001; WHO, 2004).

Treatment success

Treatment success was defined as being free from any anxiety disorder (CSR < 4) diagnosed with the ADIS-C at posttreatment assessment.

Experimental Task

The pictorial dot-probe task was a modification of the task of Yiend and Mathews (2001). The task consisted of series of randomized severely threatening/neutral pictures (ST, N), mildly threatening/neutral (MT, N) and neutral/neutral (N, N) picture pairs. Pictures were selected from the International Affective Picture System (IAPS) (Lang, Bradley, & Cuthbert, 2001). Based on standard ratings on valence and arousal, pictures were selected from the IAPS hat were mildly threatening (i.e., low to moderate valence and moderate on arousal), severely threatening (i.e., low valence and high on arousal) and neutral (i.e., moderate valence and low on arousal).

The following pictures from the IAPS were selected: 1120; 1280; 1300; 1321; 1660; 1930; 1931; 2120; 2130; 2683; 2780; 2800; 2900.1; 3230; 3280; 3500; 3530; 5950; 6190; 6213; 6230; 6242; 6244; 6250; 6260; 6300; 6370; 6940; 7380; 7390; 8179; 9000; 9041; 9050; 9160; 9280; 9404; 9411; 9421; 9470; 9471; 9480; 9530; 9584; 9630; 9635; 9911; 9920.

Two pictures were combined in each trial: either a mildly or severely threatening picture with a neutral picture, or two neutral pictures. This yielded 37 neutral/neutral (N, N), 24 mild/neutral (MT, N) and 24 severe/neutral (ST, N) picture pairs. The location of the threatening pictures (i.e., severe or mild) was balanced (left or right of the neutral picture).

First, a white cross was presented for 500 milliseconds on the middle of a computer screen, after which a picture pair was presented horizontally during 500 milliseconds. Immediately after the picture pair disappeared, a probe appeared on the spatial location of one of the preceding pictures. The probes consisted of two white dots, positioned either next to each other or above each other. In response to the appearing probe, a corresponding key had to be pressed. Intertrial intervals varied randomly between 500, 750, 1,000 and 1,500 milliseconds.

Children were instructed to react as quickly and accurately as possible to the probe stimulus. After the instruction, 10 practice trials were completed, followed by the actual pictorial dot-probe task (3 buffer [N, N] and 72 randomized trials).

Selective attention

Based on the RLs, two selective attention scores were computed, for the severely and mildly threatening pictures (MacLeod & Mathews, 1988). First, the mean RL on trials in which the probe (p) emerged at the spatial location of the threatening picture (pT, N) was used, also named *congruent trials*. Second, the mean RL on trials in which the probe emerged at the spatial location of the neutral picture (T, pN) was used, also named *incongruent trials*. To calculate the selective attention score, the mean RL on congruent trials (pT, N) was subtracted from the mean RL on incongruent trials (T, pN). In equation:

Selective attention score = RL incongruent trials (T, pN) – RL congruent trials (pT, N)

A positive score reflects a selective attention toward threat, and a negative score reflects a selective attention away from threat. A selective attention score was calculated for severely threatening pictures (ST, pN – pST, N) and for mildly threatening pictures (MT, pN – pMT, N), separately.

Components of selective attention

Koster et al. (2004) have proposed a method to examine the specific components of selective attention (i.e., vigilance or disengagement difficulties) in dot-probe tasks, by incorporating RLs on neutral-neutral trials. Response latencies on congruent trials (pT, N) and incongruent trials (T, pN) were each compared with RLs on neutral-neutral trials (pN, N).

Selective attention toward threat (positive score) can reflect a quick orienting toward threat and/or difficulties to disengage attention away from threat (table 2) (Koster et al., 2004; Posner & Petersen, 1990; Salemink et al., 2007). Smaller RLs on congruent trials (pT, N) than on neutral-neutral trials (pN, N) indicate a quick orientation toward threat (i.e., vigilance). However, larger RLs on incongruent trials (T, pN) than on neutral-neutral trials (pN, N) indicate difficulties to disengage attention away from threat.

In our opinion, selective attention away from threat (negative score) can reflect avoidance of threat and/or the tendency not to engage attention toward threat. Smaller RLs on incongruent trials (T, pN) than on neutral-neutral trials (pN, N) indicate that the attention is directed away from threat toward the neutral picture (i.e., avoidance). Larger RLs on congruent trials (pT, N) than on neutral-neutral trials (pN, N) might reflect a tendency not to engage or shift attention toward threat (table 2).

Table 2. Specific components of selective attention.

	RL (T, N) < (pN, N)	RL (T, N) > (pN, N)
Congruent trial (pT,N)	Vigilance	Tendency not to engage attention toward threat
Incongruent trial (T, pN)	Avoidance	Difficulties to disengage attention away from threat

Note. RL: response latency; T: threat; N: neutral; p: probe.

Procedure

During the intake procedure and one week posttreatment, children and their parents were interviewed separately with the ADIS-C. Approximately two weeks before treatment, the pictorial dot-probe task was administered to the children individually, in a dark and empty room, at both institutions. Procedures complied with strict ethical standards in the treatment of human subjects and were approved by the Medical Ethical Committees of both institutions.

Statistical Analyses

Total sample

With a repeated-measures ANOVA, the pretreatment RLs were compared between neutral-neutral, mildly and severely threatening pictures. It was tested whether both the severe and mild selective attention scores showed a normal distribution with Kolmogorov-Smirnov tests, differed significantly from zero with one-sample *t*-tests, and whether the pretreatment demographic characteristics (i.e., sex, socioeconomic status [SES], intelligence quotient [IQ]) were related to either of the two pretreatment selective attention scores and to treatment success. For this purpose, ANOVA, and chi-square tests were conducted for categorical variables and correlations for continuous variables. Significant pretreatment demographic characteristics were included as covariate in the subsequent analyses.

The components of selective attention were examined by means of a repeated-measures ANOVA, with congruent trials (pT, N) versus neutral-neutral trials (pN, N) as within-subjects variables. A similar analysis was performed with incongruent trials (T, pN) versus neutral-neutral trials (pN, N). Both analyses were conducted for the mildly and severely threatening pictures, separately.

Treatment response

Overall RLs on neutral-neutral, mildly and severely threatening pictures were compared between treatment responders and nonresponders with a multivariate ANOVA (MANOVA). A binary logistic regression analysis was performed, with treatment success as the dependent variable. In the first step, the severe and mild threat selective attention scores were entered as independent variables. If preliminary analyses showed that age was significantly related to treatment success and/or either of the two selective attention scores, we examined whether age moderated the association between selective attention and treatment success. To test for a moderating effect of age, age at pretreatment was also included as an independent variable. In the second step, two interaction terms were included between age and the severe and mild selective attention scores, respectively. If one or both interaction terms explained a statistically significant amount of variance, a moderator effect was present (Bennett, 2000). Additionally, we tested whether selective attention predicts treatment success, when adjusted for pretreatment anxiety disorder severity. A blockwise multiple linear regression analysis was conducted, adjusted for pretreatment anxiety disorder severity. Posttreatment anxiety disorder severity was entered as dependent variable. Pretreatment anxiety disorder severity was entered in block one. Subsequently, the mild and severe selective attention scores were entered simultaneously in block two. Pretreatment and posttreatment anxiety disorder severity were based on the CSR of the ADIS-C.

The specific components of selective attention were examined separately for treatment responders and nonresponders by means of a repeated-measures ANOVA. Congruent trials (pT, N) versus neutral-neutral trials (pN, N) were included as within-subjects variables. A

similar analysis was performed with incongruent trials (T, pN) versus neutral-neutral trials (pN, N). Both analyses were conducted separately for mildly and severely threatening pictures.

A Bonferroni correction of the α level was used to adjust for multiple comparisons. Results were considered significant if the (two-tailed) alpha level was lower than .005 (*P*-value < .005).

Results

Data preparation

Trials with erroneous responses (2.6%) and extreme RLs (.4%; < 100 milliseconds and > 3,000 milliseconds) were discarded from further analyses, in accordance with Watts and Weems (2006).

Pretreatment analyses: total sample

Picture content

A repeated-measures ANOVA, with pretreatment RL as dependent variable, showed a significant main effect of picture content ($F_{1,118}$=8.34, p=.001). Polynomial contrasts indicated a significant linear increase of RL with an increase of threatening content of the pictures (i.e., from neutral to mildly threatening to severely threatening).

Selective attention scores

Calculation of the severe selective attention score (mean = 15.01, SD = 107.10) resulted in a positive value. One-sample t-test indicated, however, that the severe selective attention score did not differ significantly from zero (t(119)= 1.53, p=.13). The mild selective attention score (mean = -23.49, SD = 82.42) was negative and differed significantly from zero (t(119)= -3.12, p=.002), indicating a selective attention away from mild threat. Kolmogorov Smirnov tests for both selective attention scores indicated that both scores showed a normal distribution.

Pretreatment demographic characteristics (i.e., sex, SES, and IQ) and pretreatment anxiety levels (i.e., CSR) were not related to either of the two selective attention scores. Although age was significantly related to the overall RL on neutral-neutral, mildly and severely threatening trials (i.e., RLs were smaller with higher age), age was not related to either of the two selective attention scores.

Table 3. Mean probe detection response latencies and standard deviations in milliseconds on neutral-neutral, congruent and incongruent mild and severe threat trials for treatment responders and nonresponders.

Trial Type	Congruency	Total Sample (n = 120)		Responders (n = 52)		Nonresponders (n =60)	
		M	SD	*M*	SD	*M*	SD
Neutral - neutral	-	1,038.32	255.02	1,003.73	237.49	1,083.72	263.33
Mild threat - neutral	Incongruent	1,036.73	265.93	1,007.32	254.78	1,076.27	269.74
	Congruent	1,060.21	275.66	1,027.29	257.46	1,106.03	288.08
	Bias score	-23.49	82.42	-19.97	78.02	-29.76	86.15
Severe threat - neutral	Incongruent	1,070.47	293.11	1,017.65	261.54	1,133.66	310.58
	Congruent	1,055.45	267.40	1,035.56	261.39	1,085.28	269.57
	Bias score	15.01	107.10	-17.91	78.88	48.38	121.79

Note. Congruent: probe emerges at the spatial location of the threatening picture; Incongruent: probe emerges at the spatial location of the neutral picture; Bias score = incongruent – congruent.

Components of selective attention

For severely threatening pictures (table 3), a repeated-measures ANOVA showed no significant difference between congruent trials (pST, N) and neutral-neutral trials ($F_{1,119}$=4.89, p=0.03). A second repeated-measures ANOVA showed that the RLs on incongruent severely threatening trials (ST, pN) were significantly higher than neutral-neutral trials ($F_{1,119}$=13.43, p=0.001), indicating difficulties to disengage attention away from the severely threatening pictures.

For mildly threatening pictures (table 3), a repeated-measures ANOVA showed that the RLs on congruent mildly threatening trials (pMT, N) were significantly higher compared with neutral-neutral trials ($F_{1,119}$=12.15, p=.001), indicating a tendency not to engage attention toward mild threat. The RLs between incongruent mildly threatening trials (MT, pN) and neutral-neutral trials were not significantly different ($F_{1,119}$=.10, p=.78).

Selective attention and CBT

Treatment response

Of the anxiety-disordered children, 46% were free of any anxiety disorder at posttreatment. Treatment success did not significantly differ between ICBT and GCBT (Liber, Van Widenfelt, Utens et al., 2008). Treatment responders and nonresponders did not significantly differ on pretreatment demographic characteristics (i.e., sex, SES, and IQ) or on age. Treatment responders and nonresponders also did not differ significantly on pretreatment anxiety levels (i.e., CSR).

Because age was not related to selective attention or to treatment response, age was not included as covariate in the subsequent analyses.

RLs in treatment responders and nonresponders

The overall RLs on neutral/neutral, mildly threatening/neutral and severely threatening/neutral trials did not significantly differ between treatment responders and nonresponders ($F_{3,108}$=1.25, p=.30).

Table 4. Binary logistic regression analyses (method: enter): mild and severe threat selective attention scores as predictor of treatment success.

Predictor Variable	OR	(95% CI)	*p*
Mild attention score	1.001	(0.996 – 1.006)	.65
Severe attention score	0.994	(0.990 – 0.998)[a]	.00

[a] Cox and Snell R^2= 0.10; Nagelkerke R^2= 0.13; Percentage correct = 59%; Note. OR: odds ratio; CI: confidence interval.

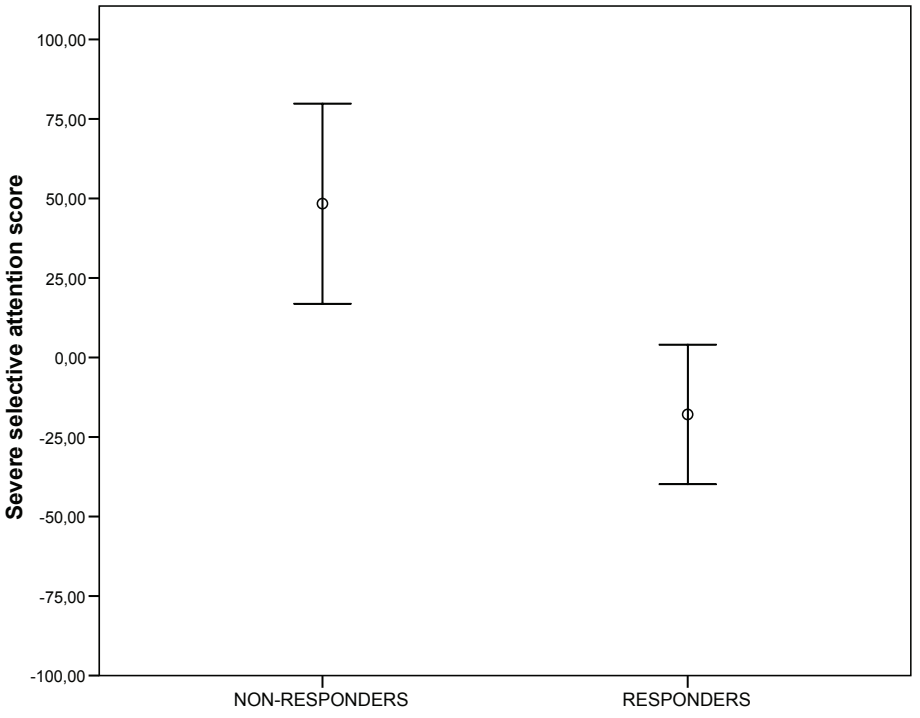
Selective attention as predictor of treatment success

The severe selective attention score seemed to be a significant predictor of treatment success (odds ratio = 0.994, 95% confidence interval: .990 – .998, p = .001; table 4). The severe selective attention score accounted between 10% (Cox and Snell R square) and 13% (Nagelkerke R square) of the total variance of treatment outcome. The mild selective attention score did not significantly predict treatment success (odds ratio = 1.001, 95% CI: 0.996 – 1.006, p = .65).

Table 3 and figure 1 show that the pretreatment severe selective attention score for treatment responders was negative (mean = -17.91, SD = 78.88), whereas the score was positive for nonresponders (mean = 48.38, SD = 121.79). The mild selective attention score for both treatment responders (mean = -19.97, SD = 78.02) and nonresponders (mean= -29.76, SD = 86.15) was negative.

After adjusting for pretreatment anxiety disorder severity, a non-significant trend emerged (β = .009, 95% CI: .002 - .016, p = .012) suggesting that severe selective attention predicted treatment success. The mild selective attention score did not seem to be a significant predictor of posttreatment anxiety disorder severity, when adjusted for pretreatment anxiety disorder severity (β = -.002, 95% CI: -.012 - .007, p = .615).

Figure 1. Pretreatment selective attention score for severe threat (95% confidence intervals) for treatment responders and nonresponders.



Components selective attention: treatment responders

For treatment responders (table 3), a non-significant trend was found that the RLs on congruent severely threatening trials (pST, N) differed from neutral-neutral trials ($F_{1,52}$=7.64, p=.008). A non-significant trend was also found that the RLs of treatment responders differed between congruent mildly threatening trials (pMT, N) and neutral-neutral trials ($F_{1,52}$=7.82, p=.007). These non-significant trends suggest that treatment responders showed a tendency not to engage their attention toward severe and mild threat.

The RLs on incongruent severely threatening trials (ST, pN) and neutral-neutral trials did not significantly differ for treatment responders ($F_{1,52}$=1.58, p=0.21). No significant difference was also found between the RLs on incongruent mildly threatening trials (MT, pN) and neutral-neutral trials ($F_{1,52}$=.20, p=.65).

Components selective attention: treatment nonresponders

For treatment nonresponders (table 3), no significant difference was found between the RLs on congruent severely threatening trials (pST, N) and neutral-neutral trials ($F_{1,59}$=.23, p=.88). A significant difference, however, was found between the RLs on incongruent severely threatening trials (ST, pN) and neutral-neutral trials ($F_{1,59}$=13.00, p=.001). The RLs were significantly higher on the incongruent severely threatening trials (ST, pN) than neutral-neutral trials, indicating that treatment nonresponders had difficulties to disengage attention away from severe threat. For mild threat, the RLs of treatment nonresponders on congruent mildly threatening pictures (pMT, N) did not significantly differ from neutral-neutral trials ($F_{1,59}$=5.24, p=.03). No significant difference was found between the RLs on incongruent mildly threatening pictures (MT, pN) and neutral-neutral trials ($F_{1,59}$=1.22, p=.28).

Discussion

This is the first study that examined the predictive value of selective attention, and its specific components, on treatment outcome in anxiety-disordered children. For the total sample of anxiety-disordered children, a selective attention away from mildly threatening pictures was found. No selective attention was found for the severely threatening pictures, neither toward nor away from severe threat. The results regarding selective attention away from mild threat contradict previous findings in adults (Koster et al., 2004; Koster, Crombez, Verschuere, Van Damme, & Wiersema, 2006), which predominantly showed a selective attention toward mild threat. With respect to the specific components of selective attention, anxiety-disordered children showed difficulties to disengage attention away from severe threat, which has also been fairly consistently reported in adults (Koster et al., 2004; Salemink et al., 2007). Furthermore, anxiety-disordered children showed a tendency not to engage their attention toward mild threat. These results might suggest that anxiety-disordered children experience a general difficulty with shifting their attention (i.e., engaging or disengaging attention). Shifting of attention is a fundamental voluntary and strategic control process in the executive functioning system (Wager, Jonides, & Smith, 2006). Attentional control, an important aspect of "effortful control" (Eisenberg et al., 2007), is important for the regulation of both positive as well as negative emotional reactions (Derryberry & Reed, 2002). It has been consistently demonstrated that poor attentional control is significantly related to anxiety problems (Derryberry & Reed, 2002; Eysenck, Derakshan, Santos, & Calvo, 2007; Lonigan, Vasey, Phillips, & Hazen, 2004).

As to the aim of this study, our result showed that selective attention for severe threat at pretreatment assessment, but not for mild threat, was predictive of treatment success in anxiety-disordered children. Selective attention toward severe threat explained a medium to large amount of variance in treatment outcome (Cohen, 1988). Treatment responders showed a selective attention away from severe threat, whereas nonresponders showed a selective attention toward severe threat. These results indicate that the direction (i.e., toward or away from threat) of selective attention for severe threat at pretreatment is able to differentiate between children who will respond and will not respond to CBT. Consistent with findings of a recent study of Watts and Weems (2006), age was not related to selective attention. Because age was also neither related to treatment response, examination of a moderating effect of age on the association between selective attention and treatment success was not warranted.

Investigation of the specific components of selective attention for severely threatening pictures showed that treatment responders tended not to engage their attention toward severe threat. In contrast, treatment nonresponders had difficulties to disengage their attention away from severe threat before CBT. Apparently, anxious children who tend not to engage their attention toward threat profit more from CBT than anxious children with "disengaging difficulties" as to severe threat. Although speculative at this moment, CBT may be less beneficial for anxiety-disordered children who are already inclined to attend to severe threat

and have problems to disengage their attention away from severe threat. During CBT, anxiety-disordered children are repeatedly exposed to anxiety-arousing and threatening topics or situations, which may reinforce their tendency to "focus on and stick to" frightening topics (Bouchard, Mendlowitz, Coles, & Franklin, 2004). They are, to a far lesser extent, trained to disengage their attention away from severe threat, which may be more helpful for some of them. Indeed, Waters et al. (2008) showed that selective attention toward threat, which can reflect attention disengagement difficulties, does not reduce during the course of CBT in anxiety-disordered children. Clinically anxious children who exhibit a selective attention toward severe threat may need a more specific attention training directed at learning to disengage attention away from threatening topics and attend to positive or neutral objects or situations (Waters et al., 2008). To our knowledge, no systematic study has examined whether attention training, targeting attention disengagement difficulties, can decrease selective attention toward severe threat. Future studies should examine moderating or mediating effects of attentional control on the association between threat-related selective attention and treatment outcome.

