Looking for mediators: cognition, perceived control and coping in the treatment of anxiety-disordered children

Hogendoorn, S.M.

Citation for published version (APA):

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Looking for Mediators

Cognition, Perceived Control and Coping in the Treatment of Anxiety-Disordered Children

Sanne M. Hogendoorn

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Graag wil ik u uitnodigen voor het bijwonen van de openbare verdediging van mijn proefschrift:

Looking for Mediators: Cognition, Perceived Control and Coping in the Treatment of Anxiety-Disordered Children

Vrijdag 21 december 2012
om 10.00
Agnietenkapel
Oudezijds Voorburgwal 231
Amsterdam

Na afloop bent u van harte welkom op de receptie ter plaatse

Paranimfen:

Lidewij Wolters
l.h.wolters@amc.uva.nl

Shelley van der Veek
s.m.vanderveek@amc.uva.nl

Sanne Hogendoorn
Van Noordtkade 28-b,
1013 BZ Amsterdam
s.hogendoorn@debascule.com
LOOKING FOR MEDIATORS

COGNITION, PERCEIVED CONTROL AND COPING IN THE
TREATMENT OF ANXIETY-DISORDERED CHILDREN

Sanne M. Hogendoorn
LOOKING FOR MEDIATORS
COGNITION, PERCEIVED CONTROL AND COPING IN THE
TREATMENT OF ANXIETY-DISORDERED CHILDREN

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. D.C. van den Boom
ten overstaan van een door het college voor promoties
ingestelde commissie,
in het openbaar te verdedigen in de Agnietenkapel
op vrijdag 21 december 2012, te 10.00 uur

door

Sanne Mereille Hogendoorn

geboren te Geldermalsen
Promotiecommissie:

Promotores:  Prof. dr. F. Boer, emeritus
             Prof. dr. P.J.M. Prins

Co-promotor: Prof. dr. E. de Haan

Overige leden: Dr. J. Huijding
               Dr. R.J.L. Lindauer
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Chapter 1
General introduction
Anxiety disorders are very common in children and adolescents (hereafter children), with a six-month prevalence rate of 9.7% in the Netherlands in 13- to 18-year old adolescents (Verhulst, Van der Ende, Ferdinand, & Kasius, 1997) and a one-year incidence of 2.9% (Roberts, Roberts, & Chan, 2009). Anxiety disorders in children are often chronic and recurring (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003) and associated with significant impairment in academic, social and family functioning (Langley, Bergman, McCracken, & Piacentini, 2004). Moreover, these disorders impose a huge burden on emotional, social and economic costs (Bodden, Dirksen, & Bügels, 2008).

Although Cognitive Behavioral Therapy (CBT) has been found to be efficacious in the treatment of childhood anxiety disorders (Reynolds, Wilson, Austin, & Hooper, 2012; Silverman, Pina, & Viswesvaran, 2008), remission rates are generally between 54% and 74% (Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; James, Soler, & Weatherall, 2009). This is more than the 28% to 35% remission rate in a waitlist or inactive control condition (Cartwright-Hatton et al., 2004; James et al., 2009), but still means that three to four out of ten children remain considerably or even clinically anxious after a standard treatment with CBT. Therefore, there is an urgent need to improve the efficacy of CBT.

In order to improve treatment efficacy and efficiency we can examine how CBT works (through research into mediators or mechanisms of change), which specific components are effective (through dismantling research) or for whom the treatment does and for whom it doesn't work (examination of moderators). This dissertation focuses on the first strategy: identifying mediators of CBT for anxiety disordered children. Although we can confidently claim that CBT is effective for most children, we still do not know why it is effective. Although it is assumed that specific elements of CBT (e.g. cognitive restructuring, exposure, problem solving strategies) bring about the desired change in anxiety symptoms, there is a surprising lack of research regarding the mechanisms involved in bringing about this change (Prins & Ollendick, 2003; Weersing & Weisz, 2002). Most studies focus on treatment efficacy, but only a small portion of researchers seek to understand why treatment works. To our knowledge, only five studies specifically examined mediators in the treatment of childhood anxiety disorders. Treadwell and Kendall (1996), and Kendall and Treadwell (2007) found that a decrease in negative self-statements and an increase of the ratio of positive and negative self-statements mediated treatment outcome in clinically anxious children. Alfano et al. (2009) showed that a decrease in loneliness mediated change in social anxiety in children with social phobia. Lau, Chan, Ll, and Au (2010) found that a decrease in negative thoughts and an increase in coping strategies mediated treatment effects. Finally, Maric, Heyne, MacKinnon, Van Widenfelt, and Westenberg (2012) showed that post-treatment increase in school attendance and a decrease of fear were mediated by increased self-efficacy. However, only one of these studies (Maric, Heyne et al., 2012) used a longitudinal design and none incorporated in-treatment assessments. In-treatment assessments are important if one wants to examine treatment mediators, as we explain later in this introduction.
It is not only not clear which mediators play a role in the treatment of childhood anxiety, but we also need to improve the measurement of putative mediators. In addition to the use of reliable and valid questionnaires that are applicable to children, we need to develop instruments that can be used repeatedly over the course of treatment to monitor individual treatment progress in more detail. Further, to circumvent certain disadvantages associated with self-report (e.g. reliance on introspective abilities; influence of social desirability) and to measure more automatic aspects of the potential mediators, indirect measures should be developed. Repeated and indirect assessments in children are barely developed. Therefore, the main purpose of this dissertation is two-fold:

1. To improve the measurement of putative mediators in children by developing two types of instruments which are currently underrepresented in this age group: an indirect measure and a measure to repeatedly assess anxiety symptoms and severity.
2. To examine putative mediators of the treatment of childhood anxiety disorders (separation anxiety disorder, specific phobia, generalized anxiety disorder, social phobia or panic disorder with or without agoraphobia) in 8- to 18-year old children. More specifically, to examine whether a change in the amount of negative and positive thoughts, perceived control and several coping strategies precedes a reduction of anxiety symptoms.

**Mediators in the Treatment of Anxiety in Children**

**Statistical Analysis of Mediators**

We use the terms "mediator" to specify factors that may be essential in the treatment of anxiety disorders. A mediator is described as an intermediate variable in the causal sequence between an independent variable and a dependent variable (MacKinnon, 2008, p. 8). A related term is "moderator" which is described as a variable that "affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (Baron & Kenny, 1986, p. 1174). Essentially, a mediator refers to how or through which mechanism treatment works and a moderator refers to for whom or under what conditions treatment works. In this dissertation we will focus on mediating variables.

The most widely used guidelines to study mediation, also known as the "causal steps approach", were developed by Baron & Kenny (1986). These guidelines include the following conditions that should be met: 1) the independent variable (e.g. treatment) predicts the dependent variable (e.g. anxiety symptoms); 2) the independent variable predicts the mediating variable; 3) after controlling for the effect of the independent variable, the mediator predicts the dependent variable; and 4) the effect of the independent variable on the dependent variable is reduced or eliminated after accounting for the indirect pathway through the mediator. However, it has been demonstrated that the causal steps approach has low power in many situations, especially due to the requirement of step 1 (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Mediation
can still be present, even in the absence of a direct relation between treatment and outcome. Therefore, there have been several modifications to the Baron and Kenny approach.

Kraemer, Wilson, Fairburn, and Agras (2002) presented an adaptation of the causal steps approach specifically for randomized controlled clinical trials, also known as the "MacArthur approach". The main difference between the MacArthur approach and the causal steps approach is the emphasis of temporal relations: the mediator should change after a change in the independent variable (or after the start of treatment) and before a change in the outcome variable. Therefore, the mediator and outcome variables should be measured repeatedly during the course of treatment and not at pre- and post-treatment only (Kraemer et al., 2002; Weersing & Weisz, 2002). Further, the mediator should be correlated with treatment condition and have a main or interactive effect on the outcome variable (Kraemer et al., 2002). A temporal or longitudinal design with repeated assessments can help to make the distinction whether the mediator is a causal variable (and therefore can be considered as a mechanism of change) or a covariate of change. As Laurenceau, Hayes, & Feldman (2007, p. 685) describe it: "...all mechanisms of change are mediators, but not all mediators will turn out to be mechanisms of change." Cross-sectional designs are not fit to determine whether a mediator is a true mechanism of change, due to the lack of temporal precedence.

A longitudinal design is also preferred for several other reasons (MacKinnon, 2008, p. 194; Selig & Preacher, 2009). First, causal relationships need time to unfold and thus cross-sectional studies might overlook an effect. Second, longitudinal data allow for the examination of temporal precedence of different variables. The magnitude of this effect might be different for different time intervals. Third, both changes within and between individuals can be investigated. Fourth, with a longitudinal design one can control for previous levels of the variables. Recently, sophisticated statistical analyses have been developed to study mediators in longitudinal designs, including autoregressive models, latent growth curve models and latent difference score models (MacKinnon, 2008, pp. 201-217).

Note that both the causal steps approach and the MacArthur approach rely on the comparison of a treatment condition and a control condition. However, sometimes it is not feasible or ethical to include a control or waitlist condition, especially when the efficacy of the treatment under investigation has already been demonstrated repeatedly or when (anxiety) problems are so severe that immediate treatment is required (Doss & Atkins, 2006). In the case of a single condition design, it is more difficult to demonstrate that the changes during and after treatment are accountable to the treatment (components) and not to other factors (i.e. passage of time). In this case it is especially important to measure changes in the outcome and the putative mediator repeatedly over time during treatment (Maric, Wiers, & Prins, 2012).

Apart from the requirement of a temporal relationship between mediator and outcome, there are more requirements that should be met before concluding that a specific variable is a mediator or even a (causal) mechanism of change. Kazdin and Nock (2003) described six other requirements: 1) there should be a strong association between the intervention and mediator
and between the mediator and therapeutic change; 2) the associations should be specific, i.e. not associated with other constructs or "non-mediators"; 3) there should be a gradient in which more of the mediator is associated with greater change in the outcome; 4) an experiment should show that manipulation of the proposed mediator is associated with a change in the outcome variable; 5) results should be consistent and replicated across studies; and 6) the proposed mediator should be plausible and coherent with theory. Maric, Wiers, and Prins and colleagues (2012) further recommend the investigation of reciprocal and sequential mediation.

As mentioned above, there are many requirements that should be met to demonstrate that a specific construct is a mediator. It is very complicated to examine all, or most, of the requirements in one study. This dissertation focusses especially on temporal precedence and possible reciprocal effects between several putative mediators and treatment outcome.

**Putative Mediators in the Treatment of Childhood Anxiety Disorders**

There are several theories which describe the etiological processes that lead to the development of anxiety disorders (Weems & Stickle, 2005), including biological (e.g. genetics, inhibited temperament, psychophysiology), behavioral (e.g. respondent, operant and vicarious learning), cognitive (e.g. information processing, cognitive content, perceived control) and interpersonal (e.g. attachment, parenting style, life events) models. These theories guided the development of treatment programs, for example by including cognitive restructuring to change dysfunctional thoughts or by involving parents in the treatment to account for the interpersonal component. However, as has been said before, we do not know through which mediators the treatment components bring about the desired change. In this dissertation the focus will be on three putative mediators that fall under the scope of the cognitive perspective, including negative and positive thoughts, perceived control and coping.

**Negative and positive thoughts.** Cognitive and information processing models assume that biases in cognition (dysfunctional cognitive schemata, negative thoughts and cognitive errors) and information processing (attention, interpretation, recall) play a central role in the development and maintenance of anxiety disorders (Beck, 2005; Beck & Clark, 1997; Kendall, 1985). Dysfunctional threat schemata are considered to be danger laden, stable and focused on future events. Anxious persons tend to overestimate the likelihood and severity of threat situations and underestimate their coping abilities (Beck, 2005).

It is assumed that a change in cognitive schemata and thoughts is essential to reduce anxiety symptoms. More specifically, the “Power of Nonnegative Thinking” hypothesis assumes that improvement during treatment is associated with a reduction of negative thoughts rather than an increase of positive thoughts (Kendall & Chansky, 1991). However, the empirical support for this claim has been mixed. In general, negative thoughts are associated with greater levels of anxiety in clinically anxious children (Kendall & Chansky, 1991; Schniering & Rapee, 2002) and normal children (Muris, Merckelbach, Mayer, & Snieder, 1998). Further, treatment efficacy studies have demonstrated that the amount and content of negative thoughts changed after
CBT (Silverman et al., 1999) and that the amount of negative thoughts can predict treatment outcome (Muris, Mayer, den Adel, Roos, & Van Wamelen, 2009).

The role of positive thoughts in anxiety is less straightforward. In some studies, psychopathology is associated with less positive thoughts (Calvete & Cardenoso, 2002; Ronan & Kendall, 1997) but in other studies this relationship has not been found (Treadwell & Kendall, 1996; Prins & Hanewald, 199; Kendall & Treadwell, 2007). Rather than examining negative and positive thoughts separately, Schwartz and Garamoni examined the ratio of positive to negative thoughts in their States of Mind Model (Schwartz, 1997; Schwartz & Garamoni, 1989). In the SOM model, an optimal ratio of positive to negative thoughts is associated with psychological health. The SOM model has been studied in children and it has been found that a lower SOM ratio is associated with more internalizing or anxiety problems (Calvete & Cardenoso, 2002; Calvete & Cardenoso, 2005; Daleiden, Kendall & Treadwell, 2007; Vasey, & Williams, 1996; Prins & Hanewald, 1997; Ronan & Kendall, 1997; Treadwell & Kendall, 1996). Further, higher SOM ratios have been reported after CBT for childhood anxiety (Kendall & Treadwell, 2007; Treadwell & Kendall, 1996).

Although an association has been found between negative thoughts, positive thoughts and SOM ratios with childhood anxiety, it remains unclear whether a change in the amount and content of thoughts is a mediator in the treatment of anxiety disorders. An indication for a mediating role of negative thoughts has been demonstrated in cross-sectional design studies by Lau et al. (2010), Treadwell and Kendall (1996) and Kendall and Treadwell (2007), but not yet in a longitudinal design. In this dissertation, we will examine the role of both negative and positive thoughts in anxiety disorders and whether they are mediators of the treatment effect in anxiety disorders.

**Perceived control.** Anxiety is not only defined by the interpretation of a situation as threatening, but also by the extent to which a child feels in control over its fear or the feared situation. According to Chorpita & Barlow (1998), a perceived lack of control over threatening situations is central to the development of anxiety disorders. Chorpita and Barlow (1998, p. 5) define control as "the ability to personally influence events and outcomes in one's environment." Chorpita and Barlow describe a model in which early experiences with a lack of control can lead to an increased tendency to perceive events as not within one's control, which in turn can lead to the experience of negative emotion and chronic anxiety. They propose an interaction between children's inhibited temperament, parental anxiety, parental rearing style and the development of a lack of perceived control. Parents with an anxiety disorder and/or an inhibited child more often display an overprotective and overcontrolling rearing style. As a result, the child acquires less experience with mild threatening situations. Finally, the child is more likely to have an avoidant coping style and not to feel in control over anxiety related situations. The role of perceived control as a mediator between parental rearing style and anxiety has been examined in different studies and was confirmed several times (e.g. Ballash, Pemble, Usui, Buckley, &
Perceived control is not directly targeted in treatment. However, it is reasonable to assume that improved coping and problem solving skills can enhance perceived control ("I know what I can do when I am scared") which subsequently decreases anxiety. On the other hand, increased perceived control could be a consequence of mastery experiences in successful exposure exercises and follow on decreased anxiety. Research shows that clinically anxious children have lower levels of perceived control than non-referred children (Weems, Silverman, Rapee, & Pina, 2003). Further, a reduction of anxiety symptoms after treatment is associated with an increase in self-reported perceived control (Muris et al., 2009). However, to our knowledge, perceived control has never been formally evaluated as a potential mediator of CBT.

Coping. Anxious persons not only tend to report more negative thoughts and less perceived control, but may also have less adaptive coping abilities. The difference between perceived control and coping is that the first is the perception of one’s ability to cope with a specific, anxiety related situation and that the latter refers to different ways of actually dealing with stressful situations. Coping has many different definitions and even more dimensions: over 400 ways of coping have been identified (Skinner, Edge, Altman, & Sherwood, 2003). We adopt the definition of Compas and colleagues (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001) who view coping as just one aspect of a broader set of processes that are used in the response to stress. They define coping as “conscious volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances” (Compas et al., 2001, p. 89).

It is surprising how little consensus there is regarding the conceptualization or measurement of ways of coping. Many coping researchers have tried to construct lower and higher order categories of coping strategies using techniques like confirmatory or exploratory factor analysis. The three most common distinctions are problem- vs. emotion-focused coping, approach vs. avoidance, and cognitive vs. behavioral coping (Skinner et al., 2003). However, both Compas and colleagues (2001) and Skinner and colleagues (2003) argue against the use of these two-dimensional categories and recommend the use of broader and hierarchical systems. Skinner and colleagues conclude that there are five core categories of coping: problem solving, support seeking, avoidance, distraction and positive cognitive restructuring.

Although it is very difficult to aggregate research findings regarding coping due to the lack of consensus about core coping categories, Compas and colleagues (2001) examined and evaluated over 60 studies regarding coping with stress during childhood. They concluded that in general, problem-focused coping is associated with better adjustment and increased coping efficacy, but that avoidant coping is associated with psychological problems and decreased coping efficacy. It is assumed that a change from passive to active emotion regulation strategies is essential for the effect of treatment. However, the mediating role of coping strategies in treatment is not clear. In one study, coping appeared to be a mediating variable in the treatment of child anxiety...
(Lau et al., 2010). However, this study did not incorporate an in-treatment assessment and this precluded strong conclusions about temporal precedence.

**Assessment of Mediators**

**Repeated Assessment**

As noted before, repeated assessment in a longitudinal design is necessary to be able to examine putative mediators in more detail. However, treatment monitoring is also important at a more individual level, referred to as “patient-oriented research” (Howard, Lueger, Maling, & Martinovich, 1993). Ongoing assessment can give information about the progress of treatment and guide decisions about the focus of treatment (Kazdin, 2005). Ongoing assessment may take place during a baseline period, each session, every other session or after a specific treatment component. Lambert and colleagues (e.g. Lambert et al., 2003) have shown that giving feedback to therapists about an individual’s treatment progress can improve treatment outcome in adults. Further, it has been found that an early positive response predicts final outcome (e.g. Wilson, 1999).

Kazdin (2005) describes several requirements for assessing changes over the course of treatment. Obviously, measures should show reliability and validity, but should also be a) acceptable to both patient and therapist; b) brief and user friendly; c) individualized to the patient’s problems and goals; d) suited for repeated use over the course of therapy; e) applicable across treatments and diverse problems; and f) have levels of degree of change. As Kazdin noted, very few measures are available that meet all of these criteria.