Several limitations of the present study need to be taken into consideration. Firstly, it must be stressed that our experimental task probably tapped the more conscious and voluntary controlled attentional processes in response to threat rather than early automatic stages of attention processing. The picture exposure duration of the pictorial dot-probe task in our study was 500 milliseconds. Other studies (Koster, Verschuere, Crombez, & Van Damme, 2005) have demonstrated that short exposure durations of 100 milliseconds summon rapid and automatic allocation of attention, whereas longer exposure durations allow for relatively late, voluntary controlled attentional processes. Therefore, although this study did not demonstrate any vigilance or avoidance of threat, such biased initial attentional processes may well be apparent in childhood anxiety disorders in general and also in relation to treatment success. Furthermore, the anxiety-disordered children in this study did not rate the valence and arousal of the threatening pictures. This did not allow us to check whether the ratings of the anxiety-disordered children corresponded to the normative ratings. However, the larger RLs with increasing severity of the pictures, as well as the differential impact between severe and mild selective attention on treatment success, are suggestive for the validity of the used threatening pictures. Another limitation of the present study was that the rate of pure anxiety diagnoses was relatively small, which prevented us to examine the association between selective attention and treatment response for specific anxiety disorder subgroups. Furthermore, we interpreted larger Rls on congruent trials as compared with neutral-neutral trials as a tendency not to engage attention toward threat. Studies in both clinical and community samples are needed to determine whether this slower response on congruent over neutral-neutral trials in anxiety-disordered children reflects a more conscious tendency not to engage attention toward threat or rather a difficulty to engage attention toward it.

In conclusion, the present study demonstrated that anxiety-disordered children experience difficulties to disengage their attention away from severe threat and show a tendency not to engage their attention toward mild threat. Selective attention for severely threatening pictures seemed to be a significant predictor of treatment response. Treatment responders showed a tendency not to engage their attention toward severe threat, whereas nonresponders showed difficulties to disengage their attention away from severe threat. Anxiety-disordered children with attention disengagement difficulties may profit from training focused on learning to disengage their attention away from anxiety-arousing topics and to focus more on pleasant or neutral objects or situations.

4

CBT for childhood anxiety disorders: differential changes in selective attention between treatment responders and nonresponders

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In Revision

Abstract

Objective: This study examined changes in threat-related selective attention and its specific components during CBT in a large clinical sample of anxiety-disordered children.
Method: Ninety-one children with an anxiety disorder were included in the present study. Children received a standardized stepped-care cognitive-behavioral treatment (CBT). Three treatment response groups were distinguished: initial responders (anxiety disorder free after phase one: child focused CBT), secondary responders (anxiety disorder free after phase two: child-parent focused CBT), and treatment nonresponders. Treatment response was determined using a semi-structured clinical interview. Children performed a pictorial dot-probe task before treatment and one year after the start of treatment
Results: Changes in selective attention to severely threatening pictures, but not to mildly threatening pictures, were significantly associated with treatment success. At pretreatment assessment, initial responders selectively attended away from severely threatening pictures, whereas secondary responders selectively attended toward severely threatening pictures. At one-year follow-up, initial and secondary responders did not show any selectivity in the attentional processing of severely threatening pictures. Treatment nonresponders did not show any changes in selective attention due to CBT.
Conclusion: Initial and secondary treatment responders showed a reduction of their predisposition to selectively attend away or toward severely threatening pictures, respectively. Treatment nonresponders did not show any changes in selective attention. The pictorial dot-probe task can be considered a potentially valuable tool in assigning children to appropriate treatment formats as well as to monitor changes in selective attention during the course of CBT.

Keywords: childhood anxiety disorders, selective attention, cognitive-behavioral therapy, dot-probe task.

Introduction

Anxiety disorders are among the most common psychiatric disorders in children, and their presence significantly interferes with social and academic functioning (La Greca & Lopez, 1998). Untreated childhood anxiety disorders tend to persist into adulthood and may develop in other psychiatric disorders (Gregory et al., 2007). Most anxiety-disordered children can be successfully treated with cognitive-behavioral therapy (CBT) (In-Albon & Schneider, 2007). However, a substantial proportion of children does not or benefit only partially from CBT. Gaining insight in the mechanisms underlying treatment response may aid in improving current CBT programs or contribute to the development of new therapeutic approaches. Selective attention is hypothesized to be involved in the etiology and maintenance of anxiety disorders (Mathews & MacLeod, 2005); as such selective attention may be an essential process facilitating anxiety changes during CBT (Mobini & Grant, 2007).

The pictorial dot-probe task is considered the most effective instrument to assess selective attention in children (Dalgleish et al., 2003). In this task, two pictures that differ in emotional valence (i.e., threat or neutral) are simultaneously shown on a computer screen. Immediately after the picture-pair disappears, a probe appears on the spatial location of one of the preceding pictures. Participants are instructed to press a button that corresponds to the spatial location of the probe. Differences in response latencies for probes replacing threatening pictures versus probes replacing neutral pictures provide a score for selective attention (MacLeod & Mathews, 1988). Selective attention toward threat is indicated by faster responses to probes that appear on the spatial location of threatening pictures as compared to probes that appear on the spatial location of neutral pictures. Slower responses to probes that replace threatening pictures compared to probes that replace neutral pictures, indicate selective attention away from threat.

Studies in anxious children with the pictorial dot-probe task found both evidence for selective attention toward threat (e.g., Monk et al., 2008), as well as selective attention away from threat (e.g., Pine et al., 2005). These divergent findings may be caused by differences in threat value of the stimuli. It has been suggested that selective attention toward high threat is common in all children, regardless of anxiety problems (Mathews & Mackintosh, 2000). High anxious children are assumed to display a greater selective attention toward mildly threatening stimuli than nonanxious children, as a result of their increased subjective arousal. Previous studies have indeed indicated that anxious adults display a greater selective attention toward intermediate levels of threat than nonanxious adults (Wilson & MacLeod, 2003).

Research has indicated that selective attention toward threat can comprise two specific components, namely a facilitated attention toward threat (i.e., vigilance) and/or a difficulty in disengagement from threat (Koster et al., 2004). Selective attention away from threat, on the other hand, might reflect an initial avoidance and/or a strategy not to engage attention toward threat (Legerstee et al., 2009). Research with adults has shown that selective attention toward threat comprises difficulties to disengage attention away from threat rather than vigilance (Salemink et al., 2007).

In a recent study using a large clinical sample, we showed that selective attention to severely threatening stimuli, but not to mildly threatening stimuli, is predictive of CBT success in childhood anxiety disorders (Legerstee et al., 2009). Treatment responders showed a selective attention away from severe threat at pretreatment assessment, and a concomitant strategy not to engage attention toward threat. Treatment nonresponders, on the other hand, showed a selective attention toward severe threat and concomitant difficulties to disengage attention away from threat. Changes in selective attention during the course of CBT have scarcely been examined in children, whereas a number of studies in anxious adults have shown that threat-related selective attention could be minimized or even eliminated by CBT (Lavy et al., 1993; Lundh & Öst, 2001; Mattia et al., 1993). Only one study has examined changes in selective attention during CBT in 19 anxiety-disordered children aged between 8 and 12 years (Waters et al., 2008). Following treatment, selective attention toward threat was not significantly reduced. Studies into the relationship between selective attention and treatment in both children and adults were mostly conducted in relatively small samples without differentiation between treatment responders and treatment nonresponders. No prior study has examined changes in selective attention to threat of different intensities (i.e., mild or severe) during CBT. Neither have changes in the specific components of selective attention during CBT been previously addressed.

The aim of the present study was to examine whether selective attention and its specific components change during CBT in anxiety-disordered children. More specifically, pretreatment levels of selective attention and its specific components were compared with levels one year after the start of treatment. Changes in these levels were compared between different treatment response groups. In addition, pretreatment levels versus one-year follow-up levels of selective attention were examined for different threat intensities (i.e., mildly and severely threatening stimuli). It was hypothesized that treatment responders would show a reduction of their predisposition to selectively attend either away or toward threat and its specific components, and that treatment nonresponders would not show any change of selective attention. Based on our earlier findings (Legerstee et al., 2009), it was expected that these findings would apply to severely threatening stimuli and not to mildly threatening stimuli.

Method

Sample

Eligible for participation were children (aged 8-16) consecutively referred to the departments of Child and Adolescent Psychiatry of the Leiden University Medical Center and the Erasmus Medical Center, Sophia Children's Hospital in Rotterdam between May 2003 and May 2007. The Anxiety Disorders Interview Schedule for Children (ADIS-C; Silverman & Albano, 1996) was administered to both children and their parents to assess childhood anxiety disorders. Children with a separation anxiety disorder, generalized anxiety disorder, social phobia, or specific phobia as primary anxiety diagnosis were included in the present study. Exclusion criteria were: an IQ below 85, poor command of the Dutch language, serious physical condition, substance abuse, pervasive developmental disorder, obsessive-compulsive disorder, posttraumatic stress disorder, and acute stress disorder.

None of the anxiety-disordered children received medication for their anxiety disorder during treatment. Five children with co-morbid attention deficit/hyperactivity disorder (ADHD) received ADHD related medication; the dosage of this medication was held constant throughout the study. A total of 154 children, who met the inclusion criteria, and their parents, gave written informed consent and these children were enrolled in the larger treatment outcome study. Six children were excluded because they could not be randomized to group CBT (GCBT) versus individual CBT (ICBT). Ten children with co-morbid affective disorder were excluded as previous studies have shown that threat-related selective attention is not apparent for anxious children with co-morbid affective disorders (Taghavi, Neshat-Doost, Moradi, Yule, & Dalgleish, 1999). Seven children did not complete the pictorial dot-probe task at pretreatment assessment due to practical and logistic reasons (for details see Legerstee et al., 2009).

Of the 131 children, 40 children did not participate at the follow-up assessment due to logistic and practical reasons. The distribution of background variables (i.e., gender, age, IQ, and socioeconomic status), pretreatment anxiety severity, treatment success, and performance on the pretreatment pictorial dot-probe task was not significantly different between participants and non-participants of the follow-up assessment. Of the final sample of 91 children, 50 (55%) children had one anxiety disorder, 28 (31%) children had two anxiety disorders and 13 (14%) children had more than two anxiety disorders (see table 1).

Table 1. Sample characteristics.

	Anxiety-Disordered Children (n = 91)
Age (SD)	11.1 (2.1)
IQ	102.5 (12.6)
Sex, female	50%
SES,	
Low	11%
Middle	43%
High	46%
Anxiety diagnosis,	
SP	31%
SOP	41%
SAD	44%
GAD	43%
PAD	1%

Note. IQ: intelligence quotient; SES: socioeconomic status; SP: specific phobia; SOP: social phobia; SAD: separation anxiety disorder; GAD: generalized anxiety disorder; PAD: panic disorder.

Instruments

Anxiety Disorders Interview Schedule for Children (ADIS-C)

The ADIS-C (Siebelink & Treffers, 2001; Silverman & Albano, 1996) consisted of a child and parent interview and assessed anxiety disorders and other diagnoses. A clinician severity rating (CSR) was used to determine the clinical significance of anxiety disorders. An anxiety diagnosis was assigned if the CSR was larger or equaled 4. Good inter-rater and test-retest reliability have been reported (Lyneham et al., 2007).

Treatment

A standardized stepped-care CBT program for childhood anxiety disorders was used, consisting of two phases. Phase one consisted of the FRIENDS program (Barrett et al., 2000a, 2000b; Utens, Nijs de et al., 2001; Utens, Van Dam et al., 2001), a standardized CBT, which comprised psycho-education, relaxation and breathing exercises, exposure, problem solving skills training, social support training, and cognitive restructuring. FRIENDS comprised 10 child sessions and 4 separate parent sessions. Children up to 12 years of age were randomly assigned in sequences of 6 to receive either individual CBT (ICBT) or group CBT (GCBT).

Children older than 12 years of age received ICBT. Children, who were not successfully treated after phase one, received supplementary CBT (i.e., phase two).

Phase two consisted of 10 standardized child-parent CBT sessions (Van Widenfelt et al., 2002). Parents were more actively involved than in phase one and participated in all sessions. The skills learned during phase one were further elaborated upon (e.g., cognitive restructuring, exposure and long-term relapse control). Furthermore, phase two was aimed to modify negative communication processes between parents as to anxiety, negative parent-child communication, cognitions of parents, and the impact of parental anxiety on the child's avoidant behavior and anxiety.

Treatment success

Treatment success was defined as being free from any anxiety disorder (CSR < 4). Children, who were successfully treated with phase 1 CBT, were considered initial treatment responders. Secondary treatment responders were children that were anxiety disorder free after phase two CBT. Treatment nonresponders were children who still were diagnosed with an anxiety disorder after phase one and phase two CBT.

Pictorial dot-probe task

The pictorial dot-probe task was a modification of the task of Yiend and Mathews (2001). Each trial started with a white cross that was presented for 500 milliseconds on the middle of a computer screen. The presentation of the white cross was followed by the horizontal presentation of a picture pair for 500 milliseconds. Two pictures were combined in each trial: either a mildly or severely threatening picture with a neutral picture, or two neutral pictures. The location of the threatening pictures was balanced. Pictures were selected from the Affective Picture System (Lang et al., 2001) based on standard ratings on valence and arousal. Immediately after the picture pair disappeared, a probe (p) appeared on the spatial location of one of the preceding pictures. Trials with probes appearing on the spatial location of the preceding threatening picture (pT, N), were named congruent trials. Incongruent trials were trials with probes appearing on the location of the preceding neutral picture (T, pN). The probes consisted of two white dots, positioned either next to each other or above each other. In response to the appearing probe, a corresponding key had to be pressed. The task began with an instruction and 10 practice trials, followed by the actual pictorial dot-probe task (3 buffer (N, N) and 72 randomized trials). Inter-trial intervals varied randomly between 500, 750, 1,000 and 1,500 milliseconds.

Selective attention

A selective attention score was calculated (MacLeod & Mathews, 1988) by subtracting the mean response latency (RL) to congruent trials (pT, N) from the mean RL to incongruent trials (T, pN). In equation:

Selective attention score = RL incongruent trials (T, pN) – RL congruent trials (pT, N)

A positive score reflects selective attention toward threat and a negative score reflects selective attention away from threat. A selective attention score was calculated for severely threatening pictures and for mildly threatening pictures, separately.

Components of selective attention

Koster et al. (2004) proposed a method to examine the specific components of selective attention to threat in dot-probe tasks, by comparing the mean RL to congruent trials (pT, N) and incongruent trials (T, pN) separately, with the mean RL to neutral-neutral trials (pN, N). For purposes of the present study, two index scores were calculated, namely a congruent index score and an incongruent index score (for more details see table 2).

The congruent index score was calculated by subtracting the mean RL to neutral-neutral trials (pN, N) from the mean RL to congruent trials (pT, N) for pretreatment as well as one-year follow-up data. The incongruent index score was calculated in a similar way for incongruent trials (T, pN). In equation:

Congruent index score = RL congruent trials (pT, N) – RL neutral-neutral trials (pN, N)

Incongruent index score = RL incongruent trials (T, pN) – RL neutral-neutral trials (pN, N)

A positive score on the congruent index score indicates a strategy not to engage toward threat, whereas a negative score indicates a quick orientation toward threat (i.e., vigilance). A positive score on the incongruent index score indicates difficulties to disengage attention away from threat, whereas a negative score indicates that the attention is directed away from threat toward the neutral picture (i.e., avoidance).

Table 2. Specific components of selective attention.

	Negative index score RL (T, N) < (pN, N)	Positive index score RL (T, N) > (pN, N)
Congruent trial (pT,N)	Vigilance	Strategy not to engage attention toward threat
Incongruent trial (T, pN)	Avoidance	Difficulties to disengage attention away from threat

Note. RL: response latency; T: threat; N: neutral; p: probe.

Procedure

The pictorial dot-probe task was administered to children individually, in a dark and empty room, at pretreatment and one-year follow-up. The ADIS-C was administered to children and their parents at three time points, namely at pretreatment, after phase 1 and one-year after the start of treatment (i.e., one-year follow-up). Post-doctoral psychologists and supervised master-level students conducted the ADIS-C before treatment, after phase one CBT and at one-year follow-up. Interviewers were blind to pretreatment diagnoses, treatment progress, and performance on the pictorial dot-probe task. Procedures complied with strict ethical standards in the treatment of human subjects and were approved by the Medical Ethical Committees of both institutions.

Statistical Analyses

Preliminary analyses

Normality of the distribution of selective attention scores to the mildly and severely threatening pictures at pretreatment assessment and at one year follow-up was tested with Kolmogorov-Smirnov tests. It was tested whether pretreatment demographic characteristics (i.e., gender, age, IQ, and socioeconomic status) and pretreatment anxiety severity were related to either selective attention or treatment success by means of one-way analyses of variance (ANOVA), chi-square tests, or correlations. Significant pretreatment demographic characteristics were included as covariates in the subsequent analyses.

Primary analyses

Changes in selective attention in relation to treatment success were examined by means of a repeated measures MANOVA. Selective attention scores for mildly and severely threatening pictures at pretreatment and one-year follow-up assessment were included as within-subjects variables and treatment success (i.e., initial responders, secondary responders, and treatment nonresponders) as between-subjects factor. Additionally, changes in the specific components of selective attention were examined for threat-related selective attention scores (i.e., mild and/or severe selective attention) that showed a significant interaction effect with treatment success.

More specifically, pretreatment versus one-year follow-up changes in the congruent index score as well as in the incongruent index score were compared between initial responders, secondary responders, and treatment nonresponders by means of two separate repeated measures ANOVAs. All analyses were adjusted for pretreatment CSR. A Bonferroni correction was employed for the three primary analyses. Results were considered significant if the obtained (two-tailed) p-value was lower than 0.016.

Secondary analyses

To gain more insight in significant associations between changes in selective attention and treatment success, it was examined whether selective attention scores at pretreatment and one-year follow-up assessment differed significantly from zero by means of one-sample t-tests. Similar one-sample t-tests were performed for the congruent and incongruent index score at pretreatment and one-year follow-up assessment. These analyses for the incongruent and congruent index scores provide more insight in significant associations between changes in the specific components of selective attention and treatment success. All secondary analyses were conducted for initial treatment responders, secondary treatment responders and treatment nonresponders, separately.

Results

Preliminary analyses

Trials with erroneous responses (2.6% pretreatment; 3.3% one-year follow-up) and extreme RLs (RLs < 100 milliseconds and > 3000 milliseconds; 0.4% pretreatment; 0% one-year follow-up) were discarded from further analyses. The selective attention scores for mildly and severely threatening pictures showed a normal distribution, both at pretreatment and one-year follow-up assessment. Gender appeared to be significantly related to treatment success but not to selective attention. Ninety-eight percent of the boys were anxiety-disorder free after step one and two CBT versus 73% of the girls. Other pretreatment demographic characteristics were not related to treatment success or pretreatment selective attention. The total number as well as the type of anxiety disorders was not related to treatment success or selective attention.

Of the anxiety-disordered children, 44% were free of any anxiety disorder after phase 1, and 42% after phase 2 of the stepped-care CBT program. Efficacy of Phase 1 CBT did not significantly differ between ICBT (48%) and GCBT (41%) (Liber et al., 2008). Fourteen percent of the children were not successfully treated after having received phase 1 and 2 of the stepped-care CBT program.

Table 3. Severe and mild selective attention of different treatment response groups at pretreatment and one-year follow-up.

Treatment success	Pretreatment		One-year follow-up	
	M	(SD)	*M*	(SD)
Initial treatment responders				
Severe selective attention	-41.89	(105.47)	20.27	(73.39)
Mild selective attention	-32.95	(75.96)	2.98	(117.38)
Secondary treatment responders				
Severe selective attention	66.25	(121.50)	16.26	(117.66)
Mild selective attention	-38.46	(95.81)	-8.16	(113.75)
Treatment nonresponders				
Severe selective attention	43.38	(121.30)	32.51	(95.11)
Mild selective attention	-3.96	(54.30)	-5.23	(59.16)

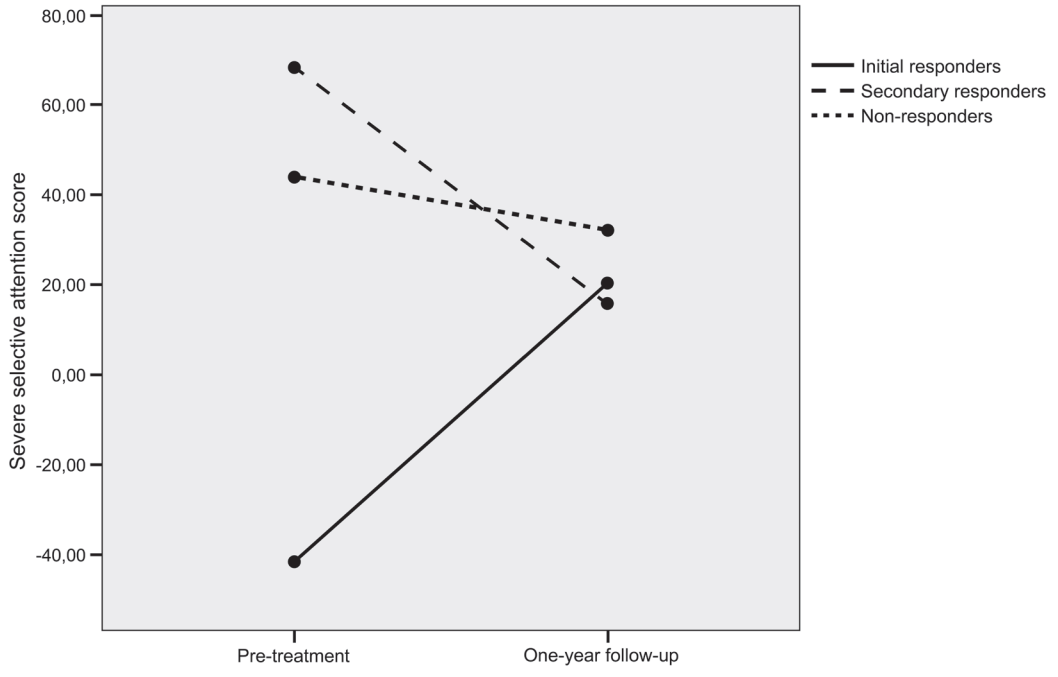
Primary analyses

Changes in selective attention in relation to treatment success

No significant interaction effect was found between treatment success and the mild selective attention score ($F_{2,75}$=2.86, p=0.06). A significant interaction effect was found between changes in the severe selective attention score and treatment success ($F_{2,75}$=4.79, p=0.01), when adjusted for gender and pretreatment anxiety disorder severity.

Changes in the severe selective attention score from pretreatment to one-year follow-up assessment accounted for 12.0% of the variability in treatment outcome. The significant interaction effect indicated that the three treatment response groups differed in pretreatment to one-year follow-up changes in selective attention to severe threatening pictures (see table 3 and figure 1). Subsequent analyses into changes in the specific components of selective attention were only examined for selective attention to severely, and not to mildly, threatening stimuli.

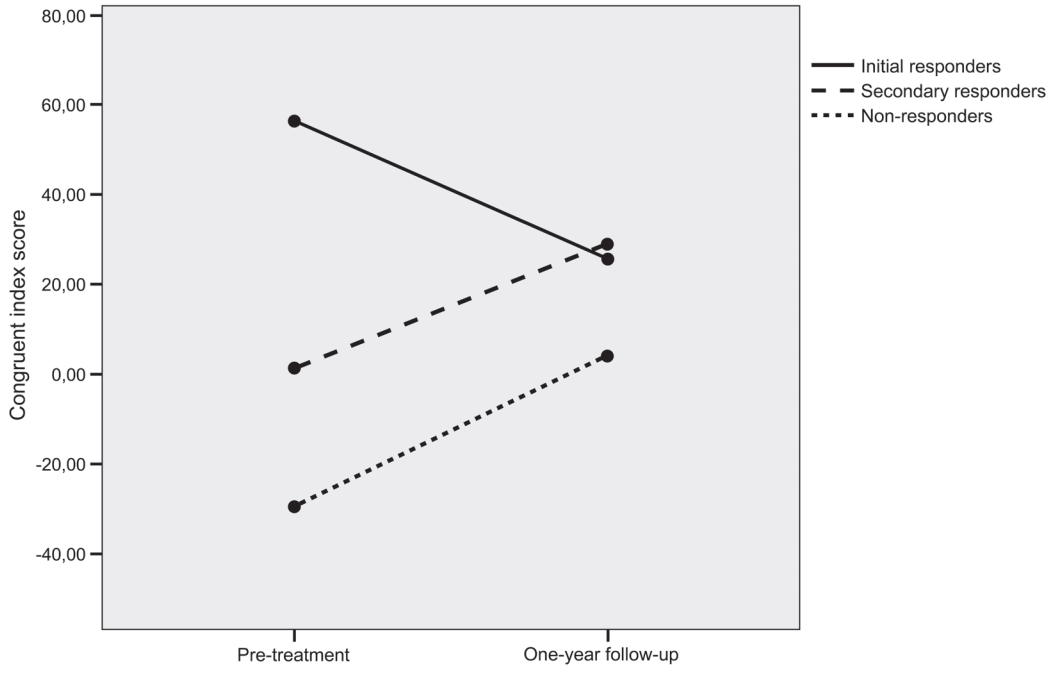
Figure 1. Changes in severe selective attention in relation to treatment success.



Changes in specific components of severe selective attention in relation to treatment success

Figure 2 displays the significant interaction effect between pretreatment to one-year follow-up changes in the congruent index score and treatment success ($F_{2,75}$=4.61, p=0.01), when adjusted for gender and pretreatment anxiety disorder severity. No significant interaction effect was found between pretreatment versus one-year follow-up changes in the incongruent index score and treatment success ($F_{2,74}$=0.97, p=0.38), when adjusted for gender and pretreatment anxiety disorder severity.

Figure 2. Changes in the congruent index score in relation to treatment success.



Secondary analyses

Severe selective attention at pretreatment and one-year follow-up assessment

ANOVA for pretreatment selective attention to severe threat showed a significant main effect of treatment success ($F_{2,80}$=8.15, p=0.001). Subsequent comparisons using Helmert contrasts indicated that the pretreatment severe selective attention score of initial treatment responders

was significantly lower (p=0.001) than of secondary treatment responders and treatment nonresponders. Secondary treatment responders did not differ from treatment nonresponders regarding pretreatment selective attention to severe threat. At one-year follow-up, no significant differences ($F_{2,75}$=0.13, p=0.88), were found between initial treatment responders, secondary treatment responders, and treatment nonresponders as regards severe selective attention.

At pretreatment assessment, the severe selective attention score for initial treatment responders was negative (M =-41.89, SD=105.47) and differed significantly from zero (t(34)=-2.35, p=0.03), indicating selective attention away from severe threat. At one-year follow-up, the severe selective attention score (M=18.26, SD=73.44) of initial treatment responders did not significantly differ from zero (t(37)=1.68, p=0.1). Secondary treatment responders showed a positive severe selective attention score (M =66.25, SD=121.50) at pretreatment assessment that differed significantly from zero (t(34)=3.23, p=0.003), indicating selective attention toward severe threat. At one-year follow-up, the severe selective attention score (M=14.21, SD=114.92) of secondary treatment responders did not significantly differ from zero (t(35)=0.78, p=0.44). For treatment nonresponders the severe selective attention score both at pretreatment (M=43.37, SD=121.30; t(12)=1.29; p=.22) and one-year follow-up (M=32.51, SD=95.11; t(11)=1.18; p=.26) did not significantly differ from zero.

Specific components of severe selective attention at pretreatment and one-year follow-up assessment

For initial responders, the pretreatment congruent index score was positive (M=56.58, SD=81.81) and differed significantly from zero (t(33)=4.03, p=0.001), indicating that initial responders showed a strategy not to engage their attention toward severe threat at pretreatment assessment. At one-year follow-up, the congruent index score did not significantly differ from zero (t(36)=1.72, p=0.10; M=26.08, SD=92.41). The pretreatment incongruent index score of initial responders did not significantly differ from zero (t(33)=1.99, p=0.06; M=25.47, SD=74.68), but at one-year follow-up assessment it was significantly larger than zero (t(36)=3.07, p=0.04; M=46.35, SD=91.73), indicating difficulties to disengage attention away from severe threat.

For secondary treatment responders, the pretreatment congruent index score did not significantly differ from zero (t(34)=0.13, p=0.90; M=1.52, SD=70.74), but the incongruent index score was significantly larger than zero (t(34)=3.52, p=0.001; M=67.77, SD=114.03), indicating difficulties to disengage attention away from severe threat at pretreatment assessment. At one-year follow-up, the congruent index score (t(31)=2.68, p=0.01; M=28.95, SD=61.10) and the incongruent index score (t(31)=2.04, p=0.05; M=45.21, SD=125.58) were significantly larger than zero. Considering the T-values, secondary treatment responders particularly showed a strategy not to engage attention toward severe threat at one-year follow-up.

For treatment nonresponders, the congruent index score (t(12)=-1.20, p=0.27; M=-29.50, SD=92.12) and the incongruent index score (t(12)=0.54, p=0.60; M=13.88, SD=92.42) did not significantly differ from zero at pretreatment, nor did the congruent (t(11)= 0.23, p=0.82; M=3.43, SD=52.27) and incongruent index scores (t(11)=1.47, p=0.17; M=35.94, SD=84.68) significantly differ from zero at one-year follow-up.

Discussion

The present study demonstrated that changes in selective attention to severe threat showed a significant association with treatment success, and explained a medium amount of variance (Cohen, 1988). Pretreatment versus one-year follow-up changes in selective attention to mild threat were not significantly related to treatment success. The present study adds to current knowledge that selective attention to severely threatening pictures is not only predictive of treatment success in anxiety-disordered children (Legerstee et al., 2009), but also shows differential changes over the course of CBT between different treatment response groups. The present study's results are in line with those of previous studies in clinically anxious adults (Lavy et al., 1993; Lundh & Öst, 2001; Mattia et al., 1993), indicating that selective attention diminishes over the course of CBT. The present study's results are, however, contradictory to those of Waters et al. (2008), who did not find any significant changes in threat-related selective attention over the course of CBT in anxiety-disordered children.

At pretreatment assessment, initial treatment responders differed significantly from both secondary treatment responders and treatment nonresponders regarding selective attention to severely threatening stimuli. At one-year follow-up, however, these three treatment response groups did not differ anymore as regards selective attention. Initial treatment responders showed a selective attention away from severe threat and a concomitant strategy not to engage attention toward severe threat at pretreatment. Secondary treatment responders, on the other hand, showed a selective attention toward severe threat and concomitant difficulties to disengage attention away from severe threat at pretreatment. At one-year follow-up, however, initial treatment responders showed difficulties to disengage attention away from severe threat, whereas secondary treatment responders showed a strategy not to engage attention toward severe threat. Children that did not improve significantly over the course of phase one and two of the stepped-care CBT, did not show changes in the allocation of attention to severe threat from pretreatment to one-year follow-up. Both at pretreatment and one-year follow-up, treatment nonresponders were not predisposed to selectively attend either toward or away from severe threat.

In a recent study (Legerstee et al., 2009), we demonstrated that child focused CBT is particularly efficacious for children that show a strategy not to engage their attention toward severe threat. Child focused CBT appeared to be significantly less efficacious for children with difficulties to disengage their attention away from severe threat. Exposure, both in vitro and in vivo, was a key component of child focused CBT. During the exposure interventions of child focused CBT, children had to direct their attention toward threat. These exposure interventions might be particularly beneficial for children that show a strategy not to engage their attention toward severe threat. The redirection of their attention toward threat during child focused CBT, may have resulted in a decrement of their anxious feelings (habituation) in this specific group of anxiety-disordered children. Indeed, the present study's results showed that the children's strategy not to engage their attention toward severe threat had disappeared at one-year follow-up. These children even showed minor difficulties to disengage their attention away from severe

threat at one-year follow-up assessment.

Child focused CBT and its exposure interventions were, on the other hand, less beneficial for children that show difficulties to disengage their attention away from severe threat. These children are already inclined to selectively attend toward severe threat and during child focused CBT their tendency to "focus on and stick to" frightening topics may not have been challenged. This study suggests that children with 'disengagement difficulties' need more CBT sessions to reduce their selective attention toward severe threat, or particularly benefit from child-parent focused CBT. It might be important for children with 'disengagement difficulties' to specifically learn to redirect their attention away from threat and to focus more on neutral or pleasant aspects of a situation. For children who do not show a predisposition to selectively attend toward or away from severe threat, both child and child-parent focused CBT appeared not to be efficacious. Additionally, these children did not exhibit any changes in selective attention from pretreatment to one-year follow-up assessment.

Some limitations of the present study should be acknowledged. First, no statistical comparison could be made as to severe selective attention at one-year follow-up between treatment responders and nonanxious children. This makes it hard to conclude that initial and secondary treatment responders showed a normalization of threat-related selective attention and its specific components. Previous studies in nonanxious children, however, have demonstrated that nonanxious children do not show selective attention to threatening stimuli on a pictorial dot-probe task (Roy et al., 2008), which might suggest a normalization of threat-related selective attention in treatment responders. A second limitation was that the stimulus exposure duration of 500 milliseconds in the pictorial dot-probe task probably tapped more voluntary and strategic attentional processes in response to stress as opposed to rapid and automatic attentional allocation processes (Koster et al., 2005). A third limitation was that no conclusions could be drawn about the direction of causality of the present findings. Changes in selective attention over the course of CBT might be a direct by-product of anxiety reductions during CBT (Mobini & Grant, 2007). On the other hand, changes in selective attention during CBT may facilitate reductions of anxious feelings in treatment responders. Recent studies in adults (Mathews & MacLeod, 2002) and children (Eldar, Ricon, & Bar-Haim, 2008) have shown that induced alterations of selective attention can result in changes in anxiety problems, suggesting a causal effect of selective attention on anxiety. A fourth limitation was that threat-related selective attention and its components were not examined directly after phase one CBT.

Despite these limitations, this is the first study demonstrating specific changes in threat-related selective attention during CBT in a relatively large sample of anxiety-disordered children. These findings emphasize the importance of considering the pictorial dot-probe task as a potentially valuable tool in assigning children to appropriate treatment formats as well as to monitor changes in selective attention over the course of CBT. We strongly encourage future studies to develop alternative treatment approaches, rather than stepped-care CBT, for anxiety-disordered children that do not exhibit selectivity in the allocation of attention in response to severely threatening stimuli.

5

Cognitive coping in childhood anxiety disorders

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In Revision

Abstract

Objective: To investigate differences in cognitive coping strategies between anxiety-disordered and nonanxious 9-11-year old children. Additionally, differences in cognitive coping between specific anxiety disorders were examined.
Method*:* A clinical sample of 131 anxiety-disordered children and a general population sample of 452 nonanxious children were gathered. All children filled out the child version of the Cognitive Emotion Regulation Questionnaire (CERQ-k). Structured clinical interviews were used to assess childhood anxiety disorders.
Results: Results showed that anxiety-disordered children experience significantly more negative life events than nonanxious children. Adjusted for the experience of negative life-events, anxiety-disordered children scored significantly higher on the strategies catastrophizing and rumination, and significantly lower on the strategies positive reappraisal and refocus on planning than nonanxious children. No significant differences in cognitive coping were found between children with specific anxiety disorders.
Conclusion: Anxiety-disordered children employ significantly more maladaptive and less adaptive cognitive coping strategies in response to negative life events than nonanxious children. The results suggest that cognitive coping is a valuable target for prevention and treatment of childhood anxiety problems.

Key words: anxiety disorders, cognitive coping, cognitive emotion regulation, children, life events

Introduction

Anxiety disorders are the most prevalent psychiatric disorders in children (Alyahri & Goodman, 2008; Cartwright-Hatton, McNicol, & Doubleday, 2006). Considering the high prevalence and persistence of childhood onset anxiety disorders and the association with considerable impairments in social and academic functioning (Ialongo et al., 1995; Langley, Bergman, McCracken, & Piacentini, 2004), efficient early prevention and intervention programs for this particular group of children are of great importance (Cartwright-Hatton et al., 2006). Such prevention and intervention programs could benefit from knowledge on the differential characteristics between clinically anxious and nonanxious children. Previous studies in adolescents and adults have shown that anxious and nonanxious individuals can be discriminated as to their use of specific cognitive coping strategies (Garnefski et al., 2001; Garnefski et al., 2002). Cognitive coping, however, has never been examined in relation to childhood anxiety disorders before.

Cognitive coping can be defined as the cognitive way of managing the intake of emotionally arousing stimuli (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Garnefski et al., 2001; Thompson, 1991). Cognitive coping is distinguished from other partially overlapping constructs, such as emotion regulation and mood regulation, by its predominant focus on decreasing negative affect in response to stressful situations (Gross, 2007; Skinner & Zimmer-Gembeck, 2007). Cognitive coping is considered to act as a mediator and moderator of the association between stress and psychological well being (Compas et al., 2001; Connor-Smith & Compas, 2002). Cognitive coping might be particularly important to examine in relation to childhood anxiety disorders, as anxiety-disordered children experience significantly more stressful situations (i.e., negative life events) than their nonanxious counterparts and perceive these situations as more threatening (Allen, Rapee, & Sandberg, 2008; Gothelf, Aharonovsky, Horesh, Carty, & Apter, 2004; Marteinsdottir, Svensson, Svedberg, Anderberg, & von Knorring, 2007). Maladaptive or excessive use of cognitive coping strategies might contribute to the development and persistence of anxiety disorders in children.

A recent study (Legerstee, Garnefski, Verhulst, & Utens, submitted) showed that anxiety-disordered adolescents experience significantly more negative life events than nonanxious adolescents. In response to these life events, anxiety-disordered adolescents use emotionally adaptive (e.g., refocus on planning) as well as maladaptive (e.g., rumination, self-blame, catastrophizing and acceptance) cognitive coping strategies to a significantly higher extent than their nonanxious counterparts (Legerstee et al., submitted). The largest proportion of variance was explained by the strategies rumination, self-blame and catastrophizing. These three strategies have also been related to anxiety symptoms in adolescents and adults from the general population (Garnefski et al., 2001; Garnefski, Kraaij, & van Etten, 2005; Garnefski et al., 2002). Apparently, anxiety-disordered adolescents not only experience more negative life events, but also tend to use more cognitive coping strategies, especially maladaptive, than nonanxious adolescents.

The results on cognitive coping in anxious adolescents and adults may not be simply generalized to children, because of large cognitive and emotional developmental differences. Childhood is a sensitive period in which children become progressively more aware of their internal emotional experiences (Calkins & Fox, 2002; Muris, Meesters, Eijkelenboom, & Vincken, 2004), show a gradual maturation of their cognitive capacities (Flavell, 2000), and begin to develop sophisticated cognitive strategies to regulate emotions (Saarni, 1999; Stegge, Meerum Terwogt, Reijntjes, & Van Tijen, 2004). Children become progressively more able to regulate their emotions in response to stress in a cognitive way (Muris, Meesters, & Rompelberg, 2007; Saarni, 1999). Recently, a questionnaire (i.e., Cognitive Emotion Regulation Questionnaire- kids version; CERQ-k) was developed to assess cognitive coping strategies in 9 to 11 year old children (Garnefski et al., 2007).

Garnefski and colleagues (2007) examined the association between nine cognitive coping strategies, assessed by the CERQ-k, and fearfulness in a community sample of 717 children. A substantial percentage (i.e., 28%) of the variance in fearfulness in children could be explained by the use of cognitive coping strategies. In accordance with previous studies in adolescents and adults, the strategies rumination, self-blame and catastrophizing were positively related to fearfulness. The strategy positive reappraisal, however, had a strong negative association with fearfulness, suggesting a protective value. The psychometric properties of the CERQ-K were shown to be satisfactory (Garnefski et al., 2007).

To our knowledge, the present study is the first to examine cognitive coping strategies in anxiety-disordered children, aged 9 to 11 years old. A clinical sample of 131 anxiety-disordered children was included and diagnoses were obtained by structured clinical interviews. The specific aim of the study was to compare anxiety-disordered and nonanxious children as regards to their use of cognitive coping strategies, taking into account the experience of negative life events.

Based on previous findings in adolescents and adults, we hypothesized that anxiety-disordered children would use significantly more 'maladaptive' cognitive coping strategies (i.e., self-blame, catastrophizing and rumination) and less 'adaptive' cognitive coping strategies (i.e., positive reappraisal) in response to negative life events than nonanxious children.

Method

Sample and Procedure

Anxiety-disordered child sample

Eligible for participation were children (aged 9-11) consecutively referred between January 2005 and May 2008 to the Department of Child and Adolescent Psychiatry of the Erasmus Medical Center -Sophia Children's Hospital. Before intake, 179 children were sent the Cognitive Emotion Regulation Questionnaire-kids version (CERQ-k) to their home addresses. As part of the routine intake procedure, all children and their parents were interviewed with the Anxiety Disorder Interview Schedule for Children (ADIS-C; Silverman & Albano, 1996). In total, 131 children fulfilled the criteria of an ADIS-C anxiety diagnosis.

The anxiety-disordered child sample consisted of 53 girls and 78 boys with a mean age of 9 years and 11 months (SD = 9 months). Table 1 shows the rate of pure (i.e., one single anxiety diagnosis without other co-morbid anxiety disorders) and co-morbid anxiety disorders in the anxiety-disordered child sample. The most prevalent pure anxiety disorder was social phobia (9%), whereas generalized anxiety disorder (35%) was the most prevalent co-morbid anxiety disorder. Seven children (5%) had a co-morbid depressive disorder and 10 (7.6%) a co-morbid dysthymic disorder. Sixty-three children (48%) had one anxiety disorder, 47 children (36%) had two anxiety disorders and 21 children (16%) had more than two anxiety disorders.

Table 1. Rate of pure and co-morbid anxiety disorder diagnoses in the anxiety-disordered child sample (*n*=131).