In general, for childhood anxiety disorders there is currently no brief, individualized and sensitive measure to evaluate treatment progress and outcome. For Obsessive Compulsive Disorder however, such an instrument is available: the Children’s Yale-Brown Obsessive Compulsive Scale (CY-BOCS; Scahill et al., 1997). We used the CY-BOCS as a reference point to develop the Anxiety Severity Interview for Children and Adolescents (ASICA, see chapter 4). The main features of the ASICA are that it a) is relatively brief; b) is client-focused and assesses an individual’s specific problems; c) can be used repeatedly over time; d) is administered by the therapist; and e) assesses three core components of the anxiety response (anxious feelings, avoidant behavior, anxious thoughts; Lang, 1968).

**Direct and Indirect Assessment**

Traditionally, most researchers use direct measurement instruments (e.g. questionnaires or interviews) to examine the construct of interest. However, direct measures can be inaccurate or incomplete as persons may have limited introspective abilities, may answer questions in a socially desirable way or when the processes they are questioned about occur outside conscious awareness. These disadvantages of direct measures are especially relevant in children. In the
past 15 years, over 20 alternative measurement procedures have been developed to indirectly measure constructs such as attitudes and self-concepts or attentional bias and inhibition (Nosek, Hawkins, & Frazier, 2011). These measures generally use response latencies to infer mental content. The distinction between direct (or explicit, controlled, or strategic) instruments and indirect (or implicit, uncontrolled, or automatic) instruments is that the latter assess attitudes or self-concepts without requiring awareness of what is being assessed. Indirect measures are not “more true” than direct measures, but assess constructs that are distinct, however related to self-report assessment. Direct measures (questionnaires) are thought to mainly predict controlled behavior and indirect measures (reaction time tasks) are more useful to predict automatic or uncontrolled behavior (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Therefore, next to direct measures, indirect measures might be valuable to predict relapse after treatment. Moreover, in the future, indirect measures could possibly be used as a new treatment modality to indirectly retrain specific (cognitive) biases.

The development and use of indirect measures in children is still scarce. Within the scope of the studies included in this dissertation we developed several indirect measures. In this dissertation we describe the development and use of an indirect measure of perceived control, the Perceived Control Implicit Association Procedure (IAP). The question was whether perceived control was a mediator of treatment effect in anxious youth and whether this could be established with both a direct and indirect measure.

The Present Study

The studies which are described in this dissertation are part of a large multi-center study conducted by two centers for child and adolescent psychiatry: the Departments of Child and Adolescent Psychiatry of the Academic Medical Center (AMC) / de Basuclle in Amsterdam and Accare in Groningen, in cooperation with the Department of Developmental Psychology of the University of Amsterdam, the Department of Clinical Psychology of the University of Groningen and the Department of Psychiatry of the University Medical Centre in Groningen. The aim of the multi-center study was to examine (the assessment of) mediators of treatment effect for anxiety disorders (this dissertation) and obsessive compulsive disorder (dissertation in progress by Lidewij Wolters). As part of this multi-center study, the behavioral inhibition system in child and adolescent anxiety was examined, with newly developed computer tasks (see dissertation by Leentje Vervoort, 2010). Finally, several moderating variables were examined, including biological and neuropsychological factors (cortisol, executive functions) and interpersonal factors (parental psychopathology, parental rearing style, therapeutic alliance). These moderation data are currently being analyzed.
The Present Dissertation

This dissertation has two major themes: the assessment of putative mediators (Chapter 2, 3, and 4), and the examination of several putative mediators of treatment change (Chapter 5, 6, and 7). The following five research questions were examined:

1. Is the Perceived Control Implicit Association Procedure (IAP) a valid and reliable measure to indirectly assess perceived control in children?
2. Is the Anxiety Severity Interview for Children and Adolescents (ASICA) a valid and reliable measure to repeatedly assess anxiety severity during treatment?
3. Can we reliably and validly assess both negative and positive thoughts with the Children's Automatic Thoughts Questionnaire – Negative/Positive (CATS-N/P)?
4. What is the role of both negative and positive thoughts and their ratio in childhood anxiety disorders?
5. Are negative and positive thoughts, perceived control and coping strategies mediators of the treatment effect for anxiety disorders?

In Chapter 2 we describe the development of the Perceived Control IAP. This reaction time based computer task measures perceived control in an indirect way. The indirect assessment of perceived control (with the IAP) was compared to a direct measure of perceived control, the Anxiety Control Questionnaire for Children (ACQ-C), in 33 non-selected children. The IAP is further evaluated in Chapter 3 by comparing 136 anxiety disordered children with a non-selected group of 31 children. Moreover, we used a second control group of 38 non-selected children to validate the pictorial stimuli that were used in the IAP. In Chapter 4 we describe the development and clinical applicability of the ASICA. The ASICA is a short, semi-structured and clinician rated interview that can be used by the therapist to repeatedly monitor anxiety severity during treatment. The ASICA incorporates three main components of anxiety: anxious feelings, avoidance, and anxious thoughts. The psychometric properties of the ASICA were examined in 139 anxiety disordered children and 40 non-anxious children. Chapter 5 describes the development and psychometric properties of the Children's Automatic Thoughts Scale Negative/Positive (CATS-N/P) in 554 non-selected children. The CATS (Schniering & Rapee, 2002) was originally designed to assess negative self-statements in children and adolescents. We extended the CATS with ten items concerning positive thoughts. The CATS-N/P thus enables the simultaneous examination of negative and positive thoughts in children. In Chapter 6 we use the CATS-N/P to examine the role of negative and positive thoughts in anxiety disorders by comparing 139 anxiety-disordered children and 293 non-anxious children. In Chapter 7 we investigate whether changes in negative and positive thoughts, perceived control over anxious situations, and five coping strategies are active mediators of CBT for anxiety disordered children and adolescents. One-hundred and forty-five children with a primary anxiety disorder were included and treated with twelve sessions of CBT. We employed a longitudinal design
and a state-of-the-art statistical analysis to examine temporal relationships between a change in putative mediators and a change in anxiety. Finally, in Chapter 8 the conclusions of the described studies are reviewed and discussed. We describe strengths and limitations, reflect on the clinical implications of the results and suggest recommendations for future studies.
Chapter 2

An indirect and direct measure of anxiety-related perceived control in children: The Implicit Association Procedure (IAP) and Anxiety Control Questionnaire for Children (ACQ-C)

Abstract

A perceived lack of control over negative events is assumed central to the development of anxiety disorders. So far, only questionnaires were used to test this theory, but they have several disadvantages. In this study, the Implicit Association Procedure (IAP) was adapted to measure anxiety-related perceived control in an indirect way. IAP data of 33 non-selected children were compared to a direct measure of perceived control, the Anxiety Control Questionnaire for Children (ACQ-C). Results showed that higher anxious children had lower perceived control over anxiety-related events than lower anxious children, on both the indirect and the direct measure.
An indirect (IAP) and direct (ACQ-C) measure of perceived control in children

Introduction

Anxiety disorders are among the most common psychiatric disorders in children\textsuperscript{1}, occurring in 5-18\% of all children and adolescents (James, Soler, & Weatherall, 2009). Existing treatments like cognitive behavioral therapy are effective in about 56\% of children (James et al., 2009). To improve treatment efficacy, it is essential to gain more insight in causal and maintaining factors of anxiety disorders. According to Barlow (Barlow, 2002; Chorpita & Barlow, 1998), a perceived lack of control over negative events is central to the development of anxiety disorders. These negative events can be threatening external events or negative internal emotional and bodily reactions. In Barlow’s model, early experiences with uncontrollable events lead to a chronic feeling of uncontrollability, and to a psychological vulnerability of perceiving future events as uncontrollable. Ultimately, this can result in negative emotion and clinical anxiety.

Research has, indeed, demonstrated a relationship between perceived control and anxiety disorders in adults and children. Rapee, Craske, Brown, and Barlow (1996) found that clinically anxious adults had lower scores on a self-report measure of perceived control, the Anxiety Control Questionnaire (ACQ), than non-clinical adults. In addition, it has been found that clinically referred children with an anxiety disorder had significantly lower levels of perceived control than non-referred children, as measured with a children’s version of the ACQ (Weems, Silverman, Rapee, & Pina, 2003). Moreover, perceived control predicted a diagnosis of clinical anxiety—even after controlling for self-reported anxiety as measured by the RCMAS (Weems et al., 2003).

So far, all studies of perceived control have been based on questionnaires like the ACQ-C. A disadvantage of direct measures is that they may be biased by limited introspective abilities and strategic processes, like social desirability. Moreover, questionnaires rely on the ability and willingness to answer in a reflective way (Greenwald & Banaji, 1995). This could especially be difficult for children. Furthermore, it is unknown whether questionnaires reflect unconscious and automatic processes. Sensitivity for these processes may be especially important in the study of treatment effects, in order to distinguish the results of conscious learning in therapy from changes on an unconscious and automatic level. Both might contribute to structural cognitive and behavioral changes.

To overcome these shortcomings, tasks have been developed that measure the construct of interest without asking the participant directly. These tasks, based on reaction times, are the so-called indirect measures (Fazio & Olson, 2003). They measure automatic attitudes and associations, which are harder to control consciously even though the participant may be aware of what the task measures (Fazio & Olson, 2003). As a result, indirect measures have shown to be more robust against response biases than questionnaires. Correlations between direct and indirect measures are quite variable and low, with average \( r \) of .24 (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005) and .37 (Nosek, 2005) for measures on different domains.

\textsuperscript{1} We use the word “children” to refer to children and adolescents, unless specified otherwise.
These low correlations might stem from the fact that indirect measures primarily reflect automatically activated associations, while responses on questionnaires may be based on both automatically activated responses and reflective or controlled processes (Fazio & Olson, 2003; Hofmann et al., 2005). Direct and indirect measures probably tap two different facets of attitudes (Greenwald & Farnham, 2000). This makes it interesting to study direct and indirect measures in concordance. So far, to our knowledge, no indirect measures have been reported in the study of perceived control.

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) is one of these indirect measures. The IAT paradigm has frequently been used to assess automatic associations in different domains, for example, anxiety, self-esteem and racial attitudes (Egloff & Schmukle, 2002; for an overview see Greenwald, Poehlman, Uhlmann, & Banaji, 2009). The IAT has good internal consistency (average α between .70 and .90; Nosek, Greenwald, & Banaji, 2006), is difficult to fake without specific instructions (Egloff & Schmukle; Kim, 2003; Schnabel, 2004) and especially useful when social desirability concerns are high (Greenwald et al., 2009). Finally, indirect measures like the IAT might be better to predict relapse in disorders than direct measures (De Jong, Pasman, Kindt, & Van den Hout, 2001).

Recently, Schnabel (2004; see also Schnabel, Banse, & Asendorpf, 2006) developed another indirect measure of self-concept: the Implicit Association Procedure (IAP). The IAP was originally developed to test the convergent validity of the IAT. However, it appears that the IAP might be an even more promising instrument than the IAT. Although psychometric properties of the IAP were similar to the IAT, the IAP tended to be even more robust to faking instructions.

The IAP is based on the Evaluative Movement Assessment (EMA; Brendl, Markman, & Messner, 2005). In the EMA the intrinsic meaning or valence of the response is used, based on automatic movement tendencies.” A movement towards the target is seen as approach behavior, with positive valence. A movement away from the target is seen as avoidance behavior, with negative valence. Brendl and colleagues (2005) assume that moving an attitude towards oneself is an approach response and away from oneself is an avoidance response (also see Rinck & Becker, 2007). Following this, in the IAP it is assumed that participants react faster with a movement towards themselves, than with a movement away from themselves, when confronted with concepts that belong to “self.” When confronted with concepts that do not belong to “self”, participants are assumed to react faster with a movement away, than with a movement towards themselves.

Building on this principle, in the IAP the participant has to pull a joystick toward or push it away from oneself, depending on whether a stimulus has to be associated with Me or Notme target words. Schnabel’s IAP consisted of three phases. In the first phase, the target phase, participants had to pull the joystick towards themselves when they saw Me words, like “I” or “self”; and push it away when they saw Notme words, like “they.” In the second phase, the combined phase, the attribute categories Shy and Nonshy were introduced. The participant had to pull the joystick towards themselves when they saw Me stimuli and Shy stimuli (e.g.
An indirect (IAP) and direct (ACQ-C) measure of perceived control in children

“inhibited”). After Nonshy stimuli (e.g. “uninhibited”) and after Notme stimuli, the participant had to push the joystick away. In the third phase, the reversed combined phase, the instruction for the attribute stimuli (Shy / Nonshy) was reversed. In the end, the IAP score is calculated, which reflects indirect measured self-concept. It is calculated as the difference between reaction times in the combined and reversed phases (Schnabel, 2004).

The main objective of the present study was to adapt the IAP to measure anxiety-related perceived control in children. First, instead of words for the target and attribute stimuli, we used pictures. This had the advantage of not having to cover the complicated concept of perceived control in one word. Furthermore, pictures are more appealing for children and do not rely on reading ability. Second, we individualized the IAP, so the children could identify themselves more easily with the stimuli (see method section for details). The data of the IAP were compared to a direct measure of perceived control, the Dutch translation of the Anxiety Control Questionnaire for Children.

Our first research question was whether an indirect measure of perceived control could predict anxiety level. We expected more anxious children to show weaker associations between Control pictures and Me pictures than less anxious children on the Perceived Control IAP, as reflected in lower (or even negative) IAP scores. Our second research question was if we could replicate the relation between anxiety and directly measured perceived control in a sample of Dutch children. We expected higher anxious children to have lower scores on the ACQ-C than lower anxious children. Third, we examined the correlation between the indirect and the direct measure. We expected a low to moderate correlation between the ACQ-C and the IAP. Furthermore, we examined the internal reliability of the IAP, and explored the influence of age on IAP scores.

Method

Participants
Participants were 33 children and adolescents between 7 and 17 years of age (11 boys; 22 girls; age \( M = 12.4 \) years). Children were recruited from three different schools: two regular, public secondary schools and an elementary school in one large and two small cities. Participants were invited as part of a larger study on information processing in children and adolescents. Children were included after written informed consent from themselves and their parents. Exclusion criteria were vision problems (not corrected with glasses/lenses) and use of medication that could interfere with reaction times. Furthermore, the Child Behavior Checklist (CBCL; Achenbach, 1991) was filled out by the parents to screen for psychiatric problems. Children were excluded if they had a clinical score on the Internalizing Scale of the CBCL or received treatment for their problem. Based on these criteria, we did not have to exclude any children.

Two children in every secondary school could win a gift coupon, worth 25 euros.
Assessments and Measures

Overall Procedure
After informed consent was given, individual appointments with the children were made. The first three authors—all psychologists—tested the children at school in a standardized way. All participants respectively rated themselves on the STAI(S), filled out the ACQ-C and completed the IAP. The ACQ-C was always filled out before the IAP, because research has shown that context can influence the measured associations: self-report can make certain evaluations more accessible for processing (Ellwart, Becker, & Rinck, 2005; Nosek, Greenwald, & Banaji, 2005). By filling out the ACQ-C first, all children had the same “frame of reference”, which was important, because the ACQ-C and IAP were part of a larger test-battery, including other indirect measures.

Implicit Association Procedure (IAP)

Task design and instructions. The Perceived Control IAP (Table 1) was based on the procedure developed by Schnabel (2004). Participants had to pull a joystick toward themselves or push it away, dependent on whether they had to associate a stimulus with Me or Notme. The IAP combined the discrimination of targets (Me versus Notme) with the discrimination of attributes (Control versus Noncontrol). The joystick was placed in the middle in front of the keyboard, so it could be handled with either the right or left hand. The participants were instructed to hold on to the joystick and respond as accurate and quick as possible.

Table 1. Implicit Association Procedure for perceived control: task sequence

<table>
<thead>
<tr>
<th>Phase</th>
<th>N of trials</th>
<th>Task</th>
<th>Joystick direction assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Toward participant</td>
</tr>
<tr>
<td>1</td>
<td>24</td>
<td>Target discrimination</td>
<td>Me</td>
</tr>
<tr>
<td>2</td>
<td>138</td>
<td>Combined task</td>
<td>Me, Control</td>
</tr>
<tr>
<td>3</td>
<td>138</td>
<td>Reversed task</td>
<td>Me, Noncontrol</td>
</tr>
</tbody>
</table>

Note. The first 10 trials of the combined and reversed phase were included as practice trials.

In the first-target-phase, participants learned to discriminate three Me and three Notme pictures. During all phases the Me pictures had to be pulled towards themselves; the Notme pictures had to be pushed away. Following this phase the concept of “control” was introduced and the five Control and five Noncontrol pictures were shown on paper. Control was described as knowing what to do in situations and the feeling that one can handle something on their own. In the second-combined-phase, these five Control and five Noncontrol pictures were added and these had to be pulled towards or pushed away from oneself, respectively. In the third and
last-reversed combined-phase (from now on: reversed phase), the instruction for the Control and Noncontrol pictures was reversed: Control pictures had to be pushed away from oneself, Noncontrol pictures had to be pulled towards oneself.

The task duration was approximately 20 minutes. The combined and reversed phases were each preceded by ten practice trials. The test trials in the combined and reversed phase were randomized in order within eight blocks of 16 trials. Stimulus order was the same for each participant. The IAP Control score was computed by subtracting mean reaction times for Control pictures in phase 2 from phase 3. The IAP Noncontrol score was computed in the same way using the mean reaction times for Noncontrol pictures. A positive IAP score reflects a stronger association with Control; a negative IAP score reflects a stronger association with Noncontrol. Other than Schnabel (2004), we do not report one IAP score for all trials (both target and attribute trials), because we were interested in the results for Control and Noncontrol pictures separately. One score can theoretically reflect only an effect on the target (Me, Notme) pictures or just reflect an effect on one attribute picture (Control or Noncontrol). The assumption of one score is that both attribute pictures are comparable (or direct opposites), but this is possibly not the case. Moreover, although the IAP is still a relative measure like the IAT, it minimizes this limitation by not showing the opposite category (e.g. Notme) explicitly (Schnabel et al., 2006)\(^2\).

**Apparatus.** The IAP was programmed and presented using the Presentation software package (Presentation 9.9, 2005) on a Dell Inspiron 9300 laptop with a 17-inch color monitor and an adapted USB joystick.

During all trials, the word “ME” (in green, with a green frame around) representing the participant was shown at the bottom center of the screen. During the second and third phase, the instruction for the pictures which had to be pulled towards the participant was shown in the left upper corner of the computer in yellow: “me = control” in phase 2 and “me = noncontrol” in phase 3. Each trial started with a green fixation cross in the middle of the screen, that lasted for 600 ms. This was followed by the black and white target or attribute picture, for a maximum of 3000 ms. The pictures moved across the screen according to the reaction of the participant and disappeared when they reached the upper or lower edge of the screen. Reaction time (in milliseconds) was measured as the time passed from the beginning of stimulus presentation to the disappearance of the stimulus. After a correct response, the interstimulus interval was 1000 ms. After an incorrect response, the participant immediately got feedback in red, in the center of the screen. This feedback was: 1) "too fast" when the response was within 100 ms from the beginning of the stimulus; 2) "too slow" if there was no response after 2000 ms or 3) "wrong" if the response was in the wrong direction. The feedback duration was 200 ms, followed by a 1000 ms interstimulus interval.