Anxiety Disorder subtype	Pure		Co-morbid	
	n	(%)	*n*	(%)
Generalized anxiety disorder	12	(9.2)	46	(35.1)
Social phobia	16	(12.2)	41	(31.3)
Specific phobia	13	(9.9)	38	(29)
Separation anxiety disorder	9	(6.9)	24	(18.3)
Panic disorder	0	(--)	2	(1.5)
Agoraphobia	1	(0.8)	3	(2.3)
Post-traumatic anxiety disorder	3	(2.3)	1	(0.8)
Obsessive-compulsive disorder	4	(3.1)	10	(7.6)

Nonanxious child sample

A general population sample was recruited from 11 primary public schools. The same standardized recruitment procedures were used at the 11 schools. Children were included if they were between 9 and 11 years old. Written parental consent was obtained for all participating children. Children, who were absent at the day of data collection, could fill out the questionnaires

at some other moment. Seven hundred seventeen children (394 boys and 323 girls) filled out the Cognitive Emotion Regulation Questionnaire – kids version (CERQ-k; Garnefski et al., 2007) and the Dutch version of the Revised Fear Survey Schedule for Children (FSSC-R; Ollendick, 1983; Oosterlaan et al., 1995). These questionnaires were completed during regular school hours, under supervision of a teacher and two graduate psychology students. The children were guaranteed anonymity in relation to their parents, teachers, and fellow students. We refer to Garnefski et al. (2007) for a full description of the sample.

To unambiguously define a nonanxious child sample, children were excluded from the general population sample when their score on the FSSC-R was higher than average according to the Dutch FSSC-R norm scores (Oosterlaan et al., 1995). The final nonanxious child sample consisted of 452 children (173 girls and 279 boys), with a mean age of 9 years and 9 months (SD = 8 months).

Comparison of anxiety-disordered and nonanxious child sample on background variables

The anxiety-disordered and nonanxious child samples did not significantly differ as to the distribution of gender. The anxiety-disordered child sample (mean age 9 years and 11 months) was significantly older (t = 3.61, p<0.001) than the nonanxious child sample (mean age 9 years and 9 months). Anxiety-disordered children reported significantly more negative life events (t = 15.83, p<0.001) than nonanxious children. As regards life events, 47% of the nonanxious children did experience any negative life events in contrast to 92% of the anxiety-disordered children. Of the anxiety-disordered children, 24% experienced one negative life event, 36% experienced two negative life events, and 32% experienced more than two negative life events. Of the nonanxious children, 38% experienced one negative life event, and 9% experienced two negative life events. The most common experienced life event in anxiety-disordered children was being bullied a lot (61%). In nonanxious children, the most common experienced life event was the death of a grandparent (26%). Parents were divorced in 24% of the anxiety-disordered children versus 3% of the nonanxious children.

Instruments

Cognitive Coping Strategies

Cognitive coping strategies in children were assessed with the kids version of the Cognitive Emotion Regulation Questionnaire (CERQ-k; Garnefski et al., 2007). The CERQ-k is an adaptation of the original CERQ (Garnefski et al., 2001), which is suitable for adults and adolescents aged 12 years or older. The items of the original CERQ were simplified and shortened. The CERQ-k was constructed as a self-report questionnaire for 9 to 11 year old children and assesses what children think after the experience of negative life events. The CERQ-k consists of 36 items measuring nine different subscales. Each subscale consists of four items ranging from 1 [(almost) never] to 5 [(almost) always]. The higher the subscale score, the more the specific cognitive coping strategy is used.

The CERQ-k subscales are: *Refocus on Planning*: thinking about what steps to take and how to handle negative events; *Rumination*: thinking about the feelings and thoughts associated with negative events; *Putting into Perspective:* thoughts of playing down the seriousness of an event or emphasizing the relativity when comparing it to other events; *Catastrophizing*: thoughts of explicitly emphasizing the terror of what you have experienced; *Positive Refocusing*: thinking about joyful and pleasant issues instead of thinking about an actual event; *Positive Reappraisal*: thoughts of creating a positive meaning to an event in terms of personal growth; *Acceptance*: thoughts of accepting what you have experienced and resigning yourself to what has happened; *Self-blame*: thoughts of putting the blame of what you have experienced on yourself; and *Other-blame*: thoughts of putting the blame of what you have experienced on the environment or another person

The psychometric properties of the CERQ-k have been proven to be good. Factorial validity and criterion-related validity of the CERQ-k are satisfactory (Garnefski et al., 2007). All subscales have been shown to have high internal consistency ranging from 0.72 to 0.85.

Anxiety disorders

The ADIS-C (Siebelink & Treffers, 2001; Silverman & Albano, 1996) was used in the clinical child sample to assess the following DSM-IV anxiety diagnoses: generalized anxiety disorder, social phobia, specific phobia, separation anxiety disorder, panic disorder, agoraphobia, post-traumatic stress disorder, and obsessive-compulsive disorder. Additionally, depressive disorder and dysthymic disorder were assessed.

The ADIS-C consists of a child and parent interview. If the minimal requirements for a DSM-IV diagnosis were met, the parent or the child was asked to indicate on a 9-point scale (i.e., 0–8) to what extent the symptoms interfered with the child's daily life. Subsequently, the interviewer gave an interference rating (Clinician Severity Rating, CSR), on the same 9-point scale, for the child and parent interview, separately. If the CSR was 4 or higher a diagnosis was assigned. Several researchers (Lyneham et al., 2007; Silverman et al., 2001) have shown that the inter-rater and test-retest reliability of the ADIS-C are good to excellent.

Experienced and trained post-doctoral clinicians administered the ADIS-C. Clinicians met several times to ensure that the procedures and decision-making were alike. The items of the ADIS-C and the CERQ did not overlap.

Anxiety symptoms

Anxiety was measured by the Dutch version of the FSSC-R (Ollendick, 1983; Oosterlaan et al., 1995). Children were asked to rate each item on a three-point fear scale ("None," "Some," or "A Lot"). The FSSC-R consists of 80 items divided over five subscales, namely, fear of failure or criticism, fear of the unknown, fear of harm of small animals, fear of danger or death, and medical fear. By summing up the subscale scores, a total score can be obtained. Ollendick et al. (1983) and Oosterlaan et al. (1995) have shown that the subscales and total scale have good internal consistency (Cronbach's alphas ranging from 0.92 to 0.95) and high test-retest reliabilities (Pearson's *r* ranging from 0.61 to 0.76).

Negative life events

Lifetime experience of negative life events was assessed in anxiety-disordered and nonanxious children with a self-report checklist. Life events that were measured are: (1) divorce of parents, (2) long-lasting or severe medical illness of brother/sister, (3) long-lasting or severe medical illness of parent(s), (4) long-lasting or severe medical illness of self, (5) death of parent(s), (6) death of brother/sister, (7) death of grandparent(s) (8) having been victim of a severe accident, (9) having been bullied a lot. For purpose of the present study, statistical analyses were adjusted for the total number of experienced negative life events.

Statistical Analyses

A multivariate analysis of covariance (MANCOVA) was performed to examine differences in cognitive coping strategies between the anxiety-disordered and nonanxious child sample. The nine cognitive coping strategies were included as dependent variables and group (i.e., anxiety disordered versus nonanxious children) as independent variable. Gender as well as the interaction between gender and group was also included as independent variables. Age and the total number of life events were entered as covariates, because the groups differed on these variables. When the MANCOVA yielded a significant main effect, subsequent univariate F-tests were performed.

A similar MANCOVA was performed, in which children with co-morbid affective disorders (i.e., depressive and dysthymic disorders) were excluded from the analysis. Previous research in the general population has shown that cognitive coping is not only related to anxiety symptoms, but also to depressive symptomatology. Therefore, this exclusion procedure was performed to rule out the possibility that the relatively high co-morbidity rate of affective disorders in the anxiety-disordered child sample would bias the results. Additionally, a MANCOVA was performed to examine differences in cognitive coping strategies between children with a pure anxiety disorder. Specifically, children with a pure generalized anxiety disorder, social phobia, specific phobia, and separation anxiety disorder were compared as regards cognitive coping strategies.

Effect sizes were expressed as the percentage of variance accounted for, and were considered small (1.0% to <5.9% of variance), medium (5.9% to <13.8%), and large (13.8% or more), according to Cohen's criteria [5].

Ethics

This study was approved by the Committee for Medical Ethics, Sophia Children's Hospital/ Erasmus Medical Center, Rotterdam.

Results

Differences in cognitive coping strategies between nonanxious and anxiety-disordered children

An overall difference in cognitive coping strategies was found between anxiety-disordered children and nonanxious children (Wilks' λ = .79; F (9,346) = 10.15; p < 0.001), explaining 20.9% of the variance. This is a large effect according to Cohen's criteria (Cohen, 1988).

Subsequent univariate F-tests showed that anxiety-disordered children scored significantly higher on the strategies self-blame, rumination, catastrophizing, and acceptance. On the other hand, anxiety-disordered children scored significantly lower on positive refocusing, positive reappraisal, and refocus on planning. Most of the variance was explained by rumination (6%) and positive reappraisal (5%). No significant interaction effect between gender and group was found (Wilks' λ =.98 ; F (9,346) = 0.96; p = 0.48).

Subsequent analyses, in which 16 children with affective disorders were excluded, revealed an overall difference in cognitive coping between anxiety-disordered and nonanxious children (Wilks' λ = .82; F (9,331) = 8.25; p < 0.001), explaining 18.3% of the variance. No significant interaction effect between gender and group was found (Wilks' λ =.97 ; F (9,331) = 0.98; p = 0.46). Anxiety-disordered children scored significantly higher on the cognitive coping strategies catastrophizing and rumination, explaining 2% and 6% of the variance, respectively. However, anxiety-disordered children scored significantly lower on positive reappraisal and refocus on planning, explaining 4% and 2% of the variance, respectively. As in the previous analyses, most of the variance was explained by the strategies rumination and positive reappraisal.

Differences in cognitive coping strategies between specific anxiety disorders

Statistical comparison of cognitive coping strategies between children with a pure generalized anxiety disorder, social phobia, specific phobia, and separation anxiety disorder revealed no significant differences (Wilks' λ =.54 ; F (27, 99) = 0.89; p = 0.67). Additional comparison of the two most prevalent anxiety disorders in the child sample (i.e., social phobia and specific phobia) also revealed no significant difference.

Table 2. MANCOVA: comparison of cognitive coping strategies between anxiety-disordered and nonanxious children.

	Nonanxious						Anxiety-disordered							
	Girls (*n*=173)		Boys (*n*=279)		Total (*n*=452)		Girls (*n*=53)		Boys (*n*=78)		Total (*n*=131)		Group*	Group x Gender*
	M	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)	(%)	(%)
Self-blame	8.1	(3.2)	7.2	(2.9)	7.5	(3.1)	9.2	(4.4)	8.5	(4.2)	8.8	(4.3)	1	-
Other-blame	6.5	(3.0)	6.9	(2.8)	6.7	(2.9)	6.3	(3.6)	7.3	(3.6)	6.9	(3.6)	-	-
Rumination	8.7	(3.4)	8.0	(3.4)	8.3	(3.4)	11.6	(4.8)	10.3	(4.0)	10.8	(4.4)	6	-
Catastrophizing	7.6	(3.2)	7.5	(3.2)	7.5	(3.2)	9.3	(3.9)	9.7	(4.3)	9.5	(4.1)	2	-
Acceptance	9.0	(3.0)	8.3	(3.2)	8.6	(3.1)	9.4	(3.8)	10.2	(3.5)	9.9	(3.7)	2	-
Putting into perspect.	10.9	(3.7)	10.8	(4.1)	10.8	(3.9)	9.3	(3.7)	9.8	(3.4)	9.6	(3.5)	-	-
Positive refocusing	12.7	(4.3)	12.0	(4.4)	12.3	(4.4)	9.8	(4.5)	10.4	(4.7)	10.2	(4.6)	1	-
Positive reappraisal	9.5	(3.6)	9.7	(3.8)	9.6	(3.7)	7.3	(3.1)	7.7	(3.1)	7.6	(3.1)	4	-
Refocus on planning	10.7	(3.7)	10.2	(4.1)	10.4	(4.0)	9.1	(4.6)	8.8	(3.5)	8.9	(3.9)	2	-

* Percentage of variance accounted for by significant group or by significant group x gender interaction effect; age and gender were included as covariate; $p < 0.05$

Table 3. MANOVA: comparison of cognitive coping strategies between children with a generalized anxiety disorder, social phobia, specific phobia, and separation anxiety disorder.

	Generalized Anxiety Disorder (*n*=12)		Social Phobia (*n*=16)		Specific Phobia (*n*=13)		Separation Anxiety Disorder (*n*=9)		Group*
	M	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)	(%)
Self-blame	7.3	(2.1)	8.6	(4.9)	6.9	(2.2)	6.1	(5.4)	-
Other-blame	7.0	(2.9)	8.4	(4.6)	5.4	(2.7)	5.4	(2.1)	-
Rumination	10.2	(3.9)	8.9	(3.6)	8.9	(3.3)	8.5	(2.4)	-
Catastrophizing	7.7	(3.0)	8.6	(3.6)	6.8	(3.0)	6.0	(1.2)	-
Acceptance	8.8	(3.4)	10.4	(2.6)	9.6	(4.4)	9.4	(3.4)	-
Putting into perspec.	9.4	(3.1)	8.6	(3.1)	10.3	(2.9)	10.6	(2.8)	-
Positive refocusing	10.9	(5.5)	10.5	(4.40	11.1	(3.6)	14.8	(3.5)	-
Positive reappraisal	6.8	(2.0)	7.4	(2.9)	6.5	(2.8)	7.4	(1.9)	-
Refocus on planning	8.8	(4.1)	9.0	(4.8)	8.0	(5.1)	9.4	(3.3)	-

* Percentage of variance accounted for by significant group effect; $p < 0.05$

Discussion

Congruent to earlier findings (Allen et al., 2008; Marteinsdottir et al., 2007) the results of the present study showed that anxiety disordered-children experience significantly more negative life-events compared to their nonanxious counterparts. Adjusted for the experience of negative life events, anxiety-disordered and nonanxious children differed in their use of cognitive coping strategies, which was not modified by gender. Cognitive coping strategies explained a large amount of variance. Anxiety-disordered children scored significantly higher on the strategies self-blame, rumination, catastrophizing, and acceptance and lower on positive reappraisal, positive refocusing, and refocus on planning. However, the results indicated that the differences found on the strategies self-blame, acceptance, and positive refocusing were attributable to affective disorder co-morbidity. Anxiety-disordered and nonanxious children differed particularly on the strategies catastrophizing, rumination, positive reappraisal, and refocus on planning. Apparently, anxiety-disordered children tend to think more about the feelings associated with negative life events and focus more on the negative aspects of what they have experienced than nonanxious children. Additionally, anxiety-disordered children use less thoughts of creating a positive meaning to an event in terms of personal growth, and think less about what steps to take and how to handle negative events. Rumination and positive reappraisal accounted for most of the difference between anxiety-disordered and nonanxious children. The present results fit with a recent study in children from the general population. Garnefski et al. (2007) also found that catastrophizing and rumination had a strong positive relation, and positive reappraisal a strong negative relation with fearfulness. These strategies, particularly catastrophizing and rumination, have also been related to anxiety symptoms in adolescents and adults from the general population (Garnefski et al., 2001; Garnefski et al., 2005; Garnefski et al., 2002).

The present results are noteworthy in comparison with our recent study in anxiety-disordered adolescents (Legerstee et al., submitted). Anxiety-disordered adolescents appeared to score significantly higher than nonanxious adolescents on strategies that have been suggested to be maladaptive (e.g., rumination, self-blame, catastrophizing and acceptance) as well as on strategies that are considered to be adaptive (e.g., refocus on planning) for psychological functioning. Contrary to clinically anxious children, anxiety-disordered adolescents did not score significantly lower on adaptive strategies. It seems that anxiety-disordered adolescents employ more cognitive efforts, both adaptive and maladaptive, to cope with negative life events, whereas anxiety-disordered children show a more distinguished pattern of cognitive coping strategies. Anxiety-disordered children specifically use more maladaptive and less adaptive cognitive coping strategies in response to negative life events compared to nonanxious children.

Childhood is considered an important period in which coping develops rapidly (Skinner & Zimmer-Gembeck, 2007). The development of a maladaptive coping repertoire in childhood might have negative consequences for the ability of a person to cope with negative life events later in life. It is of utmost importance to intervene when a child uses maladaptive and less

adaptive cognitive coping strategies. The present results suggest that treatment programs for anxiety-disordered children should specifically focus on reducing maladaptive cognitive coping strategies as well as enhancing the use of adaptive cognitive coping strategies. Furthermore, the administration of the CERQ-k before the start of treatment might give clinical therapists the unique opportunity to deliver an individually-tailored treatment program, based on a child's specific use of maladaptive and adaptive cognitive coping strategies. The CERQ-k might also be a valuable tool in monitoring changes in cognitive coping strategies over the course of treatment.

With respect to specific anxiety diagnoses, children with a generalized anxiety disorder, social phobia, separation anxiety disorder, and specific phobia did not differ in their cognitive coping strategies. Based on a recent study in adolescents with a generalized anxiety disorder, it was expected that children with a generalized anxiety disorder would score significantly higher on the strategy rumination. However, only a non-significant trend was found suggesting that children with a generalized anxiety disorder score higher on rumination than children with other anxiety diagnoses. An important limitation of the comparison of children with specific anxiety diagnoses was that the number of pure anxiety diagnoses (i.e., without affective disorder co-morbidity) was fairly small, which diminished statistical power. Statistical power analyses indicated that only large effect sizes could be detected with the number of pure anxiety diagnoses included in this comparison.

Several limitations of the present study are noteworthy to mention. It is important to acknowledge that due to the cross-sectional nature of this study, no conclusions can be drawn regarding the direction of influence. It is possible that using specific maladaptive cognitive coping strategies may cause anxiety disorders. On the other hand, cognitive coping may be an epiphenomenon of anxiety disorders. Another limitation was that the assessment of cognitive coping and the experience of life events were based on a self-report measure, which may have caused some bias. It cannot be excluded that anxiety-disordered children exhibit a different response style than nonanxious children, which may have influenced the results. Therefore, future studies should acknowledge differences in response styles by including multiple informants. Strength of the study was that anxiety diagnoses in the patient sample were obtained by a structured clinical interview in both parents and adolescents, and that the items of the CERQ did not overlap with the ADIS-C.

To summarize, this study showed that anxiety-disordered children use significantly more maladaptive cognitive coping strategies, and less adaptive cognitive coping strategies, in response to negative life events than nonanxious children. Gender does not modify the association between cognitive coping and childhood anxiety disorders. Children with specific anxiety diagnoses do not to differ in their cognitive coping strategies. As anxiety-disordered children experience significantly more negative life events and tend to cognitively cope with these events in a maladaptive way, future prevention and psychotherapeutic intervention studies on childhood anxiety may incorporate strategies to assess and address cognitive coping.

6

Cognitive coping in anxiety-disordered adolescents

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In revision

Abstract

Objective: The main purpose of this study was to investigate differences in cognitive coping strategies between anxiety-disordered and nonanxious adolescents. In addition, the interaction effect with gender as well as differences between specific anxiety diagnoses was examined.
Method: A clinical sample of 159 anxiety-disordered adolescents and a general community sample of 370 nonanxious adolescents were recruited. Nine cognitive coping strategies were assessed in all adolescents.
Results: Results showed that anxiety-disordered adolescents had significant higher scores on most of the cognitive coping strategies than nonanxious adolescents. The cognitive coping strategies rumination, self-blame and catastrophizing accounted for most of the variance. Gender did not modify the results. Further analyses within the anxiety-disordered sample indicated that adolescents with a generalized anxiety disorder scored significantly higher on rumination, but not on other cognitive coping strategies, than social phobic adolescents.
Conclusion: The results suggest that cognitive coping is a valuable target for psychological assessment and treatment in adolescents.

Key words: anxiety disorders, cognitive coping, adolescents, social phobia, generalized anxiety disorder

Introduction

A crucial developmental task during childhood and adolescence is to learn to effectively regulate one's emotions (Campos, Frankel, & Camras, 2004). Poor emotion regulation in youngsters has been associated with negative outcomes for social relationships (Cole, Michel, & Teti, 1994; Denham et al., 2003; Eisenberg, Cumberland, & Spinrad, 1998) as well as for emotional and behavioral functioning (Casey, 1996).

Emotion regulation is defined by Thompson (1991) as the "extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals". Numerous studies have shown that dysfunctional emotional regulatory processes are associated with childhood anxiety disorders (e.g., Amstadter, 2007; Garnefski et al., 2005; Southam-Gerow & Kendall, 2002). Generally speaking, anxiety-disordered children are considered to be less able to understand and regulate their emotions and feel less confident about their emotion regulation abilities than their nonanxious counterparts (Suveg & Zeman, 2004).

A partially overlapping construct to emotion regulation is coping. Coping is distinguished from emotion regulation by its predominant focus on decreasing negative affect, by its emphasis on much larger time periods, and that coping is limited to stressful situations (Gross, 2007; Skinner & Zimmer-Gembeck, 2007). Coping refers to volitional and intentional efforts to regulate negative emotional experiences (Compas et al., 2001). Coping skills may be especially relevant to childhood anxiety problems, as anxious children experience significantly more negative life events, perceive life events as more threatening, and perceive less control over negative life events than their nonanxious counterparts (Gothelf et al., 2004; Marteinsdottir et al., 2007; Weems, Silverman, Rapee, & Pina, 2003).

Coping encompasses both cognitive and behavioral regulatory processes. Cognitive coping processes may be particularly important for the study of childhood anxiety disorders, as cognitive processes are assumed to be involved in the etiology, maintenance and exacerbation of anxiety disorders (Alfano, Beidel, & Turner, 2002; Clark & Wells, 1995; Hirsch, Clark, & Mathews, 2006). Several biased and distorted cognitive processes have been associated with childhood anxiety, such as attention (Puliafico & Kendall, 2006), memory (Watts & Weems, 2006), expectations (Erath, Flanagan, & Bierman, 2007), understanding (Southam-Gerow & Kendall, 2002), interpretations (Creswell, Schniering, & Rapee, 2005), and worry (Weems, Silverman, & La Greca, 2000). Furthermore, a number of cognitive errors in the interpretation of situations have been shown to be positively related to clinical child anxiety, such as catastrophizing, over generalizing, and personalizing (Leitenberg, Yost, & Carroll-Wilson, 1986; Weems, Costa, Watts, Taylor, & Cannon, 2007).

Most studies on cognitive coping and anxiety problems stem from general community samples. Studies in the general community suggest that certain cognitive coping strategies are positively, while others are negatively, associated with anxiety symptoms (Garnefski et al., 2001; Garnefski et al., 2002). Cognitive coping strategies that are negatively related to anxiety are

considered 'adaptive' for psychological well being, whereas strategies that are positively related to anxiety are considered 'maladaptive'.

The cognitive coping strategies self-blame, rumination and catastrophizing have been shown to be positively associated with anxiety symptoms in adolescents (Garnefski et al., 2001; Garnefski et al., 2002). Positive reappraisal, on the other hand, has been shown to be negatively related to anxiety problems (Garnefski et al., 2001). Gender differences have also been demonstrated in the use of specific cognitive coping strategies. Studies on coping have suggested that women in general tend to rely on passive and emotion-focused coping strategies to a larger extent than men (Thoits, 1995). In addition, women appear to use the cognitive coping strategies rumination, catastrophizing and positive refocusing more often than men (Garnefski, Teerds, Kraaij, Legerstee, & Van Den Kommer, 2004).

Cognitive coping has never been addressed in clinically anxious adolescents, nor have adolescents with different anxiety diagnoses been compared as regard to the use of cognitive coping strategies. Studies on cognitive coping may be particularly significant for the understanding of mechanisms underlying the pathogenesis of anxiety disorders as well as for the advancement of current treatment approaches. As far as we know, this is the first study that focuses on cognitive coping in anxiety-disordered adolescents. More specifically, this paper aims to examine (1) whether cognitive coping strategies differ between anxiety-disordered adolescents and nonanxious adolescents, (2) whether gender modifies this difference, and (3) whether cognitive coping strategies differ between adolescents with different clinical anxiety diagnoses.

We hypothesized that anxiety-disordered adolescents would use 'maladaptive' cognitive coping strategies (i.e., self-blame, catastrophizing and rumination) to a higher extent, and 'adaptive' cognitive coping strategies (i.e., positive reappraisal) to a lesser extent than nonanxious adolescents. We further hypothesized that differences in the use of cognitive coping strategies between clinically anxious and nonanxious adolescents would be more apparent for girls than for boys. With respect to the comparison between different clinical anxiety diagnoses, we expected that adolescents with a generalized anxiety disorder would score higher on the cognitive coping strategy rumination than adolescents with other anxiety diagnoses, as adolescents with a generalized anxiety disorder tend to worry more and may employ more cognitive efforts to adapt with their environment.

Method

Sample and Procedure

Anxiety-disordered adolescent sample

Eligible for participation were adolescents (aged 12-16) consecutively referred between February 2004 and June 2007 to the Department of Child and Adolescent Psychiatry of the Erasmus Medical Center, Sophia Children's Hospital. Before intake, 179 adolescents were sent the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001) to their home addresses. As part of the routine intake procedure, all adolescents and their parents were interviewed with the Anxiety Disorder Interview Schedule for Children (ADIS-C; Silverman & Albano, 1996). In total 159 adolescents fulfilled the criteria of an ADIS-C anxiety diagnosis.

The anxiety-disordered adolescent sample consisted of 92 girls and 67 boys with a mean age of 14 years (SD: 1 year and 4 months). Table 1 shows the rate of pure (i.e., one single anxiety diagnosis without other co-morbid anxiety disorders) and co-morbid anxiety disorders in the adolescent patient sample. The most prevalent pure and co-morbid anxiety disorders were generalized anxiety disorder (55%) and social phobia (56%). Twenty-four (15%) anxiety-disordered adolescents had a co-morbid depressive disorder, 20 (13%) had a dysthymic disorder, and 8 (5%) had both a depressive and dysthymic disorder.

Table 1. Rate of pure and co-morbid anxiety disorder diagnoses in the anxiety-disordered adolescent sample (*n*=159).

Anxiety Disorder subtype	Pure		Co-morbid	
	n	(%)	*n*	(%)
Generalized anxiety disorder	21	(13.3)	66	(41.5)
Social phobia	26	(16.4)	63	(39.6)
Specific phobia	9	(5.7)	26	(16.4)
Separation anxiety disorder	3	(1.9)	21	(13.2)
Panic disorder	1	(0.6)	10	(6.3)
Agoraphobia	1	(0.6)	14	(8.8)
Post-traumatic anxiety disorder	1	(0.6)	10	(6.3)
Obsessive-compulsive disorder	3	(1.9)	17	(10.7)

Nonanxious adolescent sample

A general community sample was recruited from 3 different state schools, with adolescents attending the second and third grade. The same standardized recruitment procedures were used at the 3 schools. Adolescents were included if they were between 12 and 16 years of age. Five hundred ninety-seven adolescents (258 boys and 339 girls) filled out the CERQ (Garnefski et al., 2001) and the Symptom Checklist (SCL-90-R; Derogatis, 1977). These questionnaires were completed during

regular school hours, under supervision of a teacher and two graduate psychology students. The adolescents were guaranteed anonymity in relation to their parents, teachers, and fellow students. We refer to Garnefski et al. (2002) for a full description of the sample.

To unambiguously define a nonanxious adolescent sample, adolescents were excluded from the general community sample when their score on the anxiety subscale of the SCL-90-R (Arrindell & Ettema, 2003) was higher than the statistical mean within this general community sample. Furthermore, adolescents were excluded for whom it was not possible to calculate a total score on the anxiety subscale of the SCL-90-R, as a result of too many missing values. The final nonanxious adolescent sample consisted of 370 adolescents (185 girls and 185 boys). The mean age of the adolescents was 13 years and 11 months (SD = 8 months).

Comparison of anxiety-disordered and nonanxious adolescent sample on background variables

The anxiety-disordered adolescent sample and the nonanxious adolescent sample did not differ significantly from each other, regarding gender and age. They differed, however, on the total number of negative life events (χ^2: 52.81, p= 0.00). As regards life events, 37% of the anxiety-disordered adolescents sample did not experience any negative life event, 19% experienced one negative life event and 44% experienced two or more negative life events. In the nonanxious adolescent sample, 66% did not experience any negative life event, 20% experienced one negative life event and 14% experienced two or more negative life events. The most common experienced life event in anxiety-disordered adolescents was frequent conflicts between parents (30%). In nonanxious adolescents, the most common experienced life events were long lasting or severe medical illness parent (10%) and frequent conflicts between parents (9%).

Instruments

Anxiety disorders

The ADIS-C (Silverman & Albano, 1996; Silverman et al., 2008) was used in the clinical adolescent sample to measure DSM-IV anxiety diagnoses. The ADIS-C 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 the present study the ADIS-C was used to assess the following DSM-IV anxiety diagnoses: generalized anxiety disorder, social phobia, specific phobia, separation anxiety disorder, panic disorder, agoraphobia, post-traumatic stress disorder, and obsessive-compulsive disorder. Additionally, depressive disorder and dysthymic disorder were assessed.

Postdoctoral psychologists conducted ADIS-C interviews. After an initial three-day training course, all ADIS-C interviewers received regular - at least monthly- training, to establish and maintain the inter-rater reliability.

According to the ADIS-C manual (Silverman & Albano, 1996), the interviewer gave an interference rating on a 9-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.

Cognitive Coping Strategies

Cognitive coping strategies in adolescents were measured by the Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski et al., 2001), assessing what people think after the experience of negative life events. The CERQ consists of nine different subscales. Each subscale consists of four items ranging from 0 [(almost) never] to 4 [(almost) always]. The higher the subscale score, the more the specific cognitive coping strategy is used.

The CERQ subscales are: *Refocus on Planning*: thinking about what steps to take and how to handle negative events; *Rumination*: thinking about the feelings and thoughts associated with negative events; *Putting into Perspective:* thoughts of playing down the seriousness of an event or emphasizing the relativity when comparing it to other events; *Catastrophizing*: thoughts of explicitly emphasizing the terror of what you have experienced; *Positive Refocusing*: thinking about joyful and pleasant issues instead of thinking about an actual event; *Positive Reappraisal*: thoughts of creating a positive meaning to an event in terms of personal growth; *Acceptance*: thoughts of accepting what you have experienced and resigning yourself to what has happened; *Self-blame*: thoughts of putting the blame of what you have experienced on yourself; and *Other-blame*: thoughts of putting the blame of what you have experienced on the environment or another person

The psychometric properties of the CERQ have been found to be good. Previous studies have reported positively on the factorial validity and criterion-related validity. All subscales have been shown to have a good internal consistency ranging from 0.72 to 0.85, and acceptable test-retest reliability (Garnefski et al., 2002; Garnefski et al., 2007). In the current study similar alpha reliabilities were found for the anxiety-disordered adolescent sample, ranging between 0.71 and 0.85.

The items of the ADIS-C and the CERQ did not overlap.

Anxiety symptoms

The SCL-90-R (Derogatis, 1977) is a self-report questionnaire translated in Dutch by Arrindell and Ettema (2003), which can be administered to both adolescents and adults. The anxiety subscale includes 10 items, referring to symptoms of anxiety, for example feeling tense, nervousness or shaking inside, spells or terror or panic, the feeling that something bad is going to happen, and thoughts or images of a frightening nature. Each of the items is measured on a five-point scale, ranging from 1 (not at all) to 5 (very much). The SCL-90-R is an internationally well-known and standardized instrument. The validity and reliability of the SCL-90-R have been established (Derogatis, 1977) and were confirmed for the Dutch translation (Arrindell & Ettema, 2003).

Negative life events

Lifetime experience of negative life events was assessed in anxiety-disordered and nonanxious adolescents with a self-report checklist. Life events that were measured are: (1) divorce of parents, (2) frequent conflicts between parents, (3) long-lasting or severe medical illness of brother/sister, (4) long-lasting or severe medical illness of parent(s), (5) long-lasting

or severe medical illness of self, (6) death of parent(s), (7) death of brother/sister, (8) severe mental illness of parent(s), (9) severe mental illness brother/sister, (10) violence within family, (11) alcohol abuse parent(s), (12) unwanted pregnancy, (13) having been victim of a crime, (14) having been victim of a severe accident, (15) having been victim of sexual abuse, and (16) having been victim of physical abuse. For purpose of the present study, the total number of lifetime negative events was included as a covariate in the statistical analyses.

Statistical Analyses

To study differences in cognitive coping strategies between the anxiety-disordered adolescent sample and the nonanxious adolescent sample, multivariate analyses of covariance (MANCOVA) were performed. Since the distribution of number of life events significantly differed between the anxiety-disordered and nonanxious sample, the total number of life events was entered as covariate. Additionally, potential interaction effects between group (i.e., anxiety-disordered versus nonanxious) and gender were studied. When the MANCOVA yielded a significant main effect, subsequent univariate F-tests were performed.

Previous studies in the general population have demonstrated that cognitive coping is not only related to anxiety symptoms, but also to depressive symptomatology. To rule out the possibility that the relatively high co-morbidity rate of affective disorders (i.e., depressive and dysthymic disorder) in the anxiety-disordered adolescents sample has biased the results, an identical MANCOVA as the previous one was performed, but now anxiety-disordered adolescents with co-morbid affective disorders were excluded from the analysis.

To study differences in cognitive coping strategies between specific anxiety disorder diagnoses, multivariate analyses of variance (MANOVA) were performed. For reasons of statistical power, adolescents with a pure diagnosis of generalized anxiety disorder and social phobia were compared regarding these cognitive coping strategies. Other anxiety diagnostic groups were excluded from these statistical analyses, since their number of pure cases was too small. For reasons of statistical power, life events were not included as covariate.

For both the MANCOVA and MANOVA, effect sizes were expressed as the percentage of variance accounted for, and they were considered small (1.0% to <5.9% of variance), medium (5.9% to <13.8%), and large (13.8% or more), according to Cohen's criteria (Cohen, 1988).

Ethics

This study was approved by the Committee for Medical Ethics, Sophia Children's Hospital/ Erasmus Medical Center, Rotterdam.

Results

Differences in cognitive coping strategies between nonanxious and anxiety-disordered adolescents

MANCOVA (table 2) showed an overall multivariate difference in cognitive coping strategies between the nonanxious and anxiety-disordered adolescent sample (Wilks' λ = .66; F (9,458) = 26.50; p = 0.000), explaining 34.2% of the variance. This is a large effect according to Cohen's criteria (1988). Subsequent univariate F-tests showed significant differences on rumination, self-blame, catastrophizing, refocus on planning, acceptance, and other-blame. Anxiety-disordered adolescents significantly more often reported to use these cognitive coping strategies than nonanxious adolescents. Rumination accounted for most of the explained variance, namely 27%, followed by self-blame and catastrophizing (17% and 15% respectively). No significant interaction effects between gender and group were observed (Wilks' λ =.97 ; F (9,458) = 1.34; p = 0.21).

A subsequent MANCOVA was performed in which adolescents with co-morbid major depression and /or dysthymic disorder were excluded. It appeared that anxiety-disordered and nonanxious adolescents differed significantly on cognitive coping strategies (Wilks' λ = .75; F (9,419) = 15.47; p = 0.000), explaining 24.9% of the variance. Anxiety-disordered adolescents, without affective co-morbidity, scored significantly higher on the strategies rumination, self-blame, catastrophizing, refocus on planning, acceptance, and positive refocusing than nonanxious adolescents. Rumination accounted for most of the explained variance, namely 17%, followed by self-blame and catastrophizing (both 9%). Positive refocusing accounted for least of the explained variance, namely 1%. No significant interaction effects between gender and group were observed (Wilks' λ =.99 ; F (9,419) = 0.73; p = 0.68).

Differences in cognitive coping strategies between social phobic and generalized anxiety-disordered adolescents

MANOVA within the patient sample showed an overall main effect of the independent variable diagnostic group (i.e., social phobia versus generalized anxiety disorder) on cognitive coping strategies (Wilks' λ = .59 ; F (9,36) = 2.78; p = 0.014), explaining 41% of the variance. This is a large effect according to Cohen's criteria (Cohen, 1988). Subsequent univariate F-tests showed a significant difference on rumination. Adolescents with a generalized anxiety disorder scored significantly higher on rumination than social phobic adolescents.

Table 2. Mean scores on cognitive emotion regulation strategies for anxiety-disordered versus nonanxious adolescents, and percentage of variance accounted for by the group and gender x group interaction effects in MANCOVA's , with number of life events as covariate.

	Nonanxious						Anxiety-disordered							
	Girls		Boys		Total		Girls		Boys		Total		Group*	Group x Gender*
	(*n*=185)		(*n*=185)		(*n*=370)		(*n*=92)		(*n*=67)		(*n*=159)			
	M	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)	*M*	(SD)	(%)	(%)
Self-blame	2.8	(2.3)	2.4	(2.4)	2.6	(2.4)	6.5	(4.4)	4.7	(3.5)	5.8	(4.1)	17	-
Other-blame	1.5	(1.9)	2.0	(2.1)	1.7	(2.0)	2.1	(2.4)	2.8	(3.5)	2.4	(2.9)	2	-
Rumination	3.4	(3.0)	2.5	(2.4)	2.9	(2.7)	7.9	(4.3)	7.0	(3.9)	7.5	(4.1)	27	-
Catastrophizing	1.4	(2.0)	1.4	(2.0)	1.4	(2.0)	3.8	(3.9)	4.4	(3.8)	4.1	(3.9)	15	-
Acceptance	4.4	(2.9)	4.3	(3.7)	4.4	(3.3)	6.2	(3.3)	5.5	(3.3)	5.9	(3.3)	3	-
Putting into perspect.	4.9	(2.9)	4.5	(3.5)	4.7	(3.2)	5.1	(3.7)	4.9	(3.4)	5.0	(3.5)	-	-
Positive refocusing	5.2	(3.3)	4.6	(3.6)	4.9	(3.5)	5.7	(3.5)	5.8	(4.2)	5.7	(3.8)	-	-
Positive reappraisal	4.1	(2.7)	4.2	(3.0)	4.2	(2.8)	4.5	(3.4)	4.6	(3.0)	4.5	(3.2)	-	-
Refocus on planning	5.1	(3.2)	4.7	(3.4)	4.9	(3.3)	6.4	(3.7)	7.2	(3.6)	6.8	(3.7)	4	-

* Percentage of variance accounted for by significant group or by significant group x gender interaction effect; $p < 0.05$

Table 3. MANOVA results for cognitive emotion regulation strategies in adolescents with social phobia or generalized anxiety disorder.

	Social Phobia (*n*=26)		Generalized Anxiety Disorder (*n*=21)		Group*
	M	SD	*M*	SD	(%)
Self-blame	4.96	3.47	6.62	3.93	-
Other-blame	2.20	1.91	2.71	3.90	-
Rumination	5.56	3.38	8.43	4.20	13
Catastrophizing	3.08	2.98	4.71	3.59	-
Acceptance	5.08	3.11	6.76	3.03	-
Putting into perspect.	5.92	3.81	4.30	3.38	-
Positive refocusing	5.64	3.34	5.00	2.19	-
Positive reappraisal	5.08	2.98	4.57	2.84	-
Refocus on planning	6.24	3.18	7.22	3.23	-

* Percentage of variance accounted for by significant group or by significant group x gender interaction effect.

Discussion

The present study's results showed that cognitive coping differed significantly between nonanxious and anxiety-disordered adolescents, and explained a large amount of variance (Cohen, 1988). No interaction effects with gender were found, suggesting that the differences between anxiety-disordered and nonanxious children in coping were not modified by gender. Contradictory to our hypothesis, anxiety-disordered adolescents not only significantly differed from nonanxious adolescents on 'maladaptive' cognitive coping strategies, but also on 'adaptive' strategies. Anxiety-disordered adolescents more often reported the cognitive coping strategies rumination, self-blame, catastrophizing, refocus on planning, acceptance, and other-blame than nonanxious adolescents. We further investigated by means of additional analyses to what extent these results had been influenced by co-morbid affective disorders. It appeared, however, that the original results hardly changed when adolescents with co-morbid affective disorders were excluded. Overall, in anxiety-disordered adolescents, both with and without co-morbid affective disorders, most of the variance was explained by the strategies rumination, catastrophizing, and self-blame.

Previous studies in general population samples have shown that the strategies rumination, self-blame, and catastrophizing are related with self-reported anxiety symptoms (Garnefski et al., 2001; Garnefski et al., 2002). The present study adds to this knowledge that these three strategies are also significantly related to clinically diagnosed anxiety disorders among adolescents. Moreover, the results suggested a trend that clinically anxious adolescents tend to score higher on the whole range of cognitive coping strategies. Thus, anxiety-disordered adolescents also more often tend to use cognitive coping strategies like positive refocusing and refocus on planning. These strategies have been previously described as adaptive for emotional wellbeing (Garnefski & Kraaij, 2006; Garnefski et al., 2001).

Apparently, anxiety-disordered adolescents employ cognitive coping strategies more often than their nonanxious peers. One could assume that anxiety-disordered adolescents cognitively regulated their emotions more often because they experienced significantly more negative life events than their nonanxious peers. This assumption, however, could not explain our findings, since we adjusted for the total number of negative life events by including live events as covariate in the statistical analyses. It could also be argued that anxiety-disordered adolescents may employ more rational ways of regulating their emotions than nonanxious adolescents, instead of regulating their emotions by other regulatory processes, such as by physical or social processes. Other studies, for example, have shown that anxiety-disordered individuals perform less social activities, have less intimacy, companionship, and support in their close friendship, and are more impaired in their physical functioning than nonanxious individuals (Hollifield et al., 1997; La Greca & Lopez, 1998). We speculate that anxiety-disordered adolescents might benefit from interventions to increase their physical and social activities, in addition to down regulation of their cognitive efforts to cope with stressful situations.