**Stimuli.** Pictures created by a professional drawer represented the target and attribute concepts. To individualize the IAP, we developed a girl and a boy version of the task and the first

\(^2\)We did calculate one total score however, and results resembled results for the IAP Noncontrol score (with an age x group interaction effect).
letter of the child’s first name was used as one of the Me stimuli. The three Me pictures were 1) a young girl; 2) a girl pointing at herself; 3) a girl with the first letter of her name on her chest. The three Notme pictures were 1) an old man; 2) a boy pointing at himself; 3) a girl with the letter “q” on her chest (if “q” was not the first letter of the name). For boys, the sexes of the pictures were reversed.

Similar to the ACQ-C (see below), which represents control over external events and internal reactions in two subscales, the Control and Noncontrol pictures had to represent these situations. The five Control pictures were 1) a child (boy or girl) that solved a puzzle; 2) a child walking calmly and whistling; 3) a child thinking of something positive while feeling scared; 4) a child thinking of something nice while “pushing a scary thought away”; and 5) a child who, although scared, extinguishes a fire. The five Noncontrol pictures were 1) a child that does not know what to do; 2) a scared, shivering child; 3) a child having scary thoughts; 4) a child feeling uncomfortable in a group; 5) a child that has trouble breathing. Examples of a Control and Noncontrol picture are given in Figure 1.

Figure 1. Example of a Noncontrol picture for girls: trouble breathing (left) and an example of a Control picture for boys: pushing scary thought away (right)

Questionnaires

Child Behavior Checklist (CBCL; Achenbach, 1991). The CBCL was used to screen for psychiatric problems in children.

Spielberger State Trait Inventory for Children (STAIC; Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973). The STAIC trait subscale (20 items) was used to measure anxiety
An indirect (IAP) and direct (ACQ-C) measure of perceived control in children  

level. Higher scores indicate more anxiety. For adolescents (15 years and older), the adult version of the scale was used (Spielberger State Trait Inventory, STAI; Spielberger, 1983).

**Anxiety Control Questionnaire for Children** (ACQ-C; Weems, Silverman, Rapee, & Pina, 2003). The ACQ-C was adapted from the adult Anxiety Control Questionnaire (Rapee et al., 1996), which was developed to measure perceived control. The ACQ-C is a self-report measure for children aged 7-16 years with 30 items scored on a 5-point scale. Lower scores reflect less perceived control. The Total scale consists of two subscales, in line with Barlow’s theory (2002). One subscale (14 items) assesses perceived lack of control over anxiety-related negative “internal” emotional and bodily reactions. The other subscale (16 items) assesses control over “external” threats. The total scale and subscales showed good internal consistency in a sample of high school students, with Cronbach’s α of .86 to .93 (Weems et al., 2003). The ACQ-C also has an adequate one year test-retest reliability of \( r = .59 \) (Weems, Costa, Watts, Taylor, & Cannon, 2007). For the purpose of this study the ACQ-C was translated into Dutch by the authors and back-translated by a native English speaker. During the translation process, the original author was consulted for the exact meaning of some items.

**Data analysis**

For data reduction we followed to a large extent the procedure described by Schnabel et al. (2006). Reaction times below 300 ms were recoded as 300 ms. Error trials (trials where the joystick was pushed in the wrong direction) were not included in the analysis of the reaction times. Practice trials were not analyzed, because they were primarily for training. Reaction times were not log-transformed to calculate internal consistencies and IAP scores, because all relevant data were normally distributed.\(^1\)

We analyzed the IAP data by means of repeated and factorial ANOVAs with picture category (Me, Notme, Control, Noncontrol) and phases (combined, reversed) as within subjects factors; and anxiety level (lower and higher) and age (7-11 years and 12-17 years) as between subjects factors. For the analysis of the ACQ-C we used one-tailed independent sample t tests. Simple regression analyses were performed with respectively IAP scores and ACQ-C total score as predictors and anxiety (z-scores of STAI-trait and STAIC-trait) as dependent variables. Product-moment correlation (\( r \)) is reported as effect size (Field, 2006). An \( r \) of .10, .30 or .50 was used as a threshold to define small, medium and large effects (Cohen, 1992).

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\(^1\)Analogue to Schnabel’s study (2004), we do not report results for the improved D-scores (Greenwald, Nosek, & Banaji, 2003). However, we did calculate D-scores and results were all in the same direction.
Results

Detailed characteristics of the IAP
Mean error rates (i.e., incorrect complete responses) were 5.64% (SD = 3.82%) for the Perceived Control IAP. One child did not complete the IAP and one child had to be excluded from the analysis because she had an extreme error score of 21.70%. Consequently, analyses on the IAP data were performed on 31 participants. All other error rates were below 15.23%. Due to an unforeseen feature of the joystick, reaction times of some trials were not recorded and were excluded from analysis. However, error rates were comparable to the results of the first IAP study (Schnabel et al., 2006). Cronbach’s α for internal consistency was calculated for the difference between the combined phase and the reversed phase for four groups of trials, containing the trials 11–42, 43–74, 75–106, 107–138. Cronbach’s a was .78.

Table 2. Mean reaction times (and SD) and IAP scores for the entire group (N = 31)

<table>
<thead>
<tr>
<th>Categories</th>
<th>Target M (SD)</th>
<th>Combined M (SD)</th>
<th>Reversed M (SD)</th>
<th>IAP score M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Me</td>
<td>885.44 (209.67)</td>
<td>848.85 (220.35)</td>
<td>959.13 (254.30)</td>
<td>−</td>
</tr>
<tr>
<td>Notme</td>
<td>992.77 (231.60)</td>
<td>967.73 (226.16)</td>
<td>1072.92 (246.22)</td>
<td>−</td>
</tr>
<tr>
<td>Control</td>
<td>968.02 (238.90)</td>
<td>1169.36 (278.54)</td>
<td>201.33 (154.33)</td>
<td>34.93 (156.83)</td>
</tr>
<tr>
<td>Noncontrol</td>
<td>1010.17 (273.49)</td>
<td>1045.09 (254.38)</td>
<td>34.93 (156.83)</td>
<td>34.93 (156.83)</td>
</tr>
</tbody>
</table>

Note. IAP scores were calculated by subtracting the mean RT in the combined phase from the reversed phase. No IAP scores were computed for Me and Notme pictures.

Before conducting analysis on the lower and higher anxious groups, we tested for IAP effects in the whole group, with a 2 (combined phases) x 4 (categories) ANOVA with repeated measures, in order to describe the working of the task with children in general. Table 2 presents the mean reaction times (MRT) and SDs for the whole group. A significant main effect was found for phase, $F(1, 30) = 26.79, p < .001, r = .69$: all participants reacted faster in the combined phase ($M = 948.69, SE = 42.41$) than in the reversed phase ($M = 1061.62, SE = 44.48$). There was also a significant main effect of picture category, $F(1, 30) = 54.23, p < .001$. Contrasts revealed a quadratic trend, $F(1, 30) = 104.65, p < .001, r = .88$. Pairwise comparisons showed that participants reacted significantly faster on Me pictures ($M = 903.99, SE = 40.62$) than on Notme pictures ($M = 1020.32, SE = 40.91$); they reacted equally fast on Notme pictures and Noncontrol pictures ($M = 1027.63, SE = 45.30$) and they reacted slower on control pictures ($M = 4$.

The joystick had to return back in the middle before each trial, but when children held on to the joystick in between trials, it did not return well, so the reaction time was not recorded. The mean number of non recorded trials was 19.65 (SD = 22.81), range 0-67, which was 7.02% of the total amount of 8680 trials.
The interaction effect between phase and picture category was significant, $F(1, 30) = 15.87, p < .001$. Planned simple and hierarchical contrasts showed that in the reversed phase, compared to the combined phase, the reaction times for Control pictures increased more than reaction times for Me ($F(1, 30) = 11.08, p = .002, r = .52$), Notme ($F(1, 30) = 22.60, p < .001, r = .66$) and Noncontrol pictures ($F(1,30) = 44.33, p < .001, r = .77$). And reaction times for Me and Notme pictures increased more than Noncontrol pictures, respectively with $F(1, 30) = 6.68, p = .02, r = .43$, and $F(1, 30) = 9.36, p = .01, r = .49$.

To test for the hypothesis that every participant associates Control more with self than Noncontrol, we performed a one-tailed dependent $t$ test for the difference between IAP scores for Control pictures and Noncontrol pictures (IAP scores are shown in Table 2). IAP scores for Control pictures were significantly higher than for Noncontrol pictures: $t(30) = -6.66, p < .001$, their correlation was $r = .60$. IAP Control score differed significantly from zero, $t(30) = 7.26, p < .001$, IAP Noncontrol score did not significantly differ from zero, $t(30) = 1.24, p = .11$.

Anxiety and the Perceived Control IAP

We performed a regression analysis to examine the relation between anxiety ($z$-scores of STAI-trait and STAIC-trait) and perceived control as measured with the IAP. Anxiety was significantly predicted by IAP Control score, $F(1, 29) = 5.98, p = .02, \beta = -.41$ and IAP Noncontrol score, $F(1, 29) = 5.45, p = .03, \beta = -.36$. IAP Control score and IAP Noncontrol score accounted for respectively 17.1% and 15.8% of the variance in anxiety. High scores on the anxiety measure, indicating more anxiety, correlated with lower scores on the IAP, indicating less perceived control.

We also divided children into lower ($n = 16$) and higher anxious ($n = 15$) groups according to whether their scores were on / below the median, or above the median of the STAI-trait ($Mdn = 30$) or STAIC-trait ($Mdn = 31$). STAI-trait scores for lower and higher anxious children were $M = 28.17$ ($SD = 0.98$) and $M = 33.50$ ($SD = 1.64$) respectively. For the STAIC-trait the scores were $M = 25.90$ ($SD = 1.60$) and $M = 36.56$ ($SD = 4.50$)$^5$. To test whether low and high-anxious children differed on perceived control as reflected in IAP scores, a 2 (anxiety) x 2 (age) ANOVA was performed for each score (see Figure 2 and 3 for results). Age groups (below and above 12 years) were included to explore if age differed on perceived control.

A main effect for anxiety on IAP Control score was found, $F(1, 27) = 4.29, p < .05$, with medium effect size $r = .37$. Higher anxious children had lower IAP Control scores ($M = 146.38, SD = 128.73$) than lower anxious children ($M = 252.85, SD = 162.24$). The main effect of age and the interaction effect of age and anxiety were not significant, respectively $F(1, 27) = 0.35, p = .56$ and $F(1, 27) = 0.71, p = .41$.

$^5$ Note that anxiety scores were low for the whole group, especially for the STAI-trait. Even the higher anxious group scored below the mean of a Dutch reference group on the STAI-trait (Van der Ploeg, 2000). There was more variation on the STAIC-trait scores. Higher anxious children had a mean just above the mean of a Dutch reference group (Bakker, Van Wieringen, Van der Ploeg, & Spielberger, 1989).
A main effect for anxiety on IAP Noncontrol score was found in the second ANOVA, $F(1, 27) = 8.49$, $p = .01$, with medium effect size $r = .49$. Again, higher anxious children had lower IAP Noncontrol scores ($M = -30.49$, $SD = 151.24$) than lower anxious children ($M = 96.25$, $SD = 139.83$). The main effect of age was not significant, $F(1, 27) = 3.41$, $p = .08$.

Figure 2. Means for IAP Control score separate for anxiety level and age

* Higher anxious children have lower IAP Control score in both age categories, $p < .05$.

Figure 3. Means for IAP Noncontrol score separate for anxiety level and age

* IAP Noncontrol score differs significantly for lower and higher anxious children under 12 years of age, $p = .01$. 
There was a significant interaction effect between anxiety level and age, $F(1, 27) = 6.69, p = .02$, with medium effect size $r = .45$. To break down the interaction effect, two $t$ tests were performed. These showed that for children younger than 12 years, higher anxious children had lower IAP Noncontrol scores ($M = -140.68, SD = 142.78$) than lower anxious children ($M = 115.65, SD = 159.32$) under 12 years, $t(12) = 3.17, p = .01$. IAP Noncontrol scores did not differ for children aged 12 years and older, $t(15) = 0.29, p = .78$.

The ACQ-C and Anxiety

Data on the ACQ-C were analyzed for 33 children. To assess internal consistency of the Dutch translation, Cronbach’s $\alpha$ was calculated for the Total scale, Internal Reactions subscale and External Events subscale. Cronbach’s $\alpha$ was .92, .84 and .87 respectively.

To test whether the ACQ-C could predict anxiety scores, we performed a regression analysis with ACQ-C Total scale as predictor and anxiety as outcome variable. The ACQ-C Total scale predicted anxiety significantly, $F(1, 31) = 5.85, p = .02, \beta = -.40$, and the ACQ-C accounted for 15.9% of the variance in anxiety. Lower perceived control scores indicated higher anxiety scores. To test if the ACQ-C Total scale also differed for lower and higher anxious children, a one-tailed independent $t$ tests was performed. Higher anxious children had significant lower perceived control scores ($M = 67.00, SD = 14.90$) than lower anxious children on the Total scale ($M = 77.50, SD = 17.79$), $t(31) = 1.82, p = .04$.

The ACQ-C and Perceived Control IAP

To explore the relationship between the indirect and direct measure of perceived control, correlations between the ACQ-C Total scale and respectively IAP Control score and IAP Noncontrol score were computed. These correlations were low and not significant, respectively $r = .03, p = .43$ and $r = .17, p = .18$.

Discussion

In this study, we tested a new measure that assesses anxiety-related perceived control in an indirect way: the Implicit Association Procedure (IAP). Furthermore, we compared this indirect measure with the Dutch translation of a direct measure of perceived control: the Anxiety Control Questionnaire for Children (ACQ-C). Our main question was whether there is a relationship between anxiety and perceived control, measured indirectly and directly, in a non-selected sample of children. The results support our hypotheses: children with higher anxiety levels had lower IAP and ACQ-C scores than lower anxious children. This implies that higher anxious children have lower perceived control over anxiety-related events than lower anxious children.
Because we adapted the IAP to measure perceived control, we examined the psychometric properties of our measure. The results show that the internal consistency of the IAP was satisfactory and comparable to a previous study (Schnabel et al., 2006).

Before considering anxiety in our analyses, we checked in the entire group whether the IAP worked at all. Analysis of the Perceived Control IAP showed that the mean IAP Control score was positive. This means that, when confronted with Control pictures, children react faster with a movement toward themselves than away from themselves. We indeed believe that children in general perceive themselves as being in control. The mean IAP Noncontrol score was not different from zero. This means that overall, children react equally fast with a movement away from or towards themselves when confronted with Noncontrol pictures. Although we did not explicitly state a hypothesis for Noncontrol pictures, this was against expectations; because low control is not generally a concept that belongs to “self” and children in general should have more difficulties (so take more time) to pull Noncontrol pictures towards self than to push them away.

When taking anxiety into account, the results confirmed our hypothesis and demonstrated that both IAP Control and Noncontrol score significantly predicted anxiety scores. Lower IAP scores corresponded with higher anxiety levels. This supports earlier research on perceived control: more anxious children have less perceived control. Interestingly, there was an interaction effect when age was added to the analysis, but only for the Noncontrol score. Only higher anxious children under 12 years of age had significantly lower IAP Noncontrol scores than lower anxious children. They even had a negative score, which means that they associated noncontrol more with self than control. There was no difference on IAP Noncontrol score between anxiety groups in children 12 years and older. This effect may be partly explained by the overlap between anxiety scores and age. Although the whole group had very low anxiety scores, the scores for lower and higher anxious children differed the most on the child version of the anxiety measure (STAIC). Moreover, the child version scores for higher anxious children had the greatest variability. Anxiety scores on the adolescent version of the anxiety measure (STAI) were below the mean for a reference group (Van der Ploeg, 2000), even for the group that scored above the median. So, it is not very surprising that the IAP could not differentiate anxiety groups in this older sample. However, a genuine interaction effect—young anxious children having a lack of perceived control—is a possibility.

The second question in our study was if we could replicate the relation between the direct measure of perceived control, the ACQ-C, and anxiety in a Dutch sample. As hypothesized, the ACQ-C predicted anxiety level. Moreover, higher anxious children had lower ACQ-C scores than lower anxious children. So, even in this small sample, we found a relation between perceived control and anxiety. Naturally, these results should be replicated in a larger sample.

Next, we investigated the correlation between the indirect IAP and the direct ACQ-C. Although the correlations were positive, they were close to zero. This is in line with previous research, where correlations between direct and indirect measures were quite weak, with
An indirect (IAP) and direct (ACQ-C) measure of perceived control in children | 33

averages of .24 (Hofmann et al., 2005) and .37 (Nosek, 2005) for the IAT. How can this weak correlation be explained when both measures assess perceived control?

The first explanation is that the low correlation between the Perceived Control IAP and the ACQ-C might be an inherent characteristic of direct and indirect measures. Research suggests that automatic and controlled responses stem from different sources and reflect different constructs or tap different facets of attitudes (De Raedt, Schacht, Franck, & De Houwer, 2006). Because of the possibility to control the direct measure consciously, a discrepancy could be expected, especially with a measure related to perceived control. So, it is possible that the IAP and ACQ-C measure different aspects of perceived control.

Another explanation for the low correlation is that the IAP does not measure perceived control, but another construct. This should be examined by validating the measure, which is difficult, because no related and validated indirect measure of perceived control exists. Another option to find out if the IAP measures perceived control is to rate the used exemplars directly. We do not know whether the children perceived the pictures as good exemplars of these categories. De Houwer (2002) suggests that participants sometimes recode the attributes into positive or negative, using the salience of the pictures, with the aim of simplifying the task. Perhaps the task did not measure Control and Noncontrol, but positive and negative attributes, or even low and high anxiety. Although the pictures are about anxiety-related control, especially the Noncontrol pictures might primarily signal high anxiety, while the Control pictures do not clearly signal low anxiety. This might be another reason why the Noncontrol score differentiated more between groups and another argument not to construct one composite IAP score. However, even if the task would measure positive and negative attributes associated with self, or low and high anxiety, a positive correlation with the ACQ-C would still be expected: higher anxious children probably associate themselves more with negative than lower anxious children. More evidence should be sought for the validity and test-retest reliability of the IAP.

Limitations

Although the results are promising, some limitations should be considered. Reaction times on the reversed trials were longer than on the combined trials. However, this could be due to a practice effect. The children first had to pull Control words towards themselves and had to push them away in the third phase. So in the reversed phase, they had to unlearn their previous instructions. Both phases consisted of 128 trials each, preceded by ten practice trials. It will be interesting to compare these results with a task where the reversed phase is preceded by doubled practice trials or where the reversed phase is administered before the combined phase. This should guarantee that differences in reaction times are due to differences in self-concept and not to practice. However, the reaction times for Noncontrol pictures were almost equal in the combined and reversed phase, arguing against a practice effect.