Further analyses within the anxiety-disordered patient sample revealed that adolescents

with a generalized anxiety disorder differed significantly from adolescents with a social phobia on the cognitive coping strategy rumination. As expected, generalized anxiety-disordered adolescents tended to think more about the feelings and thoughts associated with a negative event than social phobic adolescents. This finding was to be expected since one of the key defining features of generalized anxiety disorder within the fourth edition Diagnostic and Statistical Manual of Mental Disorder (APA, 1994) is excessive worry. No further significant differences were found between generalized anxiety-disordered and social phobic adolescents on other cognitive coping strategies. A small and non-significant trend suggested that adolescents with a generalized anxiety disorder tend to score higher on other 'maladaptive' strategies, such as self-blame, catastrophizing, and acceptance.

The present study's results may have important implications for both assessment and psychological treatment. For targets of assessment, the CERQ (Garnefski et al., 2001) seems suitable to differentiate between clinical anxious and nonanxious adolescents. The results underline the importance for treatment programs to focus on cognitive coping. Anxiety-disordered adolescents may particularly benefit from two therapeutic approaches with regard to cognitive coping. Firstly, it seems important to restrain the use of maladaptive cognitive coping strategies, particularly rumination, self-blame and catastrophizing, for example by cognitive restructuring techniques. Secondly, it seems important to diminish the overall extent of cognitive regulatory processes. This might be accomplished by learning anxiety-disordered adolescents alternative non-cognitive ways to regulate their emotions, like performing physical or social activities. Further studies should study the differential impact of cognitive versus non-cognitive emotion regulatory processes in the development of anxiety disorder in adolescents and its treatment.

A limitation of this study was that the assessment of cognitive coping strategies in both anxiety-disordered and nonanxious adolescents was based on a self-report measure, which may have caused some bias. Anxiety-disordered adolescents may have a different response tendency while filling out a survey than nonanxious adolescents. A related limitation was that anxiety symptoms in adolescents from the general population were additionally based on a self-report measure. A strength, however, was that a strict inclusion criterion was applied, minimizing the possibility that clinically anxious adolescents were included in the nonanxious adolescents sample. An advantage of the study's design is that anxiety diagnoses in the patient sample were obtained by a structured clinical interview in both parents and adolescents, and that the items of the CERQ did not overlap with the ADIS-C. It is important to acknowledge that due to the cross-sectional nature of this study, no conclusions can be drawn regarding the direction of influence. It is possible that using specific maladaptive cognitive coping strategies may cause anxiety disorders. On the other hand, cognitive coping may be an epiphenomenon of anxiety disorders.

Despite the limitations, three conclusions can be drawn for this study. Firstly, the use of cognitive coping differs between anxiety-disordered adolescents and nonanxious adolescents. The second conclusion is that, gender does not modify the association between cognitive coping and anxiety disorders. Lastly, coping strategies are at work to a different extent in social phobic adolescents and adolescents with a generalized anxiety disorder, particularly the strategy rumination. Further investigations into cognitive coping in anxiety-disordered individuals might be promising both for scientific understanding of anxiety disorders as for psychotherapeutic interventions.

7

General Discussion

General Discussion

The main objectives of the present dissertation were: (1) to examine predictors and potential mediators of CBT success in anxiety-disordered children and adolescents (*'study on predictors and potential mediators of CBT success'),* and (2) to examine whether cognitive coping strategies should be addressed in CBT for childhood anxiety disorders *('study on cognitive coping'*).

The first study on predictors and potential mediators of CBT success was conducted in close collaboration between the departments of child and adolescent psychiatry of the Leiden University Medical Center/Curium in Leiden and the Erasmus Medical Center, Sophia Children's Hospital in Rotterdam.

The second study on cognitive coping comprised four different samples. Two samples were selected from all anxiety-disordered children and adolescents, respectively, consecutively referred to the department of child and adolescent psychiatry of the Erasmus Medical Center, Sophia Children's Hospital in Rotterdam. The other two reference samples comprised nonanxious children and adolescents, respectively, derived from the general population.

The present dissertation's results, clinical implications and recommendations for future research will be discussed.

Study on predictors and potential mediators of CBT success

In the study presented in chapter 2, the predictive value of parental psychopathology on treatment success in anxiety-disordered children and adolescents was examined. Lifetime maternal anxiety disorders were associated with favorable treatment response in adolescents with an anxiety disorder. Sixty percent of the adolescents with a lifetime anxiety-disordered mother were free from any anxiety disorder after CBT as compared to 22% of the adolescents with a nonanxious mother. For anxiety-disordered children, no associations were found between maternal or paternal lifetime internalizing psychopathology and CBT success. Lifetime anxiety disorders in fathers were not associated with treatment success, neither in children nor in adolescents. Gender did not modify the association between maternal lifetime anxiety and treatment response in children nor in adolescents.

The present dissertation's findings for adolescents are contradictory to nine previous studies that found a negative (Berman et al., 2000; Bodden et al., 2008; Cobham et al., 1998; Crawford & Manassis, 2001; Creswell et al., 2008; Liber, van Widenfelt, Goedhart et al., 2008; Southam-Gerow et al., 2001) or no association (Victor et al., 2006; Wood et al., 2006) between parental psychopathology and treatment success in youngsters. In accordance with the present dissertation's results, two other studies (Thienemann et al., 2006; Toren et al., 2000) found a favorable effect of maternal anxiety on treatment success in their offspring. Examination of the methodologies revealed that the studies differed in age range of anxiety-disordered children, anxiety diagnoses, inclusion of paternal psychopathology, and type of assessment of parental

psychopathology. However, the most pronounced difference between the studies was that the those that found a negative or no effect of parental psychopathology on children's treatment success all examined current internalizing psychiatric disorders or symptoms in parents, whereas studies that found a positive effect of parental psychopathology all examined *lifetime* psychiatric disorders. Due to the low rate of current parental anxiety and mood disorders in our sample, statistical analyses were not warranted to examine the relative contribution of current versus lifetime parental internalizing psychopathology on treatment success in children and adolescents. The presence of lifetime anxiety disorders in parents was based on a composite score including currently anxiety-disordered parents and parents that had an anxiety disorder in the past and have been cured. Based on the previous studies, we speculate that the favorable effect of maternal anxiety disorders on adolescents' treatment success in the present study was predominantly accounted for by mothers who have been cured of their anxiety disorder in the past and less by currently anxious mothers. Further analyses showed that adolescents with a mother who has been cured of her anxiety disorder in the past were anxiety disorder free after CBT in 75% of the cases. In contrast, the efficacy rate of CBT in adolescents with a nonanxious and a currently anxious mother was 18% and 25%, respectively. As mentioned above, the rate of currently anxious mothers was low. Therefore, these results should be interpreted with caution. These results may suggest that cured mothers, who have apparently learned to deal with their own anxious feelings, may be more able to figure as a role model for their anxious offspring, to encourage them, and to communicate how to overcome anxiety as compared to currently anxious and nonanxious mothers. Moreover, mothers who have learned to manage their own anxiety disorder in the past may particularly profit from parent training sessions in diminishing their negative parenting styles, such as overinvolved and critical parenting. In contrast, current anxiety disorders in mothers may restrain them in diminishing their negative parenting styles. The positive changes in parenting in lifetime anxious mothers along with improvements during child CBT may have a synergetic effect on adolescents' treatment response. Larger studies should be conducted, with sufficient statistical power, to examine the relative contribution of currently anxiety-disordered mothers versus cured mothers. Additionally, further research is needed to elucidate the mechanisms through which maternal internalizing psychopathology affects treatment response.

As aforementioned, the efficacy of step 1 CBT for adolescents with a nonanxious mother was fairly low (i.e., 22%). If future studies find comparable results, it is important to examine which treatment approach is most efficacious for this group of adolescents. It might be speculated that their anxiety disorder is less caused by environmental influences, and more by specific child characteristics. These adolescents may, for example, need more child-only CBT sessions to effectively target their anxiety disorders. On the other hand, they might profit more from a combination of medication (i.e., selective serotonin-reuptake inhibitor) and CBT. A recent large randomized controlled trial has demonstrated that this combination is more efficacious for anxiety-disordered children and adolescents than a monotherapy of CBT or medication alone (Walkup et al., 2008).

Chapter 2 showed that lifetime maternal anxiety disorders are predictive of treatment response in anxiety-disordered adolescents. Chapter 3 added to this knowledge that threat-related selective attention is predictive of treatment success in anxiety-disordered children and adolescents. More specifically, pretreatment selective attention for severe threat, but not for mild threat, was predictive of treatment success in anxiety-disordered children and adolescents. Age and gender did not modify the association between threat-related selective attention and treatment success. At pretreatment, treatment responders (i.e., initial responders) appeared to show a selective attention away from severe threat, which originated from a tendency not to engage their attention toward threat. Children who did not profit from the first step of CBT received a supplementary CBT, which comprised 10 parent-child sessions. The study presented in chapter 4 demonstrated that treatment responders to the supplementary CBT (i.e., secondary responders) showed a selective attention toward severe threat at pretreatment assessment, which comprised difficulties to disengage attention away from severe threat. Treatment nonresponders (i.e., patients who responded neither to the initial nor to the supplementary CBT) did not show any selectivity in the allocation of attention to severe threat at pretreatment.

The differences in pretreatment selective attentional processing found between initial treatment responders, secondary treatment responders and nonresponders may reflect differences in individual brain functioning (Lau & Pine, 2008). Subcortical regions implicated in threat detection, such as the amygdala, and ventrolateral prefrontal cortical regions implicated in top-down attentional control is activated during attentional tasks (Bishop, 2008). It is well established that the amygdala plays an important role in the automatic detection of threat (Hardee, Thompson, & Puce, 2008; LeDoux, 2000; Ohman, 2005) and in fear reactions, such as the startle response, which consists of skeletomuscular contractions, that prepares humans for action (Ray et al., 2008). The amydala is reciprocally connected with other brain structures, including the ventrolateral prefrontal (Ghashghaei & Barbas, 2002), which is involved in longer term responses associated with emotion-related goal-directed behavior (Davidson, Jackson, & Kalin, 2000; Rolls, 2004). The reciprocal connection between the amygdala and the ventrolateral prefrontal cortex has been linked to emotion regulation processes (Davidson, 2002; Kalin, Shelton, & Davidson, 2007). It has been suggested that the amygdala facilitates the automatic preattentive processing of threat-related stimuli (Dolan & Vuilleumier, 2003), while the ventrolateral prefrontal cortex regulates amygdala activity by exerting control over the attentional processes (Pine, 2007). Both the amygdala as well as the ventrolateral prefrontal cortex has been shown to function atypically in anxiety-disordered children. Neuroimaging studies have shown that anxiety disorders are associated with amplified amygdala responses and hyporesponsive prefrontal cortex activation to threat-related stimuli (Bishop, 2008; Bishop, Duncan, & Lawrence, 2004; McClure et al., 2007; Monk et al., 2008; Telzer et al., 2008).

The used PDT in the present study with a stimulus presentation of 500 milliseconds probably tapped the more voluntary controlled attentional processes, modulated by ventrolateral

prefrontal cortex activity. As aforementioned, the ventrolateral prefrontal cortex is strongly related to attentional control. The study's results suggest that initial treatment responders had more control over their attentional processes than secondary treatment responders. Secondary treatment responders with a selective attention toward threat had difficulties with disengaging their attention away from threat, which implies attentional control problems (Lonigan & Vasey, 2008). On the other hand, initial responders with a selective attention away from threat showed a tendency not to engage their attention toward threat, which could indicate that they had more control over their attentional processes compared to secondary responders. We assume that the ventrolateral prefrontal cortex was more active in initial responders as they exerted more control over their attentional processes than secondary responders. Selective attention away from threat, which was found in initial treatment responders, has indeed been associated with greater ventrolateral prefrontal cortex activation in adolescents with a generalized anxiety disorder (Monk et al., 2006). We further assume that the increased activity of the ventrolateral prefrontal cortex, and concomitant increased attentional control, in initial responders at pretreatment have an important influence on treatment success. A relatively recent study, for instance, has shown that brain functioning is predictive of CBT success in childhood anxiety disorders (McClure et al., 2007).

Chapter 4 showed that selective attention to severely threatening pictures is not only predictive of treatment success in anxiety-disordered children, but also shows differential changes over the course of CBT between different treatment response groups. Pretreatment versus one-year follow-up changes in selective attention to mild threat were not significantly related to treatment success. At one-year follow-up, initial treatment responders showed difficulties to disengage attention away from severe threat, whereas secondary treatment responders showed a strategy not to engage attention toward severe threat. However, on the overall score of selective attention, both the initial and secondary responders did not show selectivity in their attentional processing at one-year follow-up. Children who did not improve significantly over the course of step one and two of the stepped-care CBT (i.e., treatment nonresponders), did not show changes in the allocation of attention to severe threat from pretreatment to one-year follow-up. Both at pretreatment and one-year follow-up, treatment nonresponders were not predisposed to selectively attend either toward or away from severe threat.

During CBT, children with an initial tendency not to engage their attention toward severe threat, and hypothesized increased ventrolateral prefrontal cortex activity and attentional control, may learn more easily and faster to focus on threatening stimuli during exposure procedures than children with difficulties disengaging their attention away from severe threat. During CBT, children with this specific way of attentional processing are gradually exposed to situations or objects they fear, and consequently are required to allocate their attention toward these anxiety-inducing situations or objects. After the first step of the stepped-care CBT, these children showed difficulties to disengage their attention away from threat, but overall did not show threat-related selective attention. This attentional engagement toward anxiety-inducing

situations or objects might prompt cognitive reevaluation of the threat of these situations and objects, especially in children with initial tendencies not to engage their attention toward threat. Furthermore, it might lead to alterations in brain functioning. Effective treatments have been previously shown to decrease atypical brain functioning in anxiety-disordered adults (Furmark et al., 2002) and children (McClure et al., 2007).

Anxiety-disordered children with initial difficulties to disengage their attention away from severe threat, on the other hand, needed more CBT sessions to alter their attentional processes. Although speculative at this moment, these children may need to learn to disengage their attention away from threat and to focus on neutral or pleasant situations or objects. They may probably have less control over their attentional processes than children with a tendency not to engage their attention toward threat, and therefore it might have taken them longer to alter their difficulties to disengage their attention away from threat. The present results also suggest that children with anxiety disorders who do not show any specificity in their allocation of attention to threat may need an adjacent treatment format, for instance a combination of CBT and medication, as CBT alone appears not to be efficacious enough for them.

We are reticent to interpret and speculate about the findings of attentional processing in treatment nonresponders, as their number was reasonably small. The statistical power for this group was smaller than for the group of initial and secondary responders. At pretreatment assessment, for instance, the selective attention score for severe threat of nonresponders was 43.38. As this score was not significantly different from zero, we cautiously conclude that treatment nonresponders did not show any selectivity in their attention to severely threatening stimuli. On the other hand, initial responders showed a selective attention score for severe threat of –41.89. The standard deviations of treatment nonresponders and initial responders were comparable. This suggests that the selective attention score of nonresponders would have been significant if the number of treatment nonresponders would have been larger.

Study on cognitive coping

Chapter 5 showed that anxiety disordered-children experience significantly more negative life-events compared to their nonanxious counterparts. Adjusted for the experience of negative life events, anxiety-disordered and nonanxious children differed in their use of cognitive coping strategies. These results were not modified by gender and no differences in cognitive coping were found between specific anxiety disorder subtypes. Cognitive coping strategies explained a large amount of variance. Cognitive coping strategies that were specifically dissimilar in anxiety-disordered children compared to nonanxious children were rumination, catastrophizing, positive reappraisal, and refocus on planning. More specifically, children with anxiety disorders scored significantly higher on the maladaptive strategies rumination and catastrophizing, and significantly lower on the adaptive strategies positive reappraisal and refocus on planning. In other words, anxiety-disordered children tend to think more about the feelings associated with

negative life events and focus more on the negative aspects of what they have experienced compared to nonanxious children. Additionally, anxiety-disordered children use less thoughts of creating a positive meaning to an event in terms of personal growth, and think less about what steps to take and how to handle negative events. These results are in correspondence with a recent study of Garnefski and colleagues (2007), that also showed that catastrophizing and rumination had a strong positive relation and positive reappraisal a strong negative relation with fearfulness in primary school-aged children. These strategies, particularly catastrophizing and rumination, have also been related to anxiety symptoms in adolescents and adults from the general population (Garnefski et al., 2001; Garnefski et al., 2005; Garnefski et al., 2002).

Chapter 6 showed that, adjusted for the experience of negative life events, anxiety-disordered adolescents significantly differ from nonanxious adolescents in their use of cognitive coping strategies. Gender did not modify this difference. Cognitive coping strategies explained a large amount of the difference between anxiety-disordered and nonanxious adolescents (Cohen, 1988). In contradiction to the findings in anxiety-disordered children, anxiety-disordered adolescents scored significantly higher than nonanxious adolescents on both maladaptive and adaptive cognitive coping strategies. Anxiety-disordered adolescents more often reported the cognitive coping strategies rumination, self-blame, catastrophizing, refocus on planning, acceptance, and other-blame than nonanxious adolescents. Although anxiety-disordered adolescents also reported to make more use of adaptive strategies, most of the variance in the difference between anxiety-disordered and nonanxious adolescents was explained by the strategies rumination, catastrophizing, and self-blame. Adolescents with a generalized anxiety disorder appeared to score significantly higher on the strategy rumination than adolescents with other anxiety disorder subtypes. No further differences in cognitive coping were found between other anxiety disorder subtypes. It could also be argued that anxiety-disordered adolescents may employ more rational ways of regulating their emotions than nonanxious adolescents, instead of regulating their emotions by other regulatory processes, such as by physical or social processes. Other studies, for example, have shown that anxiety-disordered individuals perform less social activities, have less intimacy, companionship, and support in their close friendship, and are more impaired in their physical functioning than nonanxious individuals (Hollifield et al., 1997; La Greca & Lopez, 1998).

These results show that anxiety-disordered adolescents employ more cognitive efforts, both adaptive and maladaptive, to cope with negative life events than nonanxious adolescents, whereas anxiety-disordered children only use significantly more maladaptive cognitive coping strategies than nonanxious children. A previous study of Weems and colleagues (2007) also has shown that cognitive errors are more strongly related to anxiety in adolescents than in children. The difference in cognitive coping between anxiety-disordered children and adolescents might be due to cognitive developmental differences. In comparison to children, adolescents generally have more control over their thoughts (Luna et al., 2004) and are more able to cognitively process information (Kail, 1991). As a result, adolescents may report about their cognitive coping strategies in a more distinguished manner than children. Adolescents may have more

cognitive capacities to report about the temporal sequence of their cognitive strategies used to cope with life events. Anxiety-disordered adolescents may become more anxious when using maladaptive cognitive coping strategies, and subsequently use adaptive cognitive coping strategies to diminish their anxious feelings.

Strengths and limitations of the dissertation

The study on predictors and potential mediators of treatment success in childhood anxiety disorders has a number of strengths and limitations. Strengths of this study were the relatively large sample of included children and adolescents with an anxiety disorder and a strict use of inclusion and exclusion criteria. Furthermore, statistically sound and semi-structured instruments were used to assess childhood anxiety disorders and comorbid psychiatric disorders at pretreatment, posttreatment and one-year after the start of the stepped-care CBT. Parental anxiety disorders were also assessed with an internationally often used, valid, and reliable instrument. A further strength was the use of a stepped-care CBT program consisting of two consecutive structured and protocollized CBT protocols. To our knowledge, no study has examined the efficacy and predictors of a stepped care CBT program for childhood anxiety disorders before.

Despite the relatively large sample size, the rate of current as well as lifetime parental anxiety disorders was fairly low, which prevented us to examine their relative contribution to treatment success. Another limitation is that the PDT used in the study described in chapter 3 and 4 probably tapped the more conscious and voluntary controlled (i.e., supraliminal) attentional processes in response to threat rather than early automatic (i.e., subliminal) stages of attention processing. Consequently, we were not able to assess and examine subliminal selective attentional processes. The use of multiple stimulus durations and the incorporation of an eye tracking device would have helped us to examine the exact time course of selective attentional processing. Unfortunately, the PDT was not administered to children and adolescents with an anxiety disorder directly after step 1 CBT. This was a major drawback in the study described in chapter 4, because we do not know to what extent selective attentional processes did change during and after the first step of CBT and in the period after CBT. Furthermore, anxiety-disordered children and adolescents did not rate the valence and arousal of the threatening pictures used in the PDT. This did not allow us to check whether the ratings of the anxiety-disordered children corresponded to the normative ratings. However, the larger RLs with increasing severity of the pictures, as well as the differential impact between severe and mild selective attention on treatment success, are suggestive for the validity of the used threatening pictures. Another limitation of the present study was that the rate of pure anxiety diagnoses (without comorbidity) was relatively small, which prevented us to examine the association between selective attention and treatment response for specific anxiety disorder subtypes.

Strength of the study on cognitive coping was the relatively large clinical sample of anxiety

–disordered children and adolescents. A further strength was the use of structured clinical interviews to assess childhood anxiety disorders. An important limitation of the studies on cognitive coping was that due to the cross-sectional nature of both studies, no conclusions can be drawn about the direction of influence. It is possible that the use of specific maladaptive cognitive coping strategies might be a precursor of the development of childhood anxiety disorders. On the other hand, cognitive coping might be an epiphenomenon of anxiety disorders. Another limitation was that the assessment of cognitive coping and the experience of life events were based on a self-report measure, which might have caused some bias.

Clinical implications

The results of the study on predictors and potential mediators of CBT success underscore the importance of clinicians to examine parental psychopathology before the start of CBT for children and adolescents. Furthermore, it seems important to incorporate measures to assess threat-related selective attention before and after CBT for childhood anxiety disorders. Additionally, the results show that both lifetime parental psychopathology and threat-related selective attention are important variables to consider in assigning anxiety-disordered children and adolescents to appropriate treatment formats. The study's results show that mothers with a lifetime anxiety disorder, and particularly those who have been cured of anxiety disorders, have a positive effect on treatment success in anxiety-disordered adolescents. Adolescents with a nonanxious mother profit to a limited extent from CBT. These adolescents might profit more from a more extensive child-only CBT or from a combination of CBT and another treatment format, for instance a combination therapy of medication and CBT (Walkup et al., 2008). The present results also showed that lifetime maternal anxiety disorders are not associated with treatment success in anxious children. However, other studies have indicated that lifetime anxiety disorders are significantly related to favorable treatment effect in anxious children (Thienemann et al., 2006; Toren et al., 2000). Apparently, more research is needed to draw firm conclusions about the relation between lifetime anxiety disorders in mothers and treatment success in children.

The study's results also showed that anxiety-disordered children and adolescents with selective attention away from threat and a concomitant tendency not to engage their attention toward severe threat at pretreatment, profit most from child CBT. Children and adolescents with a selective attention toward threat and concomitant difficulties to disengage their attention away from severe threat, at pretreatment assessment, profit to a lower extent from child CBT and need more CBT sessions to be free from their anxiety disorder. Children and adolescents with selective attention toward severe threat may benefit from an adjunct training to alter their attentional processes. Recent studies in healthy adults have shown that changes in selective attention can facilitate changes in anxiety (MacLeod et al., 2002; Mathews & MacLeod, 2002). Reductions of selective attention toward threat in anxiety-disordered children and adolescents

may lead to diminished anxiety disorder severity. There is tentative evidence that attention training can lead to changes in selective attention and accompanying anxiety reductions in anxiety-disordered adults (Li, Tan, Qian, & Liu, 2008). Another recent study, however, showed that attention training as adjunct to CBT for socially anxious adults did not lead to better treatment outcomes as compared to CBT alone (McEvoy & Perini, in press).

Based on the results of cognitive coping in anxiety-disordered children and adolescents, we argue that it is important to target cognitive coping strategies during CBT, with a differentiation between children and adolescents. For anxiety-disordered children it seems important to diminish their maladaptive cognitive coping strategies and increase their use of adaptive cognitive coping strategies. For anxiety-disordered adolescent it also seems important to diminish their use of maladaptive cognitive coping strategies. Furthermore, it seems important for them to cope with life events in a less cognitive way, for instance by seeking more social support and performing more physical activities to cope with negative events. Targeting cognitive coping strategies during CBT might be important to enhance the efficacy of CBT and for long-term relapse prevention (Sharoff, 2002). The CERQ and CERQ-k may provide important information to individually tailor CBT on individuals' cognitive coping profile. When children and adolescents learn to effectively deal with life events, they may be more able to face up to future challenges. Furthermore, we consider the CERQ and CERQ-k important instruments to administer during routine intake procedures. These questionnaires may aid in the assessment of anxiety disorders.

Future research

With respect to the association between parental psychopathology and children's treatment response, future studies should examine the differential impact of fathers and mothers as well as incorporate measures to assess current and lifetime parental anxiety disorders. Furthermore, these studies should include enough anxiety-disordered children to sufficiently explore the relative contribution of current and lifetime parental anxiety disorders on treatment success in anxiety-disordered children and adolescents.

Future studies on the association between selective attention and treatment success should differentiate between mildly and severely threatening stimuli and should examine the specific components of selective attention. Furthermore, it is important to use measures that assess both subliminal and supraliminal attentional processes. The use of eye tracking technology might be beneficial to examine these temporal attentional processes. Additionally, current knowledge on the association between (changes of) selective attention and treatment success might be improved when measures of underlying brain functioning, such as functional magnetic resonance imaging (fMRI) or electroencephalography (EEG), and measures of attentional control are incorporated. It would be interesting to examine whether attention training alone, or as an adjunct to CBT, is beneficial for children and adolescents with anxiety disorders. To

our knowledge, as yet, no study has examined the effect of attentional training in children with anxiety disorders.

Targeting (maladaptive) cognitive coping strategies during CBT might enhance its efficacy. The present results provide a rationale why cognitive coping strategies should be addressed in CBT for childhood anxiety disorders. We recommend further research on this topic.

Final Conclusions

This dissertation aimed at extending the existing knowledge on predictors and potential mediators of CBT success in children and adolescents with an anxiety disorder. The main findings were:

1. Lifetime maternal anxiety disorders were significantly associated with favorable CBT outcomes in anxious adolescents, but not in anxious children. Paternal anxiety and mood disorders were not associated with treatment response, neither in children nor in adolescents.
2. Threat-related selective attention was a significant predictor of treatment success in anxiety-disordered children and adolescents. CBT was particularly efficacious for children and adolescents, who at pretreatment showed selective attention away from severe threat and a concomitant tendency not to engage their attention toward severe threat. Selective attention for mildly threatening stimuli was not a significant predictor of treatment success.
3. Threat-related selective attention changed in treatment responders, but not in treatment nonresponders, from pretreatment to one-year follow-up. The predisposition to selectively attend away or toward severely threatening pictures in initial and secondary responders, respectively, at pretreatment assessment had disappeared one-year after the start of CBT. Treatment nonresponders did not show any changes in threat-related selective attention.
4. Anxiety-disordered children used significantly more maladaptive and less adaptive cognitive coping strategies in response to negative life events than nonanxious children.
5. Anxiety-disordered adolescents used significantly more maladaptive as well as adaptive cognitive coping strategies in response to negative life events than nonanxious adolescents.

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Summary/ Samenvatting

Summary

In **chapter 1**, the background and the main aims of the present dissertation are presented. Given the high prevalence of childhood anxiety disorders, their tendency to persist into adolescence and adulthood, and their association with psychosocial impairments, optimal effective treatment is of great importance. The most efficacious, evidence-based, psychotherapeutic treatment for childhood anxiety disorders at present is Cognitive-Behavioral Treatment (CBT). Despite the proven efficacy of CBT, a substantial proportion of anxiety-disordered children and adolescents do not profit from CBT. The objective of the present dissertation was to gain insight in the differential characteristics of children who respond and do not respond to CBT as well as in the mechanisms underlying treatment success. Such knowledge may aid in the improvement of current treatment programs. This study was part of a larger study on (predictors of) treatment efficacy in anxiety-disordered children, which was conducted in close collaboration between the department of child and adolescent psychiatry of the Leiden University Medical Centre/Curium and the Erasmus Medical Centre, Sophia Children's Hospital.

The second objective of the present dissertation was to examine whether cognitive coping strategies should be addressed in CBT for childhood anxiety disorders. Studies in general community samples of children and adolescents have shown that certain cognitive coping strategies are adaptive for emotional well-being, while others are maladaptive. Cognitive coping strategies had never been examined in relation to anxiety disorders in children and adolescents before. The main aims of the present dissertation were: 1) to examine the predictive power of parental psychopathology and selective attention, respectively, on CBT success; 2) to examine the association between changes in selective attention during CBT and treatment success; 3) to compare anxiety-disordered children and adolescents, respectively, with their non-anxious counterparts as regards the use of cognitive coping strategies.

In **chapter 2**, the differential impact of lifetime maternal and paternal internalizing psychopathology on CBT outcome of anxiety-disordered children (aged 8-12) and adolescents (aged 12-16) was examined. One hundred twenty-seven children and 51 adolescents with an anxiety disorder were treated with the FRIENDS program, a structured CBT program. The Composite International Diagnostic Interview 2.1 was used to assess lifetime anxiety and mood disorders in mothers and fathers. Children and adolescents were evaluated at pre- and posttreatment with the Anxiety Disorders Interview Schedule for Children (ADIS-C) and with self-, and parent-reported questionnaires.

For children, neither maternal nor paternal lifetime internalizing psychopathology was predictive of treatment success after CBT. For adolescents maternal, but not paternal, lifetime anxiety disorders were positively associated with pre-post treatment improvement in clinician severity ratings and with treatment success. Sixty percent 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 nonanxious mother. For both children and adolescents 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. individual CBT versus group CBT) and gender were found.

In **chapter 3**, threat-related selective attention was examined as predictor of treatment success in anxiety-disordered children (aged 8-16 years). Selective attention was examined for different threat intensities and the specific components of selective attention were examined in treatment responders and nonresponders. One hundred thirty-one anxiety-disordered children were treated with the FRIENDS-program. At pretreatment, a pictorial dot-probe task was administered to assess selective attention. Both at pretreatment and posttreatment, diagnostic status of the children was evaluated with the ADIS-C. Selective attention for severely, but nor for mildly, threatening pictures at pretreatment assessment was predictive of treatment success. Selective attention for severely threatening pictures explained a medium to large amount of variance in treatment outcome. Treatment responders showed a selective attention *away* from severe threat and a concomitant tendency not to engage their attention toward severe threat. Treatment nonresponders showed a selective attention *toward* severe threat and concomitant difficulties to disengage their attention away from severe threat. Age was not associated with selective attention and treatment success.

In **chapter 4**, changes in threat-related selective attention and its specific components were studied in relation to treatment response. Children received a standardized stepped-care CBT. Phase 1 CBT consisted of the FRIENDS-program. Children, who were not successfully treated after phase 1 CBT, received a supplementary CBT (i.e., phase two). Phase 2 CBT comprised 10 standardized child-parent CBT sessions, which involved more active participation from parents than in phase 1. Three treatment response groups were distinguished based on the ADIS-C: initial responders (anxiety disorder free after phase one: child focused CBT), secondary responders (anxiety disorder free after phase two: child-parent focused CBT), and treatment nonresponders (who were neither anxiety disorder free after phase 1 nor after phase 2). Ninety-one children (aged 8-16 years) with an anxiety disorder were included in the present study. These children performed a pictorial dot-probe task before treatment and one year after the start of treatment. Changes in selective attention to severely threatening pictures, but not to mildly threatening pictures, were significantly associated with treatment success, and explained a medium amount of variance. Initial and secondary treatment responders showed a reduction of their predisposition to selectively attend *away* or *toward* severely threatening pictures, respectively. At one-year follow-up, initial and secondary responders did not show any selectivity in the attentional processing of severely threatening pictures. Treatment nonresponders did not show any changes in their attentional processing of threatening stimuli; both at pretreatment and one-year follow-up, treatment nonresponders were not predisposed to selectively attend either *toward* or *away* from severe threat.

In **chapter 5**, the use of cognitive coping strategies in response to negative life events was compared between anxiety-disordered and nonanxious children (aged 9-11 years). Additionally, differences in cognitive coping between specific anxiety disorders were examined. A clinical

sample of 131 anxiety-disordered children and a general population sample of 452 nonanxious children were gathered. All children filled out the child version of the Cognitive Emotion Regulation Questionnaire (CERQ-k). After adjustment for the experience of negative life-events, anxiety-disordered children scored significantly higher on the strategies catastrophizing and rumination, and significantly lower on the strategies positive reappraisal and refocus on planning than nonanxious children. These results were not modified by gender. Neither significant differences in cognitive coping were found between children with specific anxiety disorders.

In **chapter 6**, the use of cognitive coping strategies was compared between anxiety-disordered and nonanxious adolescents (aged 12-16 years). A clinical sample of 159 anxiety-disordered adolescents and a general community sample of 370 nonanxious adolescents were recruited. All adolescents filled out the Cognitive Emotion Regulation Questionnaire (CERQ). Results showed that anxiety-disordered adolescents had significant higher scores on most of the cognitive coping strategies than nonanxious adolescents. More specifically, anxiety-disordered adolescents scored significantly higher on the strategies rumination, self-blame, catastrophizing, refocus on planning, acceptance, and positive refocusing than nonanxious adolescents. The cognitive coping strategies rumination, self-blame and catastrophizing accounted for most of the variance. Gender did not modify the results. With respect to specific anxiety disorders, adolescents with a generalized anxiety disorder scored significantly higher on rumination, but not on other cognitive coping strategies, than social phobic adolescents.

In **chapter 7**, the main findings of the present dissertation were summarized and discussed. Lifetime maternal anxiety disorders were associated with favorable treatment response in adolescents with an anxiety disorder. Comparison with the results of previous studies on the same topic, revealed that the studies that showed a negative or no effect of parental psychopathology on children's treatment success all examined *current* internalizing psychiatric disorders or symptoms in parents, whereas studies that found a positive effect of parental psychopathology all examined *lifetime* psychiatric disorders. Further analyses in our sample showed that the favorable effect of maternal anxiety disorders on adolescents' treatment success in the present study was predominantly accounted for by mothers who had been cured of their anxiety disorder in the past and less by currently anxious mothers.

Threat-related selective attention appeared to be a significant predictor of treatment success in anxiety-disordered children. Additionally, differential changes of selective attention were found between different treatment response groups from pretreatment to one-year follow-up. CBT appeared to be particularly efficacious for children showing a selective attention *away* from severe threat, and a concomitant tendency not to engage their attention *toward* severe threat, at pretreatment. Children with a selective attention *toward* severe threat, and a concomitant difficulty to disengage their attention away from severe threat at pretreatment, needed more CBT sessions to be free from their anxiety disorder. One-year after the start of CBT, both children with a selective attention *away* and *toward* severe threat did not show any selectivity in their attentional processing anymore. Children with no predisposition to

selectively allocate their attention toward or away from severe threatening stimuli profited less from CBT and did not show any changes in their attentional processing from pre-treatment to one-year follow-up. We suggest that the differences in pretreatment selective attentional processing found between initial treatment responders, secondary treatment responders and nonresponders may reflect differences in individual brain functioning.

With respect to cognitive coping, children with an anxiety disorder appeared to make more use of maladaptive strategies and less use of adaptive strategies than nonanxious children. In contrast, anxiety-disordered adolescents appeared to make more use of both maladaptive as well as adaptive cognitive coping strategies than nonanxious adolescents. Although anxiety-disordered adolescents also reported to make more use of adaptive strategies, most of the variance in the difference between anxiety-disordered and nonanxious adolescents was explained by the maladaptive strategies rumination, catastrophizing, and self-blame. These results suggest that cognitive coping may be a valuable target for CBT of childhood anxiety disorders; although in targeting cognitive coping a differential approach should be used for children and adolescents.

Samenvatting

In **hoofdstuk 1** worden de achtergrond en de doelen van het huidige onderzoek besproken. Vanwege de hoge prevalentie van angststoornissen op de kinderleeftijd, de persistentie tot in de adolescentie en volwassenheid en de interferentie met het dagelijks functioneren is een optimale behandeling van groot belang. Cognitieve gedragstherapie (CGT) is tegenwoordig de meest effectieve, wetenschappelijk aangetoonde, psychotherapeutische behandeling voor angststoornissen op de kinderleeftijd. Ondanks de bewezen effectiviteit ervan profiteert een substantieel deel van de kinderen en adolescenten met een angststoornis onvoldoende van CGT. Het doel van het huidige onderzoek was om meer inzicht te krijgen in de verschillende kenmerken van kinderen die wel of geen baat hebben bij CGT. Kennis op dit gebied kan leiden tot verbeteringen van huidige behandelprogramma's. Deze studie was onderdeel van een grotere studie naar (predictoren van) behandeleffectiviteit bij kinderen met angststoornissen, die in nauwe samenwerking tussen de afdeling kinder- en jeugdpsychiatrie van het Leids Universitair Medisch Centrum/Curium en het Erasmus Medisch Centrum/Sophia Kinderziekenhuis werd verricht.

Het tweede doel van het huidige onderzoek was om te onderzoeken of het zinvol is om cognitieve coping strategieën aan te pakken tijdens CGT voor kinderen en adolescenten met een angststoornis. Studies bij kinderen en adolescenten uit de algemene bevolking lieten zien dat bepaalde cognitieve coping strategieën adaptief zijn voor het emotioneel welbevinden, terwijl andere strategieën niet adaptief zijn. Cognitieve coping strategieën waren nooit onderzocht in relatie tot angststoornissen bij kinderen en adolescenten. De belangrijkste doelen van het huidige onderzoek waren: 1) de voorspellende waarde van respectievelijk ouderlijke psychopathologie en selectieve aandacht op het succes van CGT te onderzoeken; 2) de relatie tussen veranderingen van selectieve aandacht tijdens CGT en therapiesucces te meten; en om 3) respectievelijk kinderen en adolescenten met een angststoornis te vergelijken met hun niet-angstige leeftijdgenoten wat betreft cognitieve coping.

In **hoofdstuk 2** werd de voorspellende waarde van moederlijke versus vaderlijke internaliserende psychopathologie, die zich ooit tijdens hun leven had voorgedaan (zogenaamde "life-time" psychopathologie, verder aangeduid als "gedurende het gehele leven") onderzocht voor de uitkomsten van CGT bij respectievelijk kinderen (8-12 jaar) en adolescenten (12-16 jaar). Honderdzevenentwintig kinderen en 51 adolescenten met een angststoornis werden behandeld middels het VRIENDEN-programma, een gestructureerd CGT programma. De Composite International Diagnostic Interview 2.1 werd gebruikt om moederlijke en vaderlijke angst- en stemmingsstoornissen gedurende het gehele leven in kaart te brengen. Voorafgaand en na afloop van de behandeling werden de Anxiety Disorders Interview Schedule for Children (ADIS-C) en vragenlijsten voor kind en ouders afgenomen. Moederlijke en vaderlijke internaliserende psychopathologie gedurende het gehele leven bleek bij kinderen niet van voorspellende waarde te zijn voor therapiesucces. Daarentegen bleek moederlijke, maar niet vaderlijke, internaliserende psychopathologie gedurende het gehele leven positief gerelateerd aan verbeteringen in de ernst van de angststoornis(sen) zoals beoordeeld door de

clinicus en aan therapiesucces bij adolescenten. Zestig procent van de adolescenten, met een moeder die ooit in haar leven een angststoornis heeft gehad, bleek angststoornisvrij na CGT in vergelijking met 22% van de adolescenten met moeder die nooit angstig was geweest. Bij zowel kinderen als adolescenten bleek moederlijke en vaderlijke internaliserende psychopathologie gedurende het gehele leven niet van voorspellende waarde voor verbeteringen van angst- en stemmingssymptomen op basis van vragenlijsten. Therapievorm (individuele CGT versus groep CGT) en geslacht bleken dit verband niet te beïnvloeden.

In **hoofdstuk 3** werd selectieve aandacht als voorspeller van therapiesucces bij kinderen (8-16 jaar) met een angststoornis onderzocht. Selectieve aandacht werd onderzocht voor verschillende niveaus van dreiging, aan de hand van bedreigende plaatjes. Tevens werden de specifieke componenten van selectieve aandacht onderzocht bij therapie responders en nonresponders. Honderdéénendertig kinderen met een angststoornis werden behandeld middels het VRIENDEN-programma. Voorafgaand aan de behandeling werd bij hen een computertaak afgenomen om selectieve aandacht te meten. Voorafgaand aan en na afloop van de behandeling werd de aanwezigheid van angststoornissen bij de kinderen geïnventariseerd middels de ADIS-C. Selectieve aandacht voor zeer bedreigende, maar niet voor mild bedreigende, plaatjes bleek van voorspellende waarde voor therapiesucces. Selectieve aandacht voor zeer bedreigende plaatjes verklaarde een middelgrote tot grote hoeveelheid van de variantie in therapie-uitkomst. Therapie responders lieten een selectieve aandacht *weg* van dreiging zien (d.w.z. afwenden van aandacht) en een daarmee samenhangende neiging om hun aandacht niet te richten op zeer bedreigende plaatjes. Therapie nonresponders lieten een selectieve aandacht *naar* bedreigende plaatjes zien (d.w.z. richtten er hun aandacht op) en daarmee samenhangende problemen om hun aandacht af te wenden van gevaar. Leeftijd bleek niet gerelateerd aan selectieve aandacht en therapiesucces.