*We assume that the ACQ-C does measure perceived control, because it has convergent, discriminant and incremental validity (Weems, Silverman, Alfano & Tarolla, 1999).*
In this study, no behavioral data were collected to test the incremental validity of the IAP. This is a recommendation for future studies. Moreover, a longitudinal design would be interesting for investigating the predictive validity, as previous research showed that indirect measures might predict relapse in disorders better than direct measures (De Jong et al., 2001).

With respect to the participants, we used a small sample of non-selected children. The variance in anxiety levels was very small and even low when compared to reference groups. The difference in anxiety scores between groups was not very large, because the median was used as cut-off point. Using scores in the upper and lower quartiles would have created more different groups. With our sample size this was not possible. We recommend a replication of this study with a group of clinically anxious children or a non-selected group with anxiety scores in the upper and lower quartiles of an anxiety measure. However, it is encouraging that the IAP is apparently sensitive to even relatively small variations in self-reported anxiety.

In summary, we conclude that the Perceived Control IAP is internally stable and sensitive for levels of anxiety. We believe that the Perceived Control IAP is a promising instrument to measure perceived control in an indirect way. It is a supplement to the existing direct measure of perceived control, the ACQ-C. The results of this study add to the mounting evidence that perceived control is a central concept in anxiety disorders.

Acknowledgement

The authors would like to thank Bert Molenkamp from the University of Amsterdam for his assistance with all the technical aspects of the IAP and Presentation Software, Bart Serrien for drawing all the used pictures (www.sclera.be), and all participating children and schools for their time.
Chapter 3
Perceived control in clinically anxious and non-anxious children indirectly measured with the Implicit Association Procedure (IAP)

Abstract

**Background:** Perceived control is thought to play an important role in the development and maintenance of anxiety disorders in children. The objective of the present study was to further investigate the Perceived Control Implicit Association Procedure (IAP, Hogendoorn et al., 2008) as an indirect measure of perceived control in children.

**Methods:** The IAP was completed by 136 anxiety disordered children (aged 8-18 years old, $M = 12.51$) and 31 non-selected children (8-15 years old, $M = 11.65$). A second control group of 38 non-selected children (aged 8-18 years old, $M = 12.08$) was used to validate the pictorial stimuli in the computer task.

**Results:** First, children were able to correctly classify the pictures into Control and No control categories. Second, as predicted, anxious children reported less perceived control than the control group on both the direct measure (the ACQ-C) and the indirect measure (IAP). For the No Control score however, this was only the case for children younger than twelve years old. Third, test-retest correlation in the anxious group was fair to good (ICCs .57-.58).

**Conclusions:** These results suggest that the perceived control IAP is still quite experimental, but could be an interesting departure point for future research on perceived control in children.
Introduction

Perceived control is assumed to play an important role in the development and maintenance of anxiety disorders in children. Early experiences with uncontrollable situations may lead to a cognitive style of not feeling in control, which in turn may act as a vulnerability to develop negative affect and anxiety (Chorpita, 2001; Chorpita & Barlow, 1998). It has indeed been found that perceived control mediates between family environment (especially high affective involvement and controlling parenting behavior) and negative affect (Ballash, Pemble, Usui, Buckley, & Woodruff-Borden, 2006; Chorpita, Brown, & Barlow, 1998). Moreover, clinically anxious children report lower levels of perceived control than non-anxious children (Weems, Silverman, Rapee, & Pina, 2003). Finally, a reduction of anxiety symptoms after treatment is associated with an increase in self-reported perceived control (Muris, Mayer, den Adel, Roos, & Van Wamelen, 2009). Although the direction of the relationship between perceived control and anxiety is not clear (low perceived control could also be a consequence of heightened anxiety), the two concepts at least seem interrelated.

Perceived control has mainly been studied with a questionnaire, the Anxiety Control Questionnaire for Children (ACQ-C; Weems et al., 2003). However, direct self-reports may be influenced by self-presentational concerns and are bound to introspective limits (Schnabel, Asendorpf, & Greenwald, 2008). An alternative to questionnaires (direct measures) are indirect measures, which have been developed since the late nineties (Hofmann & Schmitt, 2008). These indirect measures, like the Implicit Association Test (IAT) or the Affective Priming task, use reaction times to study the topic of interest, such as anxiety, self-esteem or racial attitudes (see De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009 for a review). The advantage of indirect measures is that they are less susceptible to social desirability or faking (Schnabel et al., 2008) and are not dependent on introspective abilities (Greenwald, Nosek, & Banaji, 2003). Furthermore, indirect measures are assumed to measure other aspects of attitudes and behavior than direct measures. Attitudes are thought to be composed of both propositional (conscious/controlled) and associative (unconscious/uncontrolled) representations (Gschwendner, Hofmann & Schmitt, 2008). These different representations are the result of different forms of information processing and they influence behavior in different ways. Direct measures (questionnaires) are thought to mainly predict controlled behavior and indirect measures (reaction time tasks) are more useful to predict automatic or uncontrolled behavior (Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

In a previous study, we developed the perceived control IAP (Implicit Association Procedure) to measure perceived control in children in an indirect way (Hogendoorn et al., 2008). The perceived control IAP is based on the fact that it is easier to react with a (approach) movement towards oneself (e.g. flexing one's arm) when a concept is associated with oneself, than with a (avoidant) movement away from oneself (e.g. extending one's arm). Conversely, when a concept
is not associated with oneself, it is easier to react with a movement away from oneself than with a movement towards oneself (Schnabel, Banse, & Asendorpf, 2006).

In the perceived control IAP, children see different pictures on a computer screen. Children use a joystick to push the pictures away from themselves or to pull them toward themselves. There are two sets of critical pictures: Control pictures and No control pictures. These pictures respectively represent situations were a child is or is not in control over an anxious situation. It is hypothesized that anxious children find it more difficult than non-anxious children to pull Control pictures towards themselves than to push them away. Also, it is hypothesized that in comparison with non-anxious children, anxious children find it easier to pull No control pictures towards themselves than to push them away. These hypotheses are tested in the IAP with the combination of two different test phases. In one phase of the task children have to pull the No control pictures towards themselves and push the Control pictures away (non-compatible phase). In another phase they have to pull the Control pictures towards themselves and push the No control pictures away (compatible phase). Reaction times from the compatible phase are subtracted from the noncompatible phase separate for Control (IAP Control score) and No control pictures (IAP No control score). A positive IAP Control and No control score both reflect a stronger association between oneself and perceived control. The hypothesis is that anxious children have lower IAP Control and No control scores than non-anxious children, indicating less perceived control.

The perceived control IAP proved to be sensitive to anxiety level in a non-selected sample. Children with higher anxiety levels had lower IAP Control and No control scores (Hogendoorn et al., 2008). The objective of the present study was to further investigate the perceived control IAP in a sample of anxious children and a control group. The first research question concerned the validity of the pictorial stimuli in the IAP. Although in an earlier study a relation was found between anxiety and both a direct and indirect measure of perceived control, the correlation between the direct and indirect measure was small and not significant ($r$ .03 to .17; Hogendoorn et al., 2008). Small correlations between direct and indirect measures are not uncommon (Hofmann, Gawronski, Gschwendner, Le and Schmitt, 2005) and may be due to method related factors. Another possible explanation is that direct and indirect instruments measure different components (propositional vs. associative) of an attitude or trait (Gschwendner et al., 2008). However, for the perceived control IAP it has not been ruled out yet that low construct validity (related to the pictures) caused the small correlations with a direct measure of perceived control. For example, it is conceivable that the IAP pictures do not represent Control and No control, but merely positive and negative attributes. Thus, before drawing conclusions based on the IAP, the validity of the pictorial stimuli should be determined. We hypothesized that children would be able to divide the pictures in two categories, but that they spontaneously would characterize them as positive and negative. However, we predicted that when children were forced to divide the pictures in Control and No control (as they are instructed to do in the IAP) they were able to do so.
Second, we examined whether the IAP is able to discriminate between clinically anxious and non-anxious children. We hypothesized that anxious children would have lower IAP Control and No control scores than children in the control group.

Third, we explored age differences on the IAP. In our previous study an interaction effect between anxiety and age was found on the IAP No control score (but not on the IAP Control score): higher anxious children had lower IAP No control scores than lower anxious children, but only if they were younger than 12 years of age (Hogendoorn et al., 2008). As no age difference was found on the direct measure of perceived control, the ACQ-C (Weems et al., 2003; Weems, Costa, Watts, Taylor, & Cannon, 2007), it was hypothesized that this previous result could be due to a lack of anxiety variability in the older group.

The fourth research question concerned the temporal stability of the IAP. Before treatment sensitivity of the IAP can be studied it should be determined whether IAP Control and No control scores remain stable without treatment. We examined eight week test-retest reliability of the IAP in clinically anxious children.

Method

Participants
The anxious group consisted of 136 children referred to one of two centers for child and adolescent psychiatry in the Netherlands (AMC / de Rascule in Amsterdam and UCKJP / Accare in Groningen). Their mean age was 12.51 (SD = 2.85, range 8-18 years) and 44.1% (n = 60) of the sample were boys. They participated in a larger study on mechanisms of change in cognitive behavioral therapy (CBT) for childhood anxiety disorders. Children were included in the study if they had a primary anxiety disorder according to the Anxiety Disorders Interview Schedule for Children (ADIS-C/P) with an exception of OCD or PTSD. Primary diagnoses were Social Phobia (n = 46, 33.8%), Separation Anxiety Disorder (n = 15, 11.0%), Specific Phobia (n = 30, 22.1%), Generalized Anxiety Disorder (n = 31, 22.8%) and Panic Disorder with or without Agoraphobia (n = 14, 10.3%). Eighty-three children (61.0%) had one or more comorbid anxiety or mood disorders or ADHD. The total number of diagnoses per child ranged from 1 to 6 (M = 2.24, SD = 1.36). Exclusion criteria were suicidal ideation, use of an SSRI, earlier CBT in the previous half year, an IQ below 80, or problems with drugs or alcohol. Children were randomized to an eight week waitlist condition (n = 47) or to an immediate treatment condition (n = 89). Children who did not go to school due to the severity of their disorder were not randomized because of ethical reasons.

There were two different control groups in this study. Group A was used to validate the IAP pictures. Group B was used to compare IAP Control and No control scores with the anxious sample. The reason to use two different control groups was to prevent a cross-over effect from first validating the pictures and then performing the computer task (or vice versa).
Group A consisted of 38 non-selected children from different schools in the Netherlands. They were all between 8 and 18 years old ($M = 12.08$) and 39.5% ($n = 15$) were boys. These children also participated in a validation study for a new anxiety interview. All children were screened for psychiatric problems with the ADIS-C/P and the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997). No children received a diagnosis or a clinical score on the SDQ.

Group B consisted of 31 non-selected children from different schools in the Netherlands. They were between 8 and 15 years old ($M = 11.65, SD = 1.87$) and 38.7% ($n = 12$) were boys. Children were screened with the Child Behavior Checklist (CBCL; Achenbach, 2005) for emotional and behavioral problems. No parents reported a clinical score on the Internalizing Scale or Total Problems Scale of the CBCL.

**Measures**

**Implicit Association Procedure (IAP)**

*Task design and instructions.* The IAP combined the discrimination of target pictures (Me versus Not me) with the discrimination of attribute pictures (Control versus No control) on a computer screen. Children had to pull a joystick towards themselves or push it away from themselves, depending on the pictures displayed and the instructions. The participants were instructed to hold on to the joystick and respond as accurate and quick as possible. The task duration was approximately 20 minutes.

In the first-target-phase, participants learned to discriminate three Me and three Not me pictures. During all phases the Me pictures had to be pulled towards themselves; the Not me pictures had to be pushed away. Following this phase the concept of “control” was introduced and the five Control and five No control pictures were shown on paper. Control was described as knowing what to do in situations and the feeling that one can handle something on one’s own.

In the second-noncompatible-phase, the five Control and five No control pictures were added to the computer task. Control pictures had to be pushed away from oneself and No control pictures had to be pulled towards oneself. In the third-compatible-phase, Control pictures had to be pulled towards oneself and No control pictures had to be pushed away from oneself. The noncompatible phase was preceded by ten practice trials. The number of practice trials for the compatible phase was increased from ten to forty, to control for a possible learning effect (Nosek, Greenwald, & Banaji, 2005). Each practice phase was followed by a self-spaced pause. The test trials in the noncompatible and compatible phase were randomized within six blocks of 16 trials. Stimulus order was the same for each participant.

The IAP Control score was computed by subtracting mean reaction times for Control pictures in phase 3 (compatible) from phase 2 (noncompatible). The IAP No control score was computed in the same way using the mean reaction times for No control pictures. A positive IAP Control and No control score reflect a stronger association between oneself and perceived
control. The IAP was programmed in the same fashion as described in Hogendoorn et al. (2008), with some minor changes (see the appendix). As in the previous study we do not report one IAP score (for the combined Control and No control pictures) because we were interested in the results for Control and No control pictures separately. With one overall IAP score it is possible that there is only an effect for one picture type (e.g. Control) and that participants are equally fast in pushing or pulling the other picture type.

**Stimuli.** Pictures created by a professional drawer represented the target and attribute concepts. We included three Me and three Not me pictures and five Control and five No control pictures. We used different versions for boys and girls. The five Control pictures included both positive and negative controlled situations. The No control pictures only included negative situations where no control was displayed. For the validation of the pictures, we added one extra picture depicting a positive, no control situation, namely a laughing child that was pushed from a raft into the water.

**Questionnaires**

**Child behavior problems.** Parents of the anxious children and control group B filled out the *Child Behavior Checklist* (CBCL; Achenbach, 2005). The CBCL was used to screen for psychiatric problems and consists of 118 items on a 3-point ordinal scale. The items can be summed into eight narrow band symptom scales, two broad band symptom scales (Internalizing and Externalizing problems) and one Total Score. Parents from children in control group A filled out the *Strengths and Difficulties Questionnaire* (SDQ; Goodman, 1997). This is a brief questionnaire (25 items) that assesses the psychological adjustment of children and adolescents. The total problem score based on 20 items was used to determine if children had substantial psychological problems.

**Anxiety Symptoms.** Anxiety disordered children and their parents and children in control group A were assessed with the *Anxiety Disorders Interview Schedule for DSM-IV Child and Parent Version* (ADIS-C/P; Silverman & Albano, 1996). The ADIS-C/P is a widely used, reliable and valid semi-structured interview that assesses the prevalence and severity of different DSM-IV disorders, with a focus on anxiety disorders. Children and parents are interviewed separately by experienced psychologists. Clinicians rate severity of symptoms based on interference in school, peer relationships, family life and internal distress on a 9-point scale, ranging from 0 to 8. A CSR (clinician severity rating) of four or higher is indicative of a diagnosis.

The *Spielberger State Trait Inventory for Children* (STAIC; Spielberger, Edwards, Lushene, Montuori, & Platzeck, 1973), trait subscale (20 items) was used to measure anxiety level. For adolescents (15 years and older), the adult version of the trait subscale was used (*Spielberger State Trait Inventory; STAI, Spielberger, 1983*). Deciles for the STAI and STAIC were calculated using Dutch norm scores. The reliability (Cronbach’s α) of the STAIC-trait was .86 in the anxious

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1 To check whether results would be different with one total score, we performed all analyses with one total score. Results and conclusions were the same as for the IAP Control score.
group and .69 in the control group. The STAI-trait was only used in the anxious group, α was .93.

**Perceived control.** The *Anxiety Control Questionnaire for Children* (ACQ-C; Weems et al., 2003) was used to measure perceived control over anxiety-related situations (emotional/bodily reactions and external threats). The ACQ-C consists of 30 items scored on a 5-point scale. Lower scores reflect less perceived control. Cronbach’s α in the anxious and control group were .94 and .92 respectively.

### Data analysis

For data reduction on the IAP we followed the procedure described by Schnabel et al., (2006). Reaction times below 300 ms were recoded as 300 ms. Error trials (i.e. trials where the joystick was pushed in the wrong direction) were not included in the analysis of the reaction times. Practice trials were not analyzed. We analyzed the results using the D score algorithm which has been suggested by Greenwald and colleagues (2003). Results reported in the Tables are raw scores.

Because sample size differed between the anxious and control group, the homogeneity of variance was tested by calculating the $F_{\text{max}}$. This is the ratio of the largest cell variance to the smallest. Tabachnik and Fidel (2001, p. 80) recommend an $F_{\text{max}}$ of at most three when the sample size ratio is larger than 4:1. Mean scores for both the anxious and the control group on all measures were compared with two-tailed independent sample $t$ tests or Mann-Whitney tests for nonparametric data.

Reliability of the IAP (Cronbach’s α) was calculated for the difference between the compatible and noncompatible phase for four blocks of test trials, containing the trials 1-24, 25-48, 49-72, and 73-96. The IAP scores were examined in more detail by a $2 \times 2 \times 2$ factorial ANOVA with picture type (Control, No control) and response direction (pull, push) as within-subjects factors and group (anxious or control) as a between-subjects factor. To examine the influence of age on IAP Control and No control scores, two $2 \times 2$ ANOVAs were performed for each IAP score separately, with group (anxious or control) and age group (8-11 years and 12-17 years) as between subjects factors. Test-retest correlations (ICCs) of the IAP Control and No control scores are reported for the waitlist group. Cohen’s $d$, $\eta^2$ or Cramer’s $V$ are reported as effect sizes.

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8 In our first study with the IAP (Hogendoorn et al., 2008) we did not report results analyzed with the D measure as they were not different from results analyzed without the D measure. However, on the advice of an anonymous reviewer we did use the D measure in this study. Results without the D measure were less strong, i.e. there was no difference between anxious and non-anxious children on the IAP Control score and correlations between the direct and indirect measures were less strong.
Overall Procedure

All children and their parents provided written informed consent. The validation study incorporated different steps. First, pictures were shown one by one and children had to describe the picture. Second, children were asked to divide the pictures in two piles (one with six and one with five pictures) and were asked to name each pile. Third, the concepts of Control and No control were explained. Children were asked to sort the pictures in Control and No control pictures with a self-determined amount per pile. Finally, children were asked to rate each picture on valence and arousal on two 5-point ordinal scales (1-5), with lower scores on the valence scale indicating a positive rating; and lower scores on the arousal scale indicating more arousal. Pictures were shown in two different counterbalanced orders.

Results

Validity of the IAP Pictures in a Control Sample

Thirty-eight children rated the five Control and five No control pictures used in the IAP and an extra (positive) No control picture. None of these children had a clinical score on the SDQ Total score or the ADIS-C/P and their mean decile score on the STAI(C)-trait was not elevated ($M = 4.68$, $SD = 2.59$). Most pictures were described correctly, with an overall percentage of 84.9% (range 52.6%-100%). Two pictures were difficult for most children: 47.4% described them incorrectly. The picture of a child thinking of something positive while scared was often described as a child being scared or a child thinking about the weather. The picture where a child has trouble breathing was often described as a child committing suicide or as having a sore throat. When the children were asked to divide the pictures in two piles (without a sorting rule), they classified 92.1% of the pictures correctly. When asked how they grouped the pictures, most children said they based it on whether pictures were related to being scared or not (55.3%). In addition, a considerable number of children (21.1%) correctly said the piles had something to do with (not) being in control, even without the introduction of the concept of control. A minority of children (15.8%) said they divided pictures in “negative” and “positive” categories. When asked to classify the pictures according to control or no control, most pictures ($M = 93.95\%$, range 70%-100%) were correctly classified. Again, some children had trouble with the picture of a child thinking of something positive: almost 40% was wrong. The filler picture of a child that is pushed into the water (positive no control picture) was rated incorrectly by 68.4% of the children. Finally, the mean valence of the five Control pictures was 1.95; meaning children rated them as positive. The mean valence of the five No control pictures was 4.00; children rated these significantly more negative than the Control pictures, $t(37) = -19.67$, $p < .001$, $d = 3.80$.

All analyses were repeated without those two pictures, but results remained unchanged.
Similarly, Control pictures were rated as less arousing (\(M = 4.19\)) than No control pictures (\(M = 2.56\)), \(t(37) = 13.76, p < .001, d = 2.23\).

**IAP Perceived Control: Anxious Versus Control Group**

**General characteristics.** General characteristics of the anxious group and control group B are reported in Table 1. Homogeneity of variance was not violated. The \(F_{\text{max}}\) ratio ranged between 1.06 and 1.18 with a sample size ratio of 4.4:1. The two groups did not differ on age, sex and age distribution (8-11 years vs. 12-18 years). The anxious group had significantly higher anxiety levels than the control group (Table 1), as reflected in higher scores on the STAI (-C)-trait deciles, CBCL total score and CBCL internalizing score. The anxious group reported lower perceived control on the ACQ-C.

Table 1. General characteristics, questionnaire and IAP Control and No control scores for anxious and control children

<table>
<thead>
<tr>
<th></th>
<th>Anxious (n = 136)</th>
<th>Control (n = 31)</th>
<th>Difference test, p, effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 12 years</td>
<td>58 (42.6%)</td>
<td>13 (41.9%)</td>
<td>(\chi^2(1) = 0.30, p &gt; .05)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>60 (44.1%)</td>
<td>12 (38.7%)</td>
<td>(\chi^2(1) = 0.01, p &gt; .05)</td>
</tr>
<tr>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>12.51 (2.85)</td>
<td>11.56 (1.87)</td>
<td>(U = 1764.00, p &gt; .05, d = 0.35)</td>
</tr>
<tr>
<td>ADIS-C CSR</td>
<td>6.30 (1.06)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>STAI (-C) decile</td>
<td>7.27 (2.99)</td>
<td>2.77 (1.91)</td>
<td>(U = 533.00, p &lt; .001, d = 1.60)</td>
</tr>
<tr>
<td>ACQ-C</td>
<td>47.84 (19.24)</td>
<td>73.03 (15.23)</td>
<td>(t(163) = -6.69, p &lt; .001, d = 1.34)</td>
</tr>
<tr>
<td>CBCL (t-score)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score</td>
<td>62.49 (8.04)</td>
<td>41.00 (7.47)</td>
<td>(U = 90.50, p &lt; .001, d = 2.74)</td>
</tr>
<tr>
<td>Internalizing</td>
<td>67.90 (9.02)</td>
<td>44.61 (7.71)</td>
<td>(U = 138.50, p &lt; .001, d = 2.67)</td>
</tr>
<tr>
<td>IAP scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control score</td>
<td>161.22 (162.05)</td>
<td>218.04 (189.82)</td>
<td>(t(165) = -2.55, p &lt; .05, d = 0.51)</td>
</tr>
<tr>
<td>No control score</td>
<td>-12.05 (180.93)</td>
<td>99.43 (170.69)</td>
<td>(t(165) = 4.30, p &lt; .001, d = 0.89)</td>
</tr>
</tbody>
</table>

**IAP Control and No control scores.** The mean error rate (i.e. incorrect responses) on the IAP did not differ between the anxious group (\(M = 3.96%, SD = 4.29\%\)) and the control group (\(M = 3.99%, SD = 3.35\%\)), \(U = 1983.00, p > .05\). Cronbach’s \(\alpha\) of the IAP was .62 in the anxious group and .68 in the control group.

The IAP Control and No control score did differ between the two groups (see Table 1). Anxious children had lower IAP Control and No control scores than control children. The
The correlation between the IAP Control score and IAP No control score was large and significant ($r = .76$, $p < .001$). The correlations between the ACQ-C and the IAP Control and No control score were small and significant (respectively $r = .24$, $p < .01$ and $r = .30$, $p < .01$).

The mean reaction times separate for each combination of group, picture type, and response direction (push or pull) are reported in Table 2. A 2 (response direction) x 2 (picture type) x 2 (group) ANOVA showed that there was a main effect for direction: on average, children reacted faster by pulling than by pushing, $F(1, 165) = 51.17$, $p < .001$, $\eta^2 = .02$. There was also a main effect for picture type: children reacted faster to the No control pictures than to the Control pictures, $F(1, 165) = 5.44$, $p < .05$, $\eta^2 = .00$. The main effect of group was not significant, $F(1, 165) = 0.30$, $p > .05$. The three-way interaction effect of group, response direction and picture type was significant, $F(1, 165) = 14.31$, $p < .001$, $\eta^2 = .04$. To disentangle this interaction effect, two separate ANOVAs were performed for each picture type. For Control pictures, both the main effect of response direction, $F(1, 165) = 171.07$, $p < .001$, $\eta^2 = .50$ and the interaction effect of group and response direction, $F(1, 165) = 8.24$, $p < .01$, $\eta^2 = .02$ were significant: both groups responded to Control pictures faster by pulling than by pushing, but this effect was stronger for non-anxious children. For the No Control pictures, both the main effect of response direction, $F(1, 165) = 51.50$, $p < .001$, $\eta^2 = .22$ and the interaction effect of group and response direction, $F(1, 165) = 16.79$, $p < .001$, $\eta^2 = .07$, were significant. The control group was faster in pushing than pulling No control pictures, while for the anxious children there was no difference between pulling and pushing.

Table 2. Mean reaction times in milliseconds (with SD) depending on group, picture type, and response direction and IAP Control and No control scores

<table>
<thead>
<tr>
<th>Picture type</th>
<th>Group</th>
<th>Response Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pull</td>
</tr>
<tr>
<td>Control</td>
<td>Anxious</td>
<td>996.33 (233.82)</td>
</tr>
<tr>
<td>Control</td>
<td>Non-anxious</td>
<td>949.05 (211.82)</td>
</tr>
<tr>
<td>No Control</td>
<td>Anxious</td>
<td>1063.78 (252.23)</td>
</tr>
<tr>
<td>No Control</td>
<td>Non-anxious</td>
<td>1074.72 (261.83)</td>
</tr>
</tbody>
</table>

*Age differences.* To investigate age differences on the IAP, a 2 (group status) x 2 (age group) ANOVA was performed for each IAP score. For the IAP Control score the main effect for group was significant, $F(1, 163) = 7.58$, $p < .001$, partial $\eta^2 = .04$: anxious children had lower IAP Control scores than non-anxious children (see Figure 1). There was no main effect for age, nor an interaction effect for group and age. For the IAP No control score the main effect for group was significant, $F(1, 163) = 22.02$, $p < .001$, partial $\eta^2 = .12$. There was no main effect for age. However, there was a significant interaction effect for group and age: $F(1, 163) = 4.39$.
$p < .05$, partial $\eta^2 = .03$ (see Figure 1). Anxious children younger than twelve years old had a lower IAP No control score ($M = -69.85, SD = 156.16$) than young children in the control group ($M = 126.36, SD = 229.40$). IAP No control scores did not differ between older ($\geq 12$ years old) anxious children ($M = 30.92, SD = 186.96$) and control children ($M = 79.98, SD = 115.39$).

Figure 1. IAP Control and No control scores for younger (8-11 years) and older (12-18 years) anxious and non-anxious children

Table 3. Baseline characteristics, questionnaire and IAP Control and No control scores for the anxious children pre- and post-waitlist

<table>
<thead>
<tr>
<th></th>
<th>T0 (M, SD)</th>
<th>T1 (M, SD)</th>
<th>Difference score, $p$, effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n = 47$</td>
<td>$n = 47$</td>
<td></td>
</tr>
<tr>
<td>STAI (-C) decile</td>
<td>6.98 (3.42)</td>
<td>7.04 (3.24)</td>
<td>$t(45) = -0.18, p &gt; .05, d = 0.02$</td>
</tr>
<tr>
<td>ACQ-C</td>
<td>49.71 (15.72)</td>
<td>48.49 (21.80)</td>
<td>$t(44) = -0.46, p &gt; .05, d = 0.06$</td>
</tr>
<tr>
<td>CSR ADIS-C/P</td>
<td>6.17 (0.92)</td>
<td>5.85 (0.93)</td>
<td>$t(46) = 2.05, p &lt; .05, d = 0.35$</td>
</tr>
<tr>
<td>CBCL (t-score)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score</td>
<td>63.17 (8.72)</td>
<td>60.86 (8.56)</td>
<td>$t(35) = 2.54, p &lt; .05, d = 0.34$</td>
</tr>
<tr>
<td>Internalizing score</td>
<td>68.86 (8.90)</td>
<td>66.47 (8.72)</td>
<td>$t(35) = 2.33, p &lt; .05, d = 0.27$</td>
</tr>
<tr>
<td>IAP scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control score</td>
<td>161.38 (184.99)</td>
<td>105.39 (154.11)</td>
<td>$t(46) = 0.02, p &gt; .05, d = 0.08$</td>
</tr>
<tr>
<td>No Control score</td>
<td>-49.71 (194.33)</td>
<td>-48.97 (185.15)</td>
<td>$t(46) = -0.12, p &gt; .05, d = 0.03$</td>
</tr>
</tbody>
</table>

Test-Retest Reliability

Test-retest reliability was assessed by comparing the IAP Control and No control scores of the anxious waitlist group ($n = 47$) before and after the waitlist period (see Table 3). Self-reported anxiety (STAI-C) and perceived control (ACQ-C) did not change from pre- to post-waitlist. However, scores on the ADIS-C/P and CBCL (parent report) did differ significantly: the CSR of the ADIS-C/P decreased after the waitlist period. Further, parents reported less Total problems.
Perceived control IAP in anxious and non-anxious children

and Internalizing problems on the CBCL. The IAP Control and No control did not differ between pre- and post-test. Test-retest reliability scores were significant and fair to good: ICC = .58 ($p < .01$) for the IAP Control score, and ICC = .57 ($p < .01$) for the IAP No control score.

### Discussion

The objective of the current study was to further investigate an indirect measure of perceived control, the Implicit Association Procedure (IAP), in a clinically anxious and a non-referred sample. First, we investigated the validity of the used pictures. It appeared that children spontaneously divided pictures in frightening and non-frightening pictures. However, after an instruction similar to the procedure in the IAP, most of them were able to divide the pictures in Control and No control. Being in control is an abstract concept and because the pictures represent (not) being in control over frightening situations, it is plausible that children attend to the depicted frightening situations first. In this study, we showed that children do understand the pictures and are able to understand the concept of being in control. However, there is an overlap in theme and valence: Control pictures were rated as more positive and less arousing than No control pictures. Therefore, it is still possible that children recode the pictures in “positive” and “negative” or “non frightening” and “frightening” categories.

Our second and third research question concerned differences between anxious and control children on the perceived control IAP and the interaction with age. As expected, anxious children reported lower perceived control than the control sample on the direct measure (ACQ-C). On the indirect measure the results were similar to results in a non-selected sample (Hogendoorn et al., 2008). Overall, all children reacted faster with a movement towards themselves when they saw pictures reflecting control over a situation; and they reacted faster with a movement away from themselves when they saw pictures concerning no control. The crucial question was whether there was an interaction effect of group and reaction time for the pull and push movements. For the Control pictures, anxious children were expected and found to have more difficulties pulling the pictures towards themselves than the children in the control group (and/or fewer difficulties pushing them away). For the No control pictures anxious children were expected to have fewer difficulties pulling the pictures towards themselves than the children in the control group (and/or more difficulties pushing them away). This effect was found, but it was fully accounted for by children younger than twelve years old. In a previous study with the IAP in a non-selected sample, a similar interaction effect with age was found for the IAP No control score (Hogendoorn et al., 2008). In that study a potential explanation was a low variability of anxiety symptoms in the older children. However, this argument does not apply here. Therefore, we cannot rule out that especially younger children with an anxiety disorder may experience less perceived control than older children with or without an anxiety disorder, at least as measured with an indirect
measure. This was unexpected, as no age differences have been reported for a direct measure of perceived control (the ACQ-C), either in this study \( (r = .02, nS) \) or earlier studies (Weems et al., 2003, 2007).

The fourth and last research question in this study was the temporal stability of the IAP. The eight week test-retest correlation in the anxious group was fair to good, with ICCs of .57 (IAP No control score) and .58 (IAP Control score). However, most studies report Pearson’s \( r \) correlations and those were of medium strength \( (r = .40 \) for IAP No control score and \( r = .41 \) for IAP Control score). This is somewhat lower compared to what is typically found for indirect measures, namely between .50 and .60 (Egloff, Schwerdfeger, & Schmukle, 2005; Hofmann et al., 2005) irrespective of time interval (e.g. one week or one year; Egloff et al., 2005). Medium test-retest correlations indicate that the IAP is not yet sensitive enough to measure intraindividual differences. Additionally, indirect measures like the IAP likely capture state variance next to trait variance, resulting in lower temporal stability (Egloff et al., 2005). At this point, we suggest using the perceived control IAP for correlational or experimental research only.

The relatively small samples size of the control group is a limitation of this study. Another limitation is that due to practical reasons the children in the control group were not interviewed with the ADIS-C/P to verify that they did not have an anxiety disorder. However, no children in the control group received a clinical score on the CBCL and they all had low scores on the anxiety measures. Further, anxious children reported substantially higher anxiety levels and less perceived control on the direct measures (questionnaires).

To conclude, in this study anxious children proved to have less perceived control than a control sample, as measured with an indirect measure. We believe that the IAP can be a point of departure for future research on indirectly measured perceived control. For example, it would be interesting to examine whether perceived control as measured by the IAP increases after treatment (which has been found with a direct measure) and whether this change precedes or follows a change in anxiety level. Further, the use of the IAP as a new treatment modality (by indirectly retraining a lack of perceived control) could be investigated.

Appendix

All pictures, with the exception of one, were the same as in a previous study (Hogendoorn et al., 2008). One different Not me picture was used: the picture of a chicken (a non-human) was used instead of a child with the letter “q” on its chest, because many errors were made with this picture in the first IAP (Hogendoorn et al.). The programming of the IAP was similar to the previous study with some exceptions. First, the reversed phase preceded the combined phase in the current task. This was done to guarantee that longer reaction times in the reversed phase were not the result from unlearning the instructions from the combined phase. Second, in the current study the fixation cross lasted for 500 ms instead of 600 ms. Third, the interstimulus
interval (ISI) was shortened from 1000 ms to 600 ms. Fourth, the feedback “too slow” was given when there was no response after 3000 ms instead of 2000 ms. Fifth, previously reaction times were not recorded when the joystick was not back in the middle of the screen before the next trial. Therefore, in the current study the next trial only started when the joystick was right back in the middle of the screen.
Chapter 4

The Anxiety Severity Interview for Children and Adolescents (ASICA): An individualized repeated measure of anxiety severity

Abstract

The Anxiety Severity Interview for Children and Adolescents (ASICA) was developed for repeated assessment of anxiety severity and control over anxiety symptoms. The ASICA incorporates three main components of anxiety: anxious feelings, avoidance and anxious thoughts. The objective of this study was to evaluate the psychometric properties of the ASICA in anxiety disordered children ($n=139$, age 8-18 years) and a non-anxious control group ($n=40$). A confirmatory factor analysis confirmed the intended factor structure. Internal reliability was moderate to good; interrater reliability was excellent. Four-week test-retest reliability was good. The ASICA discriminated between anxious and non-anxious children and appeared sensitive to treatment change. A cut-off score of 13 was determined. Convergent validity with anxiety symptoms was moderate; discriminant validity with depressive symptoms was less strong. The results suggest that the ASICA is a reliable instrument that could be used in clinical practice to repeatedly monitor anxiety severity.
Introduction

Prevalence rates for childhood anxiety disorders are high, with three-month rates of 1.8-3.1% and a cumulative prevalence rate of 9.9% by the age of sixteen (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Treatments for anxiety disorders have been widely studied, although most treatment studies focus on treatment efficacy and assess anxiety symptoms or anxiety diagnosis only pre- and post-treatment. Recently there has been a call for a more sensitive and individualized monitoring of treatments with repeated assessments over the course of therapy (Mash & Hunsley, 2005). Developing sensitive and individualized assessment methods is important, as many tests are general and unspecific and have little direct relevance for treatment (Mash & Hunsley, 2005). Monitoring treatment progress for each individual facilitates an adaptation of treatment when necessary and an early identification of treatment failures (Lambert et al., 2003). Further, regularly monitoring individual progress can play a role in motivating the child and therapist by giving insight into his or her goals and progression (Lambert et al., 2003; Mash & Hunsley, 2005).

A measure used for repeated assessment should be short, easy to administer and give insight into individual difficulties. There are many easy to administer questionnaires assessing anxiety, such as the Screen for Child Anxiety Related Emotional Disorders (SCARED; Birmaher et al., 1997) or Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997). These questionnaires have been demonstrated to have good psychometric properties, to be useful in assessing anxiety symptoms and severity and to be sensitive to treatment change (Langley, Bergman, & Piacentini, 2002). However, these questionnaires are also quite general and mostly do not measure severity across (anxiety) disorders but are linked to specific symptoms or disorders according to the Diagnostic and Statistical Manual of Mental Disorders (DSM). However, symptoms (such as hyperarousal) between anxiety disorders usually overlap and there is a high rate of comorbidity among anxiety disorders. As a result, it is difficult to measure global anxiety severity and interference based on these general questionnaires (The Research Units on Pediatric Psychopharmacology Anxiety Study Group, 2002). For instance, a child with a specific phobia may avoid many situations including school and thus may be significantly impaired, but could easily obtain a low and non-clinical score on a DSM-oriented, general anxiety measure like the SCARED or MASC. Semi-structured interviews like the Anxiety Disorders Interview Schedule for Children (ADIS-C; Silverman & Albano, 1996) are more individualized and focus on a child’s specific problems, but require much time to administer and are therefore not suited to monitor treatment effect in clinical practice.