In **hoofdstuk 4** werden veranderingen in selectieve aandacht en in de specifieke componenten onderzocht in relatie tot therapierespons. Kinderen werden behandeld met een stapsgewijze CGT. De eerste fase van de CGT bestond uit het VRIENDEN-programma. Kinderen die geen baat hadden bij deze eerste fase, werden behandeld middels de tweede fase van de CGT. Deze tweede fase bestond uit 10 gestandaardiseerde kind-ouder sessies, waarbij ouders meer actief bij de behandeling betrokken werden. Drie therapie responsgroepen werden onderscheiden op basis van de ADIS-C: initiële responders (vrij van hun angststoornis na fase 1 CGT), secundaire responders (vrij van hun angststoornis na fase 1 en 2 CGT) en therapie nonresponders (noch na fase 1 noch na fase 2 vrij van hun angststoornis). Éénennegentig kinderen (8-16 jaar) met een angststoornis werden geïncludeerd in het huidige onderzoek. Voorafgaand aan en één jaar na de start van de therapie werd bij deze kinderen de computertaak afgenomen. Veranderingen van selectieve aandacht voor zeer bedreigende plaatjes, maar niet voor mild bedreigende plaatjes, bleek significant gerelateerd aan behandelsucces en verklaarde een middelgrote hoeveelheid variantie. Initiële en secundaire therapieresponders lieten een vermindering zien van hun neiging om hun aandacht respectievelijk af te wenden van, of te richten op, dreiging. Één jaar na de start van de therapie lieten initiële en secundaire therapieresponders geen selectiviteit meer zien in hun aandacht

voor zeer bedreigende plaatjes. Therapie nonresponders lieten geen verandering zien van hun aandachtsprocessen; zowel voorafgaand aan als één jaar na de start van CGT, bleken therapie nonresponders geen selectiviteit te laten zien in hun aandacht voor bedreigende plaatjes.

In **hoofdstuk 5** werd het gebruik van cognitieve coping strategieën na het meemaken van negatieve levensgebeurtenissen vergeleken tussen kinderen met een angststoornis en niet-angstige kinderen (9-11 jaar). Tevens werden verschillen in cognitieve coping tussen kinderen met specifieke angststoornissen onderzocht. Een klinische groep van 131 kinderen met een angststoornis en een algemene bevolkingsgroep van 452 niet-angstige kinderen werden geïncludeerd. Alle kinderen vulden de kind versie van de Cognitive Emotion Regulation Questionnaire (CERQ-k) in. Bij statistische correctie voor het aantal meegemaakte levensgebeurtenissen scoorden kinderen met een angststoornis significant hoger op de strategieën catastroferen en rumineren, en significant lager op de strategieën positief herinterpreteren en concentreren op planning. De resultaten werden niet beïnvloed door geslacht. Evenmin werden er significante verschillen in het gebruik van cognitieve coping strategieën gevonden tussen kinderen met een specifieke angststoornis.

In **hoofdstuk 6** werd het gebruik van cognitieve coping strategieën vergeleken tussen adolescenten met een angststoornis en niet-angstige adolescenten (12-16 jaar). Een klinische groep van 159 adolescenten met een angststoornis en een algemene bevolkingsgroep van 370 niet-angstige adolescenten werden geïncludeerd. Alle adolescenten vulden de Cognitive Emotion Regulation Questionnaire (CERQ) in. Het onderzoek liet zien dat adolescenten met een angststoornis significant hoger scoorden op de meeste cognitieve coping strategieën in vergelijking met niet-angstige adolescenten. Adolescenten met een angststoornis scoorden significant hoger op de strategieën rumineren, jezelf de schuld geven, catastroferen, concentreren op planning, accepteren en concentreren op positieve dingen dan niet-angstige adolescenten. De cognitieve coping strategieën rumineren, jezelf de schuld geven en catastroferen verklaarden het grootste deel van de variantie. Wat betreft specifieke angststoornissen bleken adolescenten met een gegeneraliseerde angststoornis significant meer gebruik te maken van de coping strategie rumineren in vergelijking met sociaal fobische adolescenten.

In **hoofdstuk 7** werden de belangrijkste bevindingen van het huidige onderzoek samengevat en besproken. Moederlijke angststoornissen gedurende het gehele leven bleken gerelateerd aan gunstige therapie uitkomsten bij adolescenten met een angststoornis. Een vergelijking met de resultaten van vorige onderzoeken laat zien dat de studies, die een negatief effect of geen effect van ouderlijke psychopathologie op therapiesucces vonden, allen *huidige* internaliserende psychiatrische stoornissen of symptomen maten. Studies die echter een gunstig effect van ouderlijke psychopathologie vonden bleken allen ouderlijke psychopathologie *gedurende het gehele leven* te hebben gemeten. Nadere analyses binnen onze groep lieten zien dat het gunstige effect van moederlijke angststoornissen op therapie-effect bij adolescenten voornamelijk bepaald werd door moeders die in het verleden genezen waren en aanzienlijk minder uit moeders met een huidige angststoornis.

Selectieve aandacht bleek een significante voorspeller van therapiesucces bij kinderen met

een angststoornis. Voorts werden verschillende veranderingen in selectieve aandacht gevonden voor verschillende therapie responsgroepen. CGT bleek vooral effectief voor kinderen met een selectieve aandacht *weg* van dreiging (oftewel voor kinderen die geneigd zijn hun aandacht af te wenden van gevaar). Kinderen met een selectieve aandacht *naar* dreiging en moeilijkheden om hun aandacht af te wenden van gevaar, bleken meer CGT sessies nodig te hebben om te genezen van hun angststoornis. Één jaar na de start van de behandeling, bleken kinderen die zowel selectieve aandacht *naar* als *weg* van dreiging lieten zien, geen selectiviteit in hun aandacht meer te vertonen. Kinderen die niet geneigd waren om hun aandacht selectief te richten of af te wenden van dreiging, bleken minder te profiteren van CGT en lieten eveneens geen verandering van hun aandachtsprocessen zien. Wij suggereren dat verschillen in selectieve aandacht bij initiële responders, secundaire responders en therapie nonresponders voorafgaand aan de behandeling, verschillen in het functioneren van de hersenen reflecteren.

Wat betreft cognitieve coping bleek dat kinderen met een angststoornis meer gebruik maken van niet-adaptieve strategieën en minder gebruik maken van adaptieve strategieën dan niet-angstige kinderen. Adolescenten met een angststoornis bleken daarentegen meer gebruik te maken van zowel niet-adaptieve als adaptieve cognitieve coping strategieën dan niet-angstige adolescenten. Ondanks het feit dat adolescenten met een angststoornis ook meer gebruik maakten van adaptieve cognitieve coping strategieën bleek het grootste deel van de variantie verklaard te worden door de niet-adaptieve strategieën rumineren, catastroferen en jezelf de schuld geven. Deze resultaten suggereren dat het waardevol is om cognitieve coping strategieën aan te pakken tijdens de behandeling van angststoornis, doch dat in de aanpak gedifferentieerd moet worden tussen kinderen en adolescenten.

Dankwoord

Dankwoord

En dan nu het meest gelezen hoofdstuk uit dit proefschrift.

Ik heb de totstandkoming van dit proefschrift als zeer plezierig en leerzaam ervaren. Zonder de hulp van een groot aantal mensen was dit niet mogelijk geweest. Allen wil ik hiervoor enorm bedanken; een aantal van hen in het bijzonder.

Het meest onmisbaar zijn alle kinderen en ouders die hebben deelgenomen aan dit onderzoek. Zonder jullie enorme bijdrage had dit onderzoek niet kunnen plaatsvinden. Ik wil jullie zeer bedanken voor jullie bereidheid om aan de vele metingen mee te doen. Het Fonds Psychische Gezondheid ben ik dank verschuldigd voor het subsidiëren van het grootschalige (Beren van de Weg) onderzoek.

Mijn co-promotor, dr. Lisbeth Utens, beste Lisbeth, ik ben je erg dankbaar dat je destijds de begeleiding van mijn proefschrift op je wilde nemen. Ik heb veel geleerd van je zeer nauwkeurige, kundige en altijd opbouwende feedback. Je positieve energie, humor, enthousiasme en passie maakt het een feestje om met je samen te werken. Ik hoop dat we in de toekomst nog vaak mogen samenwerken. Lisbeth enorm bedankt!!

Mijn promotor, prof.dr. Frank Verhulst, beste Frank, hartelijk dank voor de uitzonderlijke mogelijkheid die je me hebt geboden om patiëntenzorg te combineren met wetenschappelijk onderzoek. Ik heb veel geleerd van je scherpzinnige en inspirerende inbreng en je onschatbare ervaring.

Dr. Robert Ferdinand, beste Robert, ik ben je zeer veel dank verschuldigd. Je bent de initiator van dit onderzoek geweest en ik wil je bedanken voor het vertrouwen en de kansen die je mij hebt gegeven. Je hebt mij geïnspireerd, en vele anderen, en ik heb veel bewondering voor je enorme drive en ambitie.

Dr. Willemijn van Gastel, beste Willemijn, dank voor de begeleiding tijdens het begin van mijn promotie-onderzoek.

Prof.dr. Philip Treffers, beste Flip, ik wil je bedanken voor de fijne samenwerking. Je was altijd bereid om mee te lezen, mee te denken en me te adviseren. De snelheid waarmee je dat deed was enorm. Ik heb je leren kennen als een integer en aimabel persoon.

Dr. Joke Tulen, beste Joke, het begon met fysiologisch onderzoek en het eindigde met selectieve aandacht. Bedankt dat je altijd tijd voor me vrij wilde maken om te overleggen; ik heb er veel van geleerd.

Dr. Nadia Garnefski, beste Nadia, ik wil je zeer bedanken voor de samenwerking. Jij bent degene geweest die mij heeft geïnteresseerd voor wetenschappelijk onderzoek middels het honours research project (HRP). Ik vond het HRP-onderzoek destijds al heel leerzaam, maar wilde toch meer de klinische kant op. Uiteindelijk heb je gelijk gehad, mijn passie voor wetenschappelijk onderzoek is toch (net) iets groter dan die voor de klinische praktijk. Dank je wel dat je me op het spoor van het wetenschappelijk onderzoek hebt gezet.

Dr. Anja Huizink, beste Anja, dank voor je bijdrage aan hoofdstuk 2 van dit proefschrift. Dr. Francine Jellesma, beste Francine, dank voor je bijdrage aan hoofdstuk 5 van dit proefschrift.

Prof.dr. Verheij, beste Fop, hartelijk dank dat je secretaris van de leescommissie wilde zijn. Prof. dr. van Busschbach, lid van de leescommissie, bedankt voor het lezen en beoordelen van dit proefschrift. Prof.dr. Muris, hartelijk dank dat u plaats wil nemen in de grote commissie. Dear prof. Barrett, I am very happy that you could make the time to oppose during the defense of my thesis. You are one of the leading researchers in the field of cognitive-behavioral therapy and childhood anxiety disorders, and it is a great privilege for me that you will take part of the PhD defense committee.

Ik wil eveneens Pieter de Nijs (sinds twee maanden Dr. de Nijs!!) en Monique van Lier bedanken voor het feit dat jullie, als respectievelijk teamcoördinator en hoofd poliklinische zorg, mij de mogelijkheid gaven om naast de patiëntenzorg tijd vrij te maken voor mijn promotie-onderzoek.

In de loop der jaren hebben vele stagiaires en studenten aan het onderzoek meegewerkt, waaronder Tessa, Annemieke, Johanneke, Marjolein en Patricia. Hartelijk dank voor jullie inzet.

Alle collega's van de afdeling kinder- en jeugdpsychiatrie hartelijk dank voor de prettige samenwerking en de interesse die jullie de afgelopen jaren in mijn onderzoek hebben getoond. Tevens wil ik Juliette Liber en Adelinde van der Leeden van het LUMC-Curium bedanken voor de fijne samenwerking en het enorme werk dat jullie verricht hebben bij alle metingen tijdens het Beren van de Weg-onderzoek. De collega's van het research-overleg wil ik enorm bedanken voor de interessante Engelse 'lectures' en discussies. Ik zal ons verblijf in Australië en de presentatie tijdens het IACAP-congres in Melbourne nooit vergeten. In het bijzonder wil ik mijn researchmaatjes Bram, Dennis, Esther, Gwen, Myra, Pieter, Victor en Sonja bedanken. Jullie brengen een hoop extra werkplezier.

Tot slot de belangrijkste mensen uit mijn leven. Pa en ma, ik wil jullie enorm bedanken dat jullie er altijd voor mij zijn. Wat was jullie warmte en liefde nodig in de afgelopen jaren!! Ik wil jullie uit de grond van mijn hart bedanken voor alles wat jullie voor me hebben gedaan. Ik had me geen fijnere ouders kunnen wensen. Victor, paranimf en broer, ik wil jou eveneens bedanken voor het feit dat je altijd voor me klaar staat. Ondanks dat je nu kiest voor een baan in de

financiële sector, zou het me niet verbazen als je in de toekomst ook kiest voor een promotie-onderzoek. Veel dank ook bij het maken van de cover; je bent een multitalent. Daniël, we kennen elkaar al vanaf de kleuterschool. Jouw vriendschap, humor, betrokkenheid en gedeelde passie voor sport, maken het leven buiten het werk een stuk aangenamer. Fijn dat je mijn paranimf wil zijn; ik hoop dat we tijdens de verdediging niet de slappe lach krijgen net zoals vroeger op school.

En tot slot, mijn allerliefste dochter. Lieve Mylène, dank voor het zijn wie je bent. Principessa, ik hou van jou van de maan, de sterren, Australië, Kos, Spanje en weer terug. Veel liefs, papa.

Curriculum Vitae

Curriculum Vitae

Jeroen Silvester Legerstee werd geboren op 12 maart 1978 te Rotterdam. In 1995 behaalde hij zijn HAVO-diploma aan het Comenius College te Capelle aan den IJssel. In hetzelfde jaar begon hij met het VWO en het jaar daarop behaalde hij zijn propedeuse aan de faculteit Economie en Management van de Ichthus Hogeschool Rotterdam. Vanaf september 1997 studeerde hij ontwikkelingspsychologie aan de Universiteit Leiden, waar hij in augustus 2001 het doctoraal examen behaalde.

Vanaf januari 2001 tot en met december 2001 werkte hij op freelance basis bij het Willem-Alexander Kinder- en Jeugdcentrum van het LUMC te Leiden en verrichtte daar ontwikkelingsonderzoek bij prematuur geboren kinderen, in het kader van het Newborn Individualized Developmental Care and Assessment Program onderzoek (NIDCAP-onderzoek). Van januari tot december 2002 was hij als psycholoog werkzaam bij 'de Opstap' te Vlaardingen, een school voor leerwegondersteunend middelbaar onderwijs, en van april tot juli 2002 was hij werkzaam bij residentiële jeugdinrichting Harreveld.

In juli 2002 werd hij aangesteld als psycholoog bij de afdeling kinder- en jeugdpsychiatrie van het ErasmusMC/Sophia te Rotterdam (hoofd: prof.dr. F.C. Verhulst). Vanaf januari 2004 tot juli 2009 werkte hij halftime als onderzoeker aan zijn promotieonderzoek. Een deel van dit promotieonderzoek was onderdeel van een grootschalig onderzoek getiteld 'cognitieve gedragsmatige behandeling van angststoornissen bij kinderen en adolescenten: op weg naar een optimale match tussen behandelingsmodaliteit en kenmerken van de patiënt', waarvan de resultaten in dit proefschrift beschreven staan. Deze grootschalige studie werd in nauwe samenwerking uitgevoerd met de afdeling kinder- en jeugdpsychiatrie van het LUMC/ Curium (hoofdonderzoekers: dr. R.F. Ferdinand, prof.dr. P.D.A. Treffers (LUMC/Curium), dr. E.M.W.J. Utens en prof.dr. F.C. Verhulst).

PhD Portfolio Summary

ERASMUS UNIVERSITEIT ROTTERDAM

PhD Portfolio Summary

Summary of PhD training and teaching activities

Name PhD student:	Jeroen S. Legerstee
PhD period:	01/2004 – 06/2009
Erasmus MC Department:	Child & Adolescent Psychiatry
Promotor(s):	Prof. Dr. F.C. Verhulst
Supervisor:	Dr. E.M.W.J. Utens

1. PhD training	Year	Workload
Research Skills		
- Modern Statistical Methods, NIHES, Rotterdam	2005	4.3 ECTS
National Presentations		
- Oral presentation, symposium 'Behandeling centraal'. Rotterdam, The Netherlands	2009	0.02 ECTS
- Oral presentation, 35th congress of the Dutch Association of Psychiatry. Maastricht, The Netherlands	2007	0.02 ECTS
- Oral presentation, 34th congress of the Dutch Association of Psychiatry. Groningen, The Netherlands	2006	0.02 ECTS
- Oral presentation, 33th congress of the Dutch Association of Psychiatry. Den Haag, The Netherlands	2005	0.02 ECTS
- Oral presentation, symposium 'Angststoornissen bij kinderen en jeugdigen'. Rotterdam, The Netherlands	2004	0.02 ECTS

	Year	Workload
International presentations		
- Co-chair, 6th World Congress on Stress. Vienna, Austria	2007	0.08 ECTS
- Poster presentation, V World Congress of Behavioral and Cognitive Therapies. Barcelona, Spain	2007	0.08 ECTS
- Oral presentations, 17th International Association for Child and Adolescent Psychiatry and Allied Professions Congress. Melbourne, Australia	2006	0.04 ECTS
Seminars and workshops		
- Symposium 'Behandeling Centraal'. Rotterdam, The Netherlands	2009	0.6 ECTS
- V World Congress of Behavioral and Cognitive Therapies. Barcelona, Spain	2007	1.0 ECTS
- 6th World Congress on Stress. Vienna, Austria	2007	0.3 ECTS
- 35th congress of the Dutch Association of Psychiatry. Maastricht, The Netherlands	2007	0.3 ECTS
- 17th International Association for Child and Adolescent Psychiatry and Allied Professions Congress. Melbourne, Australia	2006	1.0 ECTS
- 34th congress of the Dutch Association of Psychiatry. Groningen, The Netherlands	2006	0.3 ECTS
- Symposium 'Angst en Autisme'. Rotterdam, The Netherlands	2006	0.6 ECTS
- 33th congress of the Dutch Association of Psychiatry. Den Haag, The Netherlands	2005	0.3 ECTS
- Symposium 'Angststoornissen bij kinderen en jeugdigen'. Rotterdam, The Netherlands	2004	0.3 ECTS

	Year	Workload
- Symposium 'Diagnostiek, behandeling en preventie van angststoornissen bij kinderen en adolescenten. Rotterdam, The Netherlands	2001	0.3 ECTS

2. Teaching activities	**Year**
Lecturing	
- Course, medical students about observation skills and childhood psychiatric disorders (thema 3.2). Erasmus Medical University, Rotterdam, The Netherlands	2004-'09
- Course, medical house-officers about psychological assessment. Erasmus Medical University, Rotterdam, The Netherlands	2004-'09
- Course, GZ-psychologists about assessment and treatment of childhood anxiety disorders. RINO, Utrecht & Leiden, The Netherlands	2005-'09
- Course, psychology students about childhood anxiety disorders. Erasmus University, Rotterdam, The Netherlands	2005-'09
Supervising practicals and excursions	
- Supervision, research course for 3rd year medical students.	2005-'08
- Supervision, master psychologists about psychological assessment in children and adolescents.	2004-'09

3. Publications not listed in thesis

- Legerstee, J.S., Utens, E.M.W.J., & Treffers, P.D. (2009). Selectieve aandacht voorspelt behandelsucces bij kinderen met een angststoornis. *Vizier, kwartaalblad van de angst, dwang en fobie stichting, (1)*, 22-25.

- Gastel van W., Legerstee, J.S., & Ferdinand (2009). The role of perceived parenting in familial aggregation of anxiety disorders in children. *Journal of Anxiety Disorders,* 23 (1), 46-53.

- Legerstee, J.S., van der Reijden-Lakeman, I., Lechner-van der Noort, M. & Ferdinand, R.F. (2004). Bruikbaarheid verkorte versie WISC-RN in de kinderpsychiatrie. *Kind en Adolescent*, 25 (4), 291-297.

- Garnefski, N., Teerds, J., Kraaij, V., Legerstee, J.S., & van den Kommer, T. (2004). Cognitive emotion regulation strategies and depressive symptoms: differences between males and females. *Personality and Individual Differences*, 36 (2), 267-276.

- Garnefski, N., Legerstee, J.S., Kraaij, V., Van den Kommer, T., & Teerds, J. (2002). Cognitive coping strategies and symptoms of depression and anxiety: a comparison between adolescents and adults. *Journal of Adolescence,* 25 (6), 603-611.

- Garnefski, N., van den Kommer, T., Kraaij, V., Teerds, J., Legerstee, J.S., & Onstein, E. (2002). The relationship between cognitive emotion regulation strategies and emotional problems: Comparison between a clinical and a non-clinical sample. *European Journal of Personality,* 16 (5), 403-420.

- Legerstee, J.S., Teerds, J., van den Kommer, T., Garneski, N., & Kraaij, V. (2002). *Differences in cognitive coping between adolescents and adults and its relationship with psychopathology*. In Garneski, N. & Prins, F. (Eds.). Coping with Psychology: a yearly publication devoted to the results of the Honours Research Students Project at the Department of Psychology (pp. 149-162). Leiden, The Netherlands: University of Leiden.