A brief, individualized and sensitive measure to evaluate treatment progress and outcome in children with various anxiety disorders is lacking. For children with Obsessive Compulsive Disorder (OCD), such a measure has been used for some time, namely the Children’s Yale-Brown Obsessive Compulsive Scale (CY-BOCS), developed by Scahill and colleagues (1997).
The CY-BOCS is a short, semi-structured, clinician rated interview that assesses severity of obsessions and compulsions in the previous week. The interview is used to examine OCD symptoms in children and monitor treatment progress and outcome. The CY-BOCS is useful because it does not only assess severity in terms of symptom frequency, but also interference and distress from obsessions and compulsions and resistance to and control over obsessions and compulsions. In this way, the CY-BOCS not only gives insight into the impact of OCD on daily life, but also in the way a child deals with the OCD problems. The CY-BOCS is widely used, has good psychometric properties and is sensitive to treatment change (Scahill et al., 1997; Storch et al., 2004; Storch et al., 2005).

To our knowledge, only one measure has been developed to monitor (the severity of) anxiety disorders other than OCD during treatment: the Pediatric Anxiety Rating Scale (PARS; The Research Units on Pediatric Psychopharmacology Anxiety Study Group, 2002). The PARS focuses on frequency of symptoms, distress and interference. However, unlike the CY-BOCS this rating scale does not assess resistance to or control over anxiety related behavior. This is important as it gives insight into the way a child deals with anxiety symptoms. During treatment, it is expected that children learn to resist their anxious impulses (e.g. anxious cognitions, avoidant behavior) and succeed more and more in doing so.

Therefore, we developed the Anxiety Severity Interview for Children and Adolescents (ASICA), an interview similar to the CY-BOCS. The ASICA is a semi-structured, clinician-rated interview designed to measure the severity of anxiety symptoms over the previous week in children and adolescents with an anxiety disorder. According to the bio-informational theory (Lang, 1968), the anxiety response is displayed across a three-response system including (1) the somatic or physiological response system, (2) the behavior system (avoidance of feared stimuli), and (3) the cognitive or verbal response system. Although this theory is generally adopted for adults and children, many studies fail to assess outcome in these response channels. It has been recommended to assess all three components in future treatment studies (Davis & Ollendick, 2005). The bio-informational theory is represented in the ASICA with three different subscales. One subscale (anxious feelings) refers to physiological responses like sweating or feeling dizzy. A second subscale (avoidance) questions the behavior response of anxiety, namely avoidance of feared stimuli. The third subscale (anxious thoughts) refers to the cognitive or verbal response system by asking about anxious thoughts, ideas or images, e.g. “Everybody will think I am stupid”. The severity of the three different anxiety response components (anxious feelings, avoidance and anxious thoughts) is rated on five items: 1) frequency, 2) interference, 3) distress, 4) resistance, and 5) control (see Method section for more details). Because the ASICA is individualized and can be easily administered repeatedly, it facilitates the planning, monitoring and evaluation of treatment progress or failure.

The objective of the present study was to examine the psychometric properties of the ASICA in a clinically anxious sample and a non-anxious control group of children and adolescents. First, a confirmatory factor analysis was performed to determine the factor structure of the
The Anxiety Severity Interview for Children and Adolescents (ASICA) was used. Second, the reliability of the interview was assessed: internal and interrater reliability in both groups, and four week test-retest reliability in the control group. Third, convergent and discriminant validity were determined in the combined anxious and control group. Finally, treatment sensitivity and criterion validity were assessed. We expected the ASICA to be sensitive to treatment changes and to be able to discriminate between anxious and non-anxious children.

Method

Participants
Participating children were clinically anxious children (n = 139; 55.4% girls; mean age 12.46, SD 2.83) and non-anxious children (n = 40; 62.5% girls; mean age 12.30, SD 2.78). Anxious children were included if they were 8 to 18 years old, suffered primarily from an anxiety disorder (except posttraumatic stress disorder or obsessive compulsive disorder), had not received cognitive behavioral therapy (CBT) in the past half year and did not use an SSRI (Selective Serotonin Reuptake Inhibitor). Parental educational level was low (24.5%), medium (42.4%), and high (26.7%) for mothers; and low (23.0%), medium (30.9%), and high (31.7%) for fathers. Information about parental educational level was not available for 20 fathers (14.4%) and 9 mothers (6.5%). We have no information about parents’ income level in the anxious group. Most children (82.7%) lived in two-parent families. Almost all children (99.3%) had the Dutch nationality; one child (0.7%) was Turkish.

The control sample was recruited in the general population through various schools. Schools were two regular, public elementary schools and one secondary school in different parts of the Netherlands. Children were included if they did not have an anxiety disorder and had not been in therapy for an anxiety disorder in the past. Parental educational level was low (15.0%), medium (22.5%), and high (62.5%) for mothers; and low (15.0%), medium (25.0%), and high (60.0%) for fathers. Most families (62.5%) had an income level above the mean (>34,000 EUR), 7.5% had a mean income level (28,500-34,000 EUR), and 5.0% had an income level below the mean (<28,500 EUR). Ten families (25.0%) refused to give information about their income level. Most children (95.0%) lived in two-parent families. Almost all children (97.5%) had the Dutch nationality; one child (2.5%) was Moroccan.

Measures

The Anxiety Severity Interview for Children and Adolescents (ASICA). The ASICA is a clinician-rated, semi-structured interview, designed to measure anxiety severity over the previous week. The ASICA has 15 items divided into three different subscales, namely anxious somatic feelings (Feelings), avoidant behavior (Avoidance) and anxious thoughts (Thoughts). All items were developed by the authors (EdH, SH, LW, LV, PP, FB) and based on the CY-BOCS. Items from the CY-BOCS were adapted to represent anxious feelings, avoidant behavior and anxious
thoughts instead of obsessions and compulsions. Each subscale consists of five items scored on a 5-point ordinal scale, ranging from 0 to 4, with higher scores reflecting more problems. The five items are 1) time occupied by feelings, avoidance or thoughts; 2) interference at home, in school or with friends; 3) distress from the feelings or thoughts or distress when not allowed to avoid feared situations; 4) resistance to feelings, avoidant behavior or anxious thoughts; and 5) degree of control. The answers have to reflect an average day in the previous week. An example of a question assessing frequency of anxious feelings is: “How often do you feel afraid? When we consider an average day, how often are you afraid or anxious in the morning, afternoon or evening?” Possible answers are: 0) no fear, 1) now and then, or < 1 hour per day, 2) regularly, or 1-3 hours per day, 3) very often, or 3-8 hours per day, 4) almost continuous, or > 8 hours per day. An example of a question assessing resistance to anxious thoughts is: “How often do you try to get these anxious thoughts out of your mind?” Possible answers are: 0) always, or thoughts are so insignificant resistance is not necessary, 1) most of the time, 2) sometimes, 3) does not try to resist anxious thoughts, but reluctantly, 4) never. The full interview can be obtained upon request.

At the start of the interview the clinician explains the topic of each subscale and mentions specific problems of the child. Information from the intake or from previous therapy sessions is used to individualize the questions, i.e. incorporating the child’s specific problems. The clinicians base their ratings on the child’s information, but are allowed to take their clinical knowledge into consideration or to use information from the parents when the child is very young. The administration time depends upon the amount of anxiety symptoms and varies between 10 and 20 minutes.

Three different subscale scores are obtained by adding the scores of all five items from each component (range 0 to 20). The total score is a sum of the three components (15 items, range 0 to 60). Higher scores indicate more anxiety severity.

Anxiety Disorder Interview Schedule for Children-child version (ADIS-IV C/P; Silverman & Albano, 1996). The ADIS-C is a widely used, reliable and valid semi-structured interview that assesses the prevalence and severity of different DSM-IV disorders, with a main focus on anxiety disorders. Children and parents are separately interviewed by experienced psychologists (not their therapists). Clinicians rate severity of symptoms based on interference in school, peer relationships, family life and internal distress on a 9-point scale, ranging from 0 to 8. A CSR (clinician severity rating) of four or higher is indicative of a diagnosis.

Spielberger State Trait Inventory for Children-trait (STAIC-trait; Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973). The STAIC-trait subscale consists of 20 items and measures trait anxiety. The adult version of the scale (STAI-trait; Spielberger, 1983) was used for children 15 years of age and older. For both versions, higher scores indicate more trait anxiety. Decile scores were calculated using Dutch norm scores (Bakker, Van Wieringen, Van der Ploeg, & Spielberger, 1989; Van der Ploeg, 2000). The STAI-trait and STAIC-trait have been widely used and shown to have satisfactory psychometric properties (Bakker et al., 1989; Van der Ploeg,
The Anxiety Severity Interview for Children and Adolescents (ASICA) | 2000). Cronbach’s alphas for the STAI-trait and STAIC-trait in the current sample were .93 and .86 in the anxious sample and .89 and .75 in the control sample.

Revised Child Anxiety and Depression Scale-child version (RCADS-C; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000). The RCADS-C is a self-report questionnaire (47 items) which measures symptoms of anxiety and depression. The RCADS possesses good internal reliability (with Cronbach’s α of .73 to .82), moderate to good one-week test-retest reliability, and good convergent and discriminant validity (Chorpita, Moffitt, & Gray, 2005; Chorpita et al., 2000). In this study we report two RCADS-C scores to differentiate between anxiety and depression symptoms: the subscale MDD (Major Depressive Disorder) and a RCADS-anxiety score, which is the total score without the MDD subscale. Higher scores reflect more symptoms. Cronbach’s alphas for the MDD subscale and the RCADS-anxiety score were respectively .86 and .94 in the anxious sample and .77 and .89 in the control sample.

Strengths and Difficulties Questionnaire (SDQ-P; Goodman, 1997). The SDQ-Parent version (25 items) assesses the psychological adjustment of children and adolescents and has demonstrated good internal reliability (Cronbach’s α for Total problems is .81) and concurrent validity (Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). The total problem score was used to determine if children had substantial psychological problems. The SDQ-P was only assessed in the control group. Cronbach’s α of the Total problem score in the current sample was .69.

Overall Procedure
The study has been evaluated and approved of by the Medical Ethics Committees of all participating centers. All anxious and non-anxious children and their parents gave active informed consent. Clinically anxious children were referred for treatment to one of two academic centers for child and adolescent psychiatry in the Netherlands (AMC / de Bascule in Amsterdam and UCKJP / Accare in Groningen). All children were diagnosed with an anxiety disorder according to the ADIS-C and received 12 sessions of CBT (Coping Cat manual; Kendall & Ronan, 1990; Dutch version: Nauta & Scholing, 2007). The ASICA was administered by the therapist at session 1, 4, 8, and 12. Therapists were trained in administering the ASICA and received monthly supervision. Interviews at session 4, 8 and 12 were video-taped and 37 interviews (11.1%) were randomly selected to assess interrater reliability. At least two other therapists, in different combinations, rated the interviews. The ADIS-C interview and questionnaires were administered within a week before the first treatment session and within a week after the last treatment session (session 12).

The control sample was recruited through various schools. Twelve schools were asked to participate in the study, of which three schools agreed to cooperate (25%). A total of 416 children were informed about the study and 365 children (76.7%) were screened for trait anxiety level with the STAI (-C). The other children (n = 51) did not agree to participate. To prevent a restricted range of scores on the ASICA, we randomly selected 40 children based on three different ranges of decile scores on the STAI (-C)-trait: deciles ranging from 1-3 (n = 14),
from 4-6 (n = 16), and from 7-9 (n = 10). At time one (T1) children were individually screened for anxiety disorders with the ADIS-C. If they reported an anxiety disorder, they were excluded. Next, they were interviewed with the ASICA and they filled out the RCADS-C. No parents had to be consulted for the ASICA. Parents were asked to fill out a questionnaire concerning demographic variables and the SDQ-P to screen for psychopathology. After four weeks the ASICA was administered again (T2). The four week interval was chosen similar to the time between two assessments in the anxious group. All ASICA interviews at T1 were recorded and 20 interviews (50%) were scored by two other raters to assess interrater reliability.

Results

Handling of Missing Data

There were several missing observations in the anxious group, ranging from three questionnaires or interviews at session 1, to 42 questionnaires or interviews at session 12. Most missing data were the result of dropping out of treatment (n = 36 at session 12). There were no significant differences regarding pre-treatment questionnaire and interview scores, age and gender between children who did not drop out and children who dropped out at session 4, 8, and 12. All missing observations, except post ADIS-C CSR scores, were imputed using the Expectation-Maximization procedure in SPSS. Results displayed in the tables are imputed scores.

Comparison of Anxious and Non-Anxious Children

All anxious children had an anxiety disorder according to the ADIS-C. Mean CSR score for the primary diagnosis was 6.32 (SD = 1.05), range 4 to 8. Primary diagnoses were Social Phobia (SP, 33.8%), Separation Anxiety Disorder (SAD, 11.5%), Specific Phobia (Phobia, 23.0%), Generalized Anxiety Disorder (GAD, 23.0%), and Panic Disorder with or without Agoraphobia (PD, 8.6%). Eighty-three children (59.7%) had one or more co morbid anxiety or mood disorders or ADHD. The total number of diagnoses per child ranged from 1 to 6 (mean 2.20).

Five children in the control group reported anxiety symptoms on the ADIS-C, but received a CSR well below four (range 0-3, mean 0.28), indicating mild anxiety problems that did not interfere with daily life. One child had a clinical score on the SDQ-P total problem score. No children in the non-anxious group had received treatment for anxiety problems.

Anxious and non-anxious children did not differ on mean age and gender. As expected, children with an anxiety disorder had significantly higher ASICA scores (see Table 1). They also had higher anxiety scores on the RCADS-C and STAI (-C)-trait. There were no differences between boys and girls on most ASICA scores (ps all > .14, ns). Taking the Bonferroni correction into account (α was set at .0125), there was a trend on the Thoughts subscale, t(137) = -2.10, p = .04, Cohen's d = 0.36, with higher scores for anxious girls (M = 9.34, SD = 3.94) than for
The Anxiety Severity Interview for Children and Adolescents (ASICA) | 59

anxious boys (M = 7.94, SD = 3.88). Age and ASICA scores were not significantly correlated (range .09-.15).

Table 1. Basic characteristics, ASICA and questionnaire scores for anxious (n = 139) and non-anxious children (n = 40)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Anxious (M, SD)</th>
<th>Non-anxious (M, SD)</th>
<th>Difference test</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>n = 62 (44.6%)</td>
<td>n = 15 (37.5%)</td>
<td>χ²(1) = 0.64, p &gt; .05</td>
<td>Cramer’s V = 0.06</td>
</tr>
<tr>
<td>Female</td>
<td>n = 77 (55.4%)</td>
<td>n = 25 (62.5%)</td>
<td>t(177) = 0.32, p &gt; .05</td>
<td>d = 0.06</td>
</tr>
<tr>
<td>Age</td>
<td>12.46 (2.83)</td>
<td>12.30 (2.78)</td>
<td>U = 1407.50, p &lt; .001</td>
<td>d = 0.89</td>
</tr>
<tr>
<td>STAI(-C)-trait decile</td>
<td>7.26 (2.96)</td>
<td>4.73 (2.53)</td>
<td>U = 1340.00, p &lt; .001</td>
<td>d = 0.89</td>
</tr>
<tr>
<td>RCADS-anxiety</td>
<td>29.75 (18.24)</td>
<td>14.95 (9.88)</td>
<td>U = 1355.50, p &lt; .001</td>
<td>d = 0.89</td>
</tr>
<tr>
<td>RCADS-MDD</td>
<td>8.26 (5.26)</td>
<td>3.95 (2.94)</td>
<td>U = 1355.50, p &lt; .001</td>
<td>d = 0.89</td>
</tr>
<tr>
<td>ADIS-C CSR</td>
<td>6.32 (1.05)</td>
<td>0.28 (0.82)</td>
<td>U = 0.00, p &lt; .001</td>
<td>d = 6.05</td>
</tr>
<tr>
<td>ASICA Total</td>
<td>28.09 (9.42)</td>
<td>5.58 (4.84)</td>
<td>U = 117.50, p &lt; .001</td>
<td>d = 2.63</td>
</tr>
<tr>
<td>ASICA feelings</td>
<td>9.54 (3.28)</td>
<td>2.08 (2.11)</td>
<td>U = 194.50, p &lt; .001</td>
<td>d = 2.45</td>
</tr>
<tr>
<td>ASICA avoidance</td>
<td>9.85 (4.29)</td>
<td>1.65 (1.79)</td>
<td>U = 338.50, p &lt; .001</td>
<td>d = 2.12</td>
</tr>
<tr>
<td>ASICA thoughts</td>
<td>8.72 (3.96)</td>
<td>1.85 (1.99)</td>
<td>U = 430.00, p &lt; .001</td>
<td>d = 1.91</td>
</tr>
</tbody>
</table>

Note. Nonparametric tests (Mann-Whitney test, U) were used when data were not normally distributed for one or both samples. Cohen’s d is reported as effect size with thresholds of .20, .50 and .80 indicating small, medium and large effects respectively.

Confirmatory Factor Analysis (CFA)

Amos 18.0 was used to determine the fit of six alternative models. Data from the first assessment (session 1) in anxious children were used. Model 1 was a single-factor model in which all items loaded on one factor representing anxiety severity. Model 2 was the intended three-factor model representing anxious Feelings, Avoidance and anxious Thoughts. The other models were conceptualized based on earlier results with the (C) Y-BOCS (Anholt et al., 2010; Storch et al., 2005; Storch et al., 2006). Model 3 was similar to model 2, with the exception that all resistance items loaded on a separate factor. Model 4 was a two-factor model with one factor representing all items concerning frequency, resistance and control; and a second factor representing interference and distress items. Model 5 was also a two-factor model. One factor represented frequency, interference, distress and the second factor represented resistance and control items. Model 6 was a model with five factors representing the different items: frequency, severity, distress, resistance and control. As the items had positive skew and kurtosis, the unweighted least-squares (UWLS) method was used.

Model 2 and 6 showed to have the best fit. Fit indices for the three-factor model (Model 2) were satisfactory (χ² = 231.33, df = 72, GFI = .938, AGFI = .897, NFI = .896, RFI = .849;
Fit indices for the five-factor model (Model 6) were good ($\chi^2 = 90.92$, $df = 50$, $GFI = .976$, $AGFI = .942$, $NFI = .959$, $RFI = .914$). Higher order factor models with one factor explaining the covariation between the first order factors were tested. The target coefficient $T$ (Marsh & Hocevar, 1985) for the higher order factor of Model 2 was almost 1 (.997), indicating that this model can effectively explain the correlation between the first order factors. The target coefficient $T$ for the higher order factor of Model 6 was less satisfactory ($T = .61$) and the factor loading of Resistance was not significant.

**Reliability**

Internal reliability of (sub) scales was assessed with Cronbach’s $\alpha$, separately for the anxious (ANX) and non-anxious (NA) children. Reliability was good for the Total score (ANX $.86$, NA $.83$) and weak to good for the three subscales Feelings (ANX $.64$, NA $.73$), Avoidance (ANX $.80$, NA $.59$) and Thoughts (ANX $.78$, NA $.70$).

Interrater reliability was evaluated by calculating one-way random Intraclass Correlations (ICCs) for the anxious sample and two-way random ICCs for the control sample (Shrout & Bolger, 2002); and kappas of individual items. The Intraclass Correlation Coefficient (ICC) for three raters was $.99$ (ANX) and $.96$ (NA) for the Feelings subscale, $.99$ (ANX) and $.96$ (NA) for the Avoidance subscale, $.98$ (ANX and NA) for the Thoughts subscale, and $.99$ (ANX) and $.98$ (NA) for the Total score (Table 2). The mean item-by-item kappa coefficient was $.75$ for the anxious sample and $.65$ for the non-anxious sample, ranging from $.35$ to $.92$ for the five Feeling items, from $.35$ to $.83$ for the Avoidance items and $.35$ to $1.00$ for the Thought items.

Test-retest reliability (ICCs) in the non-anxious group over four weeks (mean 4.73 weeks, range 3-9) was moderate to good for Total ASICA score (.85), Feelings (.66), Avoidance (.75) and Thoughts (.72). Mean scores did not differ significantly between the first and second assessment ($ps$ all > .05).

**Convergent and Discriminant Validity**

Correlations between the ASICA and anxiety measures (STAI (-C)-deciles, ADIS-C, RCADS-anxiety, see Table 3) were all significant and medium (.32) to high (.72). Correlations with the RCADS-MDD were also significant and of medium strength (range .39 to .47). Correlations for the total score and subscales of the ASICA were comparable, except for some lower correlations with the Avoidance subscale. Differences between the convergent and discriminant correlations were analyzed by Steiger’s $t$-statistic (Cohen & Cohen, 1983; Steiger, 1980). The ASICA total score correlated significantly stronger with the ADIS-C CSR ($\rho = .72$) than with the RCADS-MDD subscale (.47), Steiger’s $t(178) = 4.59$, $p < .001$. The correlation between the ASICA and RCADS-MDD (.47) was not different from the correlation between the ASICA and RCADS-anxiety (.47), Steiger’s $t(178) = 0.00$, $p = 1.00$ or the correlation between the ASICA and STAI (-C)-decile (.42), Steiger’s $t(178) = -1.01$, $p > .15$. 

Brown, 2006).
Table 2. Intraclass Correlation Coefficients (ICCs) for the ASICA subscales and kappa coefficients for each item across three raters, separately for anxious and non-anxious children

<table>
<thead>
<tr>
<th>Scale / Item</th>
<th>ICC ANX</th>
<th>ICC NA</th>
<th>κ ANX</th>
<th>κ NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>.99</td>
<td>.98</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Feelings</td>
<td>.99</td>
<td>.96</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Time spent</td>
<td>-</td>
<td>-</td>
<td>.84</td>
<td>.92</td>
</tr>
<tr>
<td>Interference</td>
<td>-</td>
<td>-</td>
<td>.69</td>
<td>.35*</td>
</tr>
<tr>
<td>Distress</td>
<td>-</td>
<td>-</td>
<td>.78</td>
<td>.85</td>
</tr>
<tr>
<td>Resistance</td>
<td>-</td>
<td>-</td>
<td>.85</td>
<td>.35*</td>
</tr>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>.84</td>
<td>.57</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.99</td>
<td>.96</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Time spent</td>
<td>-</td>
<td>-</td>
<td>.83</td>
<td>.79</td>
</tr>
<tr>
<td>Interference</td>
<td>-</td>
<td>-</td>
<td>.76</td>
<td>.35*</td>
</tr>
<tr>
<td>Distress</td>
<td>-</td>
<td>-</td>
<td>.63</td>
<td>.62</td>
</tr>
<tr>
<td>Resistance</td>
<td>-</td>
<td>-</td>
<td>.70</td>
<td>.53</td>
</tr>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>.69</td>
<td>.51</td>
</tr>
<tr>
<td>Thoughts</td>
<td>.98</td>
<td>.98</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Time spent</td>
<td>-</td>
<td>-</td>
<td>.81</td>
<td>1.00</td>
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<tr>
<td>Interference</td>
<td>-</td>
<td>-</td>
<td>.65</td>
<td>.35*</td>
</tr>
<tr>
<td>Distress</td>
<td>-</td>
<td>-</td>
<td>.65</td>
<td>.80</td>
</tr>
<tr>
<td>Resistance</td>
<td>-</td>
<td>-</td>
<td>.76</td>
<td>.83</td>
</tr>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>.84</td>
<td>.89</td>
</tr>
</tbody>
</table>

Note. All p-values are significant $p < .001$, except for the values marked with an asterisk, those are not significant, $p > .05$

Table 3. Correlations (Spearman’s Rho) between the ASICA and anxiety and depression measures

<table>
<thead>
<tr>
<th></th>
<th>ASICA Total</th>
<th>ASICA Feelings</th>
<th>ASICA Avoidance</th>
<th>ASICA Thoughts</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAI(-C) decile</td>
<td>.42**</td>
<td>.42**</td>
<td>.32**</td>
<td>.41**</td>
</tr>
<tr>
<td>ADIS-C CSR</td>
<td>.72**</td>
<td>.67**</td>
<td>.69**</td>
<td>.60**</td>
</tr>
<tr>
<td>RCADS-anxiety</td>
<td>.47**</td>
<td>.45**</td>
<td>.35**</td>
<td>.47**</td>
</tr>
<tr>
<td>RCADS-MDD</td>
<td>.47**</td>
<td>.45**</td>
<td>.39**</td>
<td>.45**</td>
</tr>
</tbody>
</table>

** $p < .01$

Sensitivity to Change

Differences between pre- and post-treatment ASICA scores were calculated with Bonferroni corrected paired sample t-tests. Anxious children had significantly lower ASICA scores at post-treatment (see Table 4). The mean decrease in ASICA total scores from pre- to post-treatment
was 54.20% ($SD = 32.29$). The mean CSR score and number of diagnoses were significantly lower after treatment. Next, treatment responders and non-responders were compared with Bonferroni corrected $t$-tests on their post-treatment ASICA scores. A child was a responder if he had a post-treatment CSR score below 4 on any anxiety disorder. Information from the ADIS-C was available for 116 children and 66 of them (56.9%) were treatment responders (CSR < 4). Treatment responders had significantly lower ASICA total scores than non-responders at post-treatment. They also reported less anxious feelings, less avoidant behavior and less anxious thoughts (see Table 5). At pre-treatment, non-responders reported significant higher levels of total ASICA scores than responders (see Table 5).

Changes in ASICA scores over time (session S1, S4, S8 and S12) were evaluated with four repeated measure ANOVAs. Figure 1 displays the course of scores over sessions. Eta squared ($\eta^2$) is reported as effect size with small (.01), medium (.06) and large (.14) effects. Mauchly’s test indicated that the assumption of sphericity had been violated. Therefore, degrees of freedom were corrected using the Greenhouse-Geisser estimates of sphericity. ASICA total score was significantly affected by time, $F(2.42, 338.92) = 127.03, p < .001, \eta^2 = .48$, with scores significantly decreasing from S1 to S4 ($F(1, 138) = 23.39, p < .001, \eta^2 = .05$), from S4 to S8 ($F(1, 138) = 39.08, p < .001, \eta^2 = .09$) and from S8 to S12 ($F(1, 138) = 110.9, p < .001, \eta^2 = .12$). ASICA Feelings score was also significantly affected by time, $F(2.53, 348.75) = 99.40, p < .001, \eta^2 = .42$. Scores significantly decreased from S1 to S4 ($F(1, 138) = 27.40, p < .001, \eta^2 = .06$), from S4 to S8 ($F(1, 138) = 23.85, p < .01, \eta^2 = .06$) and from S8 to S12 ($F(1, 138) = 76.15, p < .001, \eta^2 = .09$). ASICA Avoidance score was significantly affected by time, $F(2.50, 344.64) = 109.66, p < .001, \eta^2 = .44$. Scores significantly decreased from S1 to S4 ($F(1, 138) = 14.52, p < .001, \eta^2 = .03$), from S4 to S8 ($F(1, 138) = 44.92, p < .001, \eta^2 = .10$) and from S8 to S12 ($F(1, 138) = 81.70, p < .001, \eta^2 = .11$). Finally, ASICA Thoughts score was also significantly affected by time, $F(2.60, 359.21) = 58.85, p < .001, \eta^2 = .30$. Scores significantly decreased from S1 to S4 ($F(1, 138) = 7.90, p < .01, \eta^2 = .02$), from S4 to S8 ($F(1, 138) = 18.63, p < .001, \eta^2 = .04$) and from S8 to S12 ($F(1, 138) = 49.17, p < .001, \eta^2 = .07$).

Table 4. Pre- and post-treatment scores for anxious children on the ASICA and ADIS-C

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment (M, SD)</th>
<th>Post-treatment (M, SD)</th>
<th>Difference test</th>
<th>Effect size Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASICA Total score</td>
<td>28.09 (9.42)</td>
<td>14.17 (7.86)</td>
<td>$t(138) = 16.00, p &lt; .001$</td>
<td>1.64</td>
</tr>
<tr>
<td>ASICA Feelings</td>
<td>9.54 (3.28)</td>
<td>4.89 (2.51)</td>
<td>$t(138) = 15.70, p &lt; .001$</td>
<td>1.60</td>
</tr>
<tr>
<td>ASICA Avoidance</td>
<td>9.85 (4.29)</td>
<td>4.54 (3.74)</td>
<td>$t(138) = 14.74, p &lt; .001$</td>
<td>1.32</td>
</tr>
<tr>
<td>ASICA Thoughts</td>
<td>8.72 (3.96)</td>
<td>4.70 (2.76)</td>
<td>$t(138) = 10.70, p &lt; .001$</td>
<td>1.18</td>
</tr>
<tr>
<td>ADIS-C CSR</td>
<td>6.37 (1.02)</td>
<td>2.46 (2.95)</td>
<td>$T = 46.50, p &lt; .001$</td>
<td>1.78</td>
</tr>
<tr>
<td>Nr. of diagnoses</td>
<td>2.15 (1.27)</td>
<td>0.77 (1.12)</td>
<td>$T = 236.00, p &lt; .001$</td>
<td>1.16</td>
</tr>
</tbody>
</table>

Note. Nonparametric tests (Wilcoxon’s signed rank test, $T$) were used when data were not normally distributed for one or both samples; otherwise the paired-sample $t$-test ($t$) was used.
Table 5. Pre- and post-treatment scores (M, SD) for responders (n = 66) and non-responders (n = 50) on the ASICA

<table>
<thead>
<tr>
<th></th>
<th>Pre-treatment (session 1)</th>
<th></th>
<th></th>
<th>Post-treatment (session 12)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Responders</td>
<td>Non-responders</td>
<td>T (df), p</td>
<td>Effect size d</td>
<td>Responders</td>
<td>Non-responders</td>
</tr>
<tr>
<td>Total score</td>
<td>26.60 (9.29)</td>
<td>30.66 (8.75)</td>
<td>t(114) = 2.39, p &lt; .02</td>
<td>0.43</td>
<td>11.17 (7.92)</td>
<td>18.19 (8.31)</td>
</tr>
<tr>
<td>Feelings</td>
<td>8.90 (3.33)</td>
<td>10.24 (2.84)</td>
<td>t(114) = 2.28, p &lt; .05</td>
<td>0.43</td>
<td>3.94 (2.55)</td>
<td>6.10 (2.78)</td>
</tr>
<tr>
<td>Avoidance</td>
<td>9.34 (3.94)</td>
<td>11.08 (4.18)</td>
<td>t(114) = 2.29, p &lt; .05</td>
<td>0.43</td>
<td>3.34 (3.33)</td>
<td>6.34 (4.39)</td>
</tr>
<tr>
<td>Thoughts</td>
<td>8.35 (3.51)</td>
<td>9.37 (3.95)</td>
<td>t(114) = 1.46, p &gt; .05</td>
<td>0.28</td>
<td>3.92 (2.83)</td>
<td>5.70 (3.20)</td>
</tr>
</tbody>
</table>

Figure 1. ASICA scores at sessions one, four, eight, and twelve

Cut-Off Point ASICA
Sensitivity and specificity of the ASICA were determined by calculating a Receiver Operator Curve (ROC). ASICA total score was the test variable, ADIS-C diagnosis (anxious children vs. non-anxious children) was the "gold standard". Sensitivity is the percentage of children who were anxious according to the ADIS-C and correctly identified as such on the ASICA. Specificity is the percentage of children correctly identified on the ASICA as non-anxious, compared to the
ADIS-C. The Area Under the Curve (AUC) was 0.979 (SE = 0.01), \( p < .001 \), which means that the ASICA is able to correctly determine group status. The optimal cut-off point was 12.50, with a sensitivity of 95.0% and a specificity of 92.5%. This means that a total ASICA score of 13 or higher is indicative of an anxiety disorder.

**Discussion**

In this study, we described the development and psychometric properties of the ASICA, a new semi-structured interview assessing three main components of anxiety (anxious feelings, avoidant behavior and anxious thoughts). The purpose of the ASICA is to measure anxiety severity in a sensitive and individualized way, facilitating repeated monitoring of treatment progress and effect. Overall, the results show that the ASICA is a promising instrument.

The factor analysis revealed two different models with adequate to good fit. The first was the intended three-factor model with different factors for anxious Feelings, Avoidant behavior and anxious Thoughts. The second model was a five-factor model with different factors representing the different items: frequency of symptoms; interference with daily life; distress from symptoms; resistance to symptoms and control over symptoms. We found no support for other models that were suggested for the CY-BOCS (Anholt et al., 2010; Storch et al., 2005; Storch et al., 2006). The five-factor model was actually a little better than the three-factor model and the division in five factors makes sense as all items question different topics. However, the higher order model was not very satisfactory as it did not capture the resistance items very well. Furthermore, the current sample was quite small to perform a factor analysis. Therefore, we chose to report and use the intended three-factor model for now, awaiting further examination of the factor structure in a larger sample.

The ASICA showed to be sensitive to treatment changes. Scores were not only lower after treatment, but the ASICA was also sensitive to progressive changes during therapy, which is essential for a repeated measure. Responders and non-responders were effectively discriminated post-treatment and interestingly also pre-treatment. ASICA scores might be predictive for treatment effect. Although the ASICA is not specifically designed for diagnostic purposes, it appears to be able to discriminate between anxious and non-anxious children. More importantly, the retrieved cut-off score of 13 seems able to discriminate responders from non-responders, as the mean post-treatment score of responders was below 13 (mean was 11.17), and of non-responders above 13 (mean was 18.19).

The sensitivity and specificity of the retrieved cut-off score was excellent. However, we should note that although we tried to include non-anxious children with a range of (non-clinical) anxiety symptoms, there were only five children who reported anxiety symptoms on an elevated level. The range of ASICA score in the non-anxious group was 0 to 19, with three participants with a score of 13 or higher. Two of those reported anxiety symptoms on an elevated level.
Future work could examine a larger group of youth with subclinical levels of anxiety and an ASICA score closer to the cut-off point to more accurately determine sensitivity and specificity.

Internal reliability was satisfactory and test-retest reliability in the control group was good to excellent. Especially the total score of the ASICA is quite stable and four week differences in therapy are most likely to show real changes and not merely the passing of time. Although interrater agreement overall was excellent, it should be noted that this was determined by scoring videotaped interviews. Although this is an accepted and commonly used method (e.g. see Goodman et al., 1989 and Scahill et al., 1997), it means that scoring depends on the questions asked by the interviewer. As the ASICA is a semi-structured interview, other interviewers could have asked other questions or could have used other formulations, possibly resulting in different answers and scoring. Therefore, ICCs might be artificially high. Agreement was inconsistent for some individual items. In the anxious sample, kappas were all good to excellent. However, in the control sample, some kappas (especially for interference items) were poor and not significant. This might be explained by a more restricted range of scores in the control sample.

Convergent validity of the ASICA with other anxiety scales was moderate to good. Especially correlations with the ADIS-C were high. On the one hand, this could be expected as the ASICA and the ADIS-C use the same kind of informants: both are clinician rated interviews. Moreover, questionnaires like the STAI (-C) and RCADS rely on self-report and measure only symptoms and thoughts, but not avoidance or interference. The ASICA taps into different domains of anxiety, specifically because it is an individualized instrument. On the other hand, the correlations between the ASICA and ADIS-C might be artificially high because of shared method variance. Discriminant validity was less convincing. Correlations between the ASICA and a subscale of the RCADS measuring depression symptoms were almost equal to correlations with anxiety measures, with an exception of clinician severity ratings on a diagnostic interview. This could be a consequence of the usually high correlation between anxiety and depression symptoms (Costello et al., 2003) and similar results were found for the CY-BOCS (Scahill et al., 1997; Storch et al., 2005). The discriminant validity of the ASICA should be a topic of further investigation.

A limitation of this study is the relatively small sample size of the control group. Future studies should replicate the results and especially the factor structure in a larger sample and test-retest reliability in an anxious sample. Another question that remains to be answered is whether the ASICA is influenced by developmental changes. However, we do not expect age to influence the scores on the ASICA, as the interviewer should be sensitive to age-appropriate answers. Similarly, there are no age differences on the ADIS-C interview, which is also used in a wide age-range. The results of the present study support our expectations, as correlations between age and ASICA scores were small and non-significant.
Clinical Implications

As was stated in the introduction, individualized repeated assessment is important in at least two ways: to monitor treatment progress and to early identify treatment failures; and to motivate a child by regularly monitoring individual progress. Existing (self-report) measures of anxiety like the SCARED, MASC or PARS could be used to repeatedly assess anxiety symptoms and may be of lower costs than the ASICA in terms of time and resources. However, in our opinion the ASICA has a unique (clinical) value over and above those measures. First, the ASICA is individualized and focuses on a child’s specific problems and different aspects of anxiety (anxious feelings, avoidant behavior, and anxious thoughts). This facilitates the possibility to personalize a manualized treatment. The therapists can use pre-treatment information from the ASICA to identify specific problems of the child and to plan treatment. For example, some children will report many anxiety-related physiological responses, while others will report many anxious thoughts. Some children may report that they never try to do anything about their fears, while others do try to resist their avoidant behavior or fears, but do not manage yet to control them. For each of these children the focus of treatment could be different. Second, the ASICA not only measures severity of symptoms, but also resistance to and control over anxiety-related behavior. These items can inform the therapist to what extent a child brings learned skills into practice. Third, the repeated assessment of the ASICA can be part of treatment and the answers can directly be used in-session. For example, some children cannot report any negative or positive thoughts pre-treatment. In this case, a first goal can be to learn to distinguish thoughts from feelings, and a second goal to change these thoughts and feelings. The repeated assessment of the ASICA can help to evaluate and monitor this process. Finally, displaying the ASICA results in a graph gives a child, parents and the therapist insight into treatment progress. Lambert and colleagues (Lambert et al., 2003) showed that giving feedback to therapists can improve outcome. We know from clinical practice that the plotting of ASICA scores in a graph can be a real incentive for children: they report to be motivated to “see the lines go down”. The ASICA can help the therapist to provide their clients with an individualized insight into their treatment progress.
Chapter 5

Measuring negative and positive thoughts in children:
An adaptation of the Children’s Automatic Thoughts Scale (CATS)

Abstract

The aim of this study is to describe the factor structure and psychometric properties of an extended version of the Children’s Automatic Thoughts Scale (CATS), the CATS-Negative/Positive (CATS-N/P). The CATS was originally designed to assess negative self-statements in children and adolescents. However, positive thoughts also play a major role in childhood disorders such as anxiety and depression. Therefore, positive self-statements were added to the CATS. The CATS-N/P was administered to a community sample of 554 children aged 8-18 years. The results of a confirmatory factor analysis revealed that the positive self-statements formed a separate and psychometrically sound factor. Internal and short-term test-retest reliability was good. Boys reported more hostile and positive thoughts than girls; and younger children reported more negative thoughts concerning physical threat, social threat, and failure than older children. In conclusion, the results of the current study support the use of the CATS-N/P for the measurement of positive and negative thoughts in children. The application of the CATS-N/P can facilitate further research on cognitive factors in different childhood disorders.
Measuring negative and positive thoughts in children: the CATS-N/P

Introduction

Many children suffer from emotional disorders. Indeed, lifetime prevalence rates range from 7% to 15%, depending on the type of emotional disorder studied (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Verhulst, Van der Ende, Ferdinand, & Kasius, 1997). Although evidence-based therapies are available to treat children with emotional disorders, around 45% of children do not respond sufficiently (Bodden et al., 2008), so there is room for improvement. To improve treatment results we need to know more about developmental and maintaining factors of disorders, but also about effective components of treatment. One factor which is presumed to play a critical role in the onset and maintenance of anxiety disorders is cognition (Beck, 2005). Commonly, anxious cognition is examined by measuring negative thoughts (e.g., “I am worthless”). However, in order to investigate cognitive models of anxiety disorders it is also necessary to measure positive thoughts (e.g., “I feel good about myself”). In the current study, we describe the development of a questionnaire which incorporates negative and positive thoughts: the Children’s Automatic Thoughts Scale-Negative/Positive (CATS-N/P).

Cognitions play an important role in disorders and their treatment. For example, children with anxiety and mood disorders report more dysfunctional and negative beliefs than healthy children (Beck, 2003). There are three important models which describe the contribution of thoughts to emotional disorders. According to the “States-of-Mind” (SOM) model (Schwartz & Garamoni, 1989), the balance of positive and negative thoughts is essential for psychological well-being. A ratio of .62 between positive and negative thoughts is considered optimal or healthy. A ratio less than .31 is related to depression or anxiety (Schwartz & Garamoni, 1989). A second model is Kendall’s “Power of Nonnegative Thinking”. This model states that anxious children may benefit more from a reduction in the amount of their negative thoughts than from an increase in the amount of their positive thoughts (Kendall & Chansky, 1991; Kendall & Korgeski, 1979). Third, Beck’s "Content Specificity" hypothesis focuses on dysfunctional cognitive schemata and specific cognitive content. Anxious self-talk is future-oriented, unstable, and focused on threat. Depressive self-talk is past-oriented, stable, and focused on loss and failure (Beck & Clark, 1997; Ronan & Kendall, 1997).

Several questionnaires have been developed to measure cognitions in children. However, several problems have been associated with the application of these questionnaires. First, the majority of cognition questionnaires for children (e.g., the Children’s Anxious Self-Statements Questionnaire (CASSQ; Ronan, Rowe, & Kenny, 1988), or the Cognition Checklist for Children (CCL-C; Jolly & Dykman, 1994)), are downward extensions of measures developed for adults. Children might have trouble understanding items of these questionnaires or make different self-statements than adults. Therefore, the original factor structure for adults may not hold in a younger population. A second problem is that most cognition questionnaires fail to distinguish between thoughts and symptoms. For example, the Negative Affectivity Self-Statement Questionnaire (NASSQ; Ronan, Kendall, & Rowe, 1994; NASSQ-Anxiety scale; Sood
& Kendall, 2007), which was developed using self-statements generated by children, measures both symptoms (e.g. “I was shaking”) and thoughts (e.g. “I usually do something stupid”). This overlap in item content might artificially inflate correlations between symptom measures and cognition measures. The overlap in item content also makes it difficult to disentangle the specific contributions of symptoms and cognitions to the disorder. Third, most cognition questionnaires measure general (negative) affect and not anxiety and/or depression separately, so it is difficult to examine content specificity. Finally, there are no psychometrically sound questionnaires which incorporate negative as well as positive thoughts (and not positive affect).

A cognitions questionnaire which circumvents most of these problems is the Children's Automatic Thoughts Scale (CATS; Schniering & Rapee, 2002). This questionnaire was specifically designed for children, has been used in different international studies, and measures thoughts but not symptoms. The items of the CATS are based on self-statements made by clinically anxious, depressed, or behaviorally disturbed children (Schniering & Rapee, 2002). The CATS assesses negative beliefs common to both internalizing and externalizing problems. In addition, it also contains specific items related to different disorders, which can facilitate the investigation of content specificity (i.e. thoughts that are specific or common to these disorders). Confirmatory factor analysis of the CATS in a community sample revealed four distinct first-order factors (Physical threat, Social threat, Personal failure and Hostility) and one higher-order factor reflecting negative beliefs (Schniering & Rapee, 2002). This factor structure was replicated in two other studies (Schniering & Lyneham, 2007; Schniering & Rapee, 2004). The CATS has consistently shown good internal reliability, with Cronbach's alphas ranging from .82 to .96 (Bodden & Bögels, 2006; Schniering & Lyneham, 2007; Schniering & Rapee, 2002, 2004). Test-retest reliability was good at one month (.66-.80) and three months (.68-.77; Schniering & Rapee, 2002). The CATS has good discriminant validity. In fact, the CATS has been demonstrated to discriminate between children with anxiety disorders and healthy controls (Bodden & Bögels, 2006; Schniering & Rapee, 2002); to discriminate between anxiety, depression, and behavioral disorders (Bodden & Bögels, 2006; Schniering & Rapee, 2002); and to discriminate between different anxiety disorders (Bodden & Bögels, 2006; Schniering & Lyneham, 2007). Finally, the CATS has also been shown to be sensitive to treatment change (Mifsud & Rapee, 2005; Schniering & Lyneham, 2007).

While the CATS has a number of advantages over other measures of cognition, it does not assess positive thoughts. The inclusion of positive thoughts in a cognition questionnaire makes it possible to examine theoretical cognitive models like the SOM model, Power of Nonnegative Thinking, and the Content Specificity hypothesis. Therefore, to increase the applicability of this questionnaire in research on cognition in children, we decided to extend the CATS with positive self-statements. The resulting measure was named the CATS-Negative/Positive (CATS-N/P). The objective of the present study was to describe the development and psychometric properties of the CATS-N/P in a community sample of children and adolescents.
Our first research question concerned the factor structure of the CATS-N/P and consisted of two parts: a) whether we could derive the original four-factor structure of the CATS in a Dutch population; and b) if the factor structure for the CATS-N/P would include an extra factor for positive thoughts. Performing a factor analysis of the CATS-N/P is important for several reasons. First, adding extra items to a questionnaire might change the overall factor structure. We wanted to be confident that the original subscales were still relevant to the new questionnaire. This is important because earlier studies showed that subscales of the CATS discriminated between different disorders (Bodden & Bögels, 2006; Schniering & Rapee, 2002). Secondly, translating a questionnaire or using it in a different population can change the factor structure. However, the factor structure of the Dutch translation of the CATS had not been examined in previous studies. Third, a factor analysis can reveal whether the positive items will form a coherent factor. This should be determined before the balance between negative and positive thoughts can be examined in future studies using the CATS-N/P.

Our second research question concerned the internal reliability of the scale and the eight-week test-retest reliability. Our third research question focused on the convergent and discriminant validity of the CATS-N/P. We hypothesized that there would be a positive correlation between the negative beliefs factor and the measures for emotional problems and anxiety; and a negative correlation between the measures for emotional problems and anxiety and the positive thoughts scale of the CATS-N/P. Finally, age and sex differences on the CATS-N/P were examined exploratively.

Method

Participants
Participants were a community sample of 554 children (8-11 years, \( n = 183 \)) and adolescents (12-18 years, \( n = 371 \)) with a mean age of 12.55 years. There were 272 boys and 282 girls. Ten different schools were asked to participate in the study, and six schools agreed to cooperate (60%). Schools were public secondary schools and elementary schools in several rural and urban areas of the Netherlands. A total of 681 children and their parents were informed about the study and 569 children and their parents (83.6%) agreed to participate. Of these, twelve children were not present when the questionnaires were administered. Three children were excluded from the analyses because they had too many missing items on the CATS-N/P (i.e., a maximum of two missing items per subscale was allowed and missings were replaced with the subscale mean). Despite repeated reminders, only 402 parents (72.6%) returned the questionnaires.

Socioeconomic status of participants was assessed. Parental educational level was low (29.8%), medium (36.5%), and high (33.7%) for mothers, and low (27.3%), medium (31.2%), and high (41.5%) for fathers. 113 families (28.1%) refused to give information about their income level. Of the other families, most (68.9%) had an income level above the mean (> 34,000
EUR), 17.0% had a mean income level (28,500-34,000 EUR), and 14.1% had an income level below the mean (< 28,500 EUR). Most children (83.4%) lived in two-parent families. Children represented the main ethnic groups in the Netherlands: Dutch (94.0%), Turkish (2.7%), Moroccan (0.7%), Antillean (1.2%), or different (1.2%). Most parents (89.6%) had the Dutch nationality.

Measures

Development of the CATS-N/P

The original Children’s Automatic Thoughts Scale (Schniering & Rapee, 2002) consists of 40 items which represent different negative thoughts (e.g., “Something awful is going to happen” or “Kids will think I’m stupid”). Children rate how often they have had each of the 40 thoughts in the past week. The items are scored on a five-point scale from “not at all” (0) to “all the time” (4). Four 10-item subscales (Physical threat, Social threat, Personal failure and Hostility) are calculated by adding item scores. The Total score is derived by adding the four subscale scores. We used the 40-item Dutch CATS, translated by Bodden and Bögels (2006), and added ten positive thoughts. Ten items were chosen to be added in order to facilitate the calculation of SOM (ratio) scores in the future (i.e. all subscales have an equal amount of items). We selected the positive items from the Flemish PNG-k (Positieve en Negatieve Gedachten bij kinderen; Bracke & Braet, 2000). In addition to 35 negative items (all from the NASSQ-39; Ronan et al., 1994), the PNG-k contains 35 positive items which were selected from the NASSQ-39 (Ronan et al., 1994), the Automatic Thoughts Questionnaire-Positive (ATQ-P; Ingram & Wisnicki, 1988), and other child questionnaires. The PNG-k was validated in a sample of 690 children. All items had high factor loadings and internal reliability was good (Cronbach’s α > .91). However, the items from the PNG-k reflect positive and negative affect, including symptoms, as well as cognition. Therefore, we used the highest loading positive items and selected items representing thoughts rather than symptoms. Moreover, positive items which were the opposite of the negative CATS items were selected first. Examples of the positive items are: “Only good things will happen to me”, “My future looks bright”, and “I enjoy life” (see Table 1 for all items). For the English language version of the CATS-N/P, the positive Flemish items were translated into English in three steps. First, all authors (except EK), who are bilingual and familiar with the

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10 Information about mean income level was obtained from Intomart GfK, a Dutch research bureau. While most children in our sample came from two-parent families with high levels of education and high incomes, about 25% of parents did not return the demographic questionnaire. Most of these parents were parents of children attending schools offering vocational education or schools situated in low socio-economic suburbs. These factors are known to be associated with ethnic minorities and/or low educational level and income of families. Consequently, the available sample characteristics may not fully reflect the actual sample characteristics.

11 The original English items are reproduced with permission of the authors (R. Rapee and C. Schniering).

12 Part of this table is reprinted from Behaviour Research and Therapy, 40 (9), Schniering, C.A., & Rapee, R. M., Development and validation of a measure of children’s automatic thoughts: the children’s automatic thoughts scale, 1091-1109, Copyright 2002, with permission from Elsevier.
topic in the questionnaire, independently translated all ten items from Flemish to English. The translations were compared until we uniformly agreed on the phrasing. Next, a native English speaker, who is an expert in the field of childhood anxiety disorders, reviewed the items and recommended some minor changes. Third, the revised items were reviewed by three other bilingual psychologists, and a back translation was made from English to Dutch (equivalent to Flemish). No more changes were made after this step.

The final items of the CATS-N/P were scored on a five-point scale, ranging from "not at all" (0) to "all the time" (4). Higher scores on the five subscales reflect a higher amount of negative or positive thoughts. The range of each subscale is 0-40. As the Total score of the CATS-N/P represents the extent to which a child has negative thoughts, the positive items are not added to the Total score on the CATS-N/P. Therefore, the range of the Total score is 0-160.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Questionnaire item</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Physical threat</td>
<td>I'm going to have an accident</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>I'm going crazy</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>I'm going to die</td>
<td>.48</td>
</tr>
<tr>
<td></td>
<td>My mum or dad are going to get hurt</td>
<td>.49</td>
</tr>
<tr>
<td></td>
<td>I'm scared of losing control</td>
<td>.63</td>
</tr>
<tr>
<td></td>
<td>I'm going to get hurt</td>
<td>.67</td>
</tr>
<tr>
<td></td>
<td>Something awful is going to happen</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>I'm scared that somebody might die</td>
<td>.46</td>
</tr>
<tr>
<td></td>
<td>There is something very wrong with me</td>
<td>.70</td>
</tr>
<tr>
<td></td>
<td>Something will happen to someone I care about</td>
<td>.59</td>
</tr>
<tr>
<td>Social threat</td>
<td>Kids will think I'm stupid</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>I'm worried that I'm going to get teased</td>
<td>.65</td>
</tr>
<tr>
<td></td>
<td>Kids are going to laugh at me</td>
<td>.73</td>
</tr>
<tr>
<td></td>
<td>I'm going to look silly</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>People are thinking bad things about me</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>I'm afraid of what other kids will think of me</td>
<td>.66</td>
</tr>
<tr>
<td></td>
<td>I look like an idiot</td>
<td>.75</td>
</tr>
<tr>
<td></td>
<td>Other kids are making fun of me</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>Everyone is staring at me</td>
<td>.44</td>
</tr>
<tr>
<td></td>
<td>I'm afraid I will make a fool of myself</td>
<td>.66</td>
</tr>
<tr>
<td>Failure</td>
<td>I can't do anything right</td>
<td>.62</td>
</tr>
<tr>
<td></td>
<td>I am worthless</td>
<td>.71</td>
</tr>
</tbody>
</table>
Table 1. Factors, items and factor loadings on the CATS-N/P (continued)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Questionnaire item</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Nothing ever works out for me anymore</td>
<td>.64</td>
</tr>
<tr>
<td>22</td>
<td>It's my fault that things have gone wrong</td>
<td>.58</td>
</tr>
<tr>
<td>29</td>
<td>I've made such a mess of my life</td>
<td>.68</td>
</tr>
<tr>
<td>33</td>
<td>I'll never be as good as other people are</td>
<td>.60</td>
</tr>
<tr>
<td>35</td>
<td>I am a failure</td>
<td>.76</td>
</tr>
<tr>
<td>38</td>
<td>Life is not worth living</td>
<td>.47</td>
</tr>
<tr>
<td>43</td>
<td>I will never overcome my problems</td>
<td>.57</td>
</tr>
<tr>
<td>48</td>
<td>I hate myself</td>
<td>.73</td>
</tr>
<tr>
<td>Hostility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I have the right to take revenge on people if they deserve it</td>
<td>.66</td>
</tr>
<tr>
<td>7</td>
<td>Other kids are stupid</td>
<td>.46</td>
</tr>
<tr>
<td>13</td>
<td>Most people are against me</td>
<td>.65</td>
</tr>
<tr>
<td>18</td>
<td>I won't let anyone get away with picking on me</td>
<td>.74</td>
</tr>
<tr>
<td>24</td>
<td>If someone hurts me, I have the right to hurt them back</td>
<td>.68</td>
</tr>
<tr>
<td>27</td>
<td>Some people deserve what they get</td>
<td>.71</td>
</tr>
<tr>
<td>34</td>
<td>I always get blamed for things that are not my fault</td>
<td>.47</td>
</tr>
<tr>
<td>44</td>
<td>People always try to get me into trouble</td>
<td>.53</td>
</tr>
<tr>
<td>47</td>
<td>Some people are bad</td>
<td>.56</td>
</tr>
<tr>
<td>50</td>
<td>Bad people deserve to get punished</td>
<td>.72</td>
</tr>
<tr>
<td>Positive thought</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I enjoy life</td>
<td>.56</td>
</tr>
<tr>
<td>3</td>
<td>I know that everything I do will work out well</td>
<td>.53</td>
</tr>
<tr>
<td>11</td>
<td>I don't give up</td>
<td>.51</td>
</tr>
<tr>
<td>19</td>
<td>Other people understand me</td>
<td>.69</td>
</tr>
<tr>
<td>21</td>
<td>Only good things will happen to me</td>
<td>.52</td>
</tr>
<tr>
<td>28</td>
<td>I feel good about myself</td>
<td>.71</td>
</tr>
<tr>
<td>32</td>
<td>My future looks bright</td>
<td>.71</td>
</tr>
<tr>
<td>37</td>
<td>Everything will turn out well</td>
<td>.62</td>
</tr>
<tr>
<td>40</td>
<td>Kids my age like me</td>
<td>.64</td>
</tr>
<tr>
<td>45</td>
<td>I feel great</td>
<td>.67</td>
</tr>
</tbody>
</table>
Symptom Questionnaires

Four symptom questionnaires were administered in order to determine anxiety levels and to establish the convergent and discriminant validity of the CATS-N/P.

**Strengths and Difficulties Questionnaire** (SDQ). The SDQ-parent version (Goodman, 1997) is a 25-item questionnaire that assesses the psychological adjustment of children and adolescents. The questionnaire has five scales: Emotional symptoms, Conduct problems, Hyperactivity-attention, Peer problems, and Prosocial behavior. Higher scores (range 0-40) reflect more problems. The total problem score was used in the current study to determine whether children had substantial psychological problems. The SDQ-parent version has good internal reliability (Cronbach’s α for Total problems .81) and concurrent validity (Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). The Cronbach’s α of the Total problem score in this sample was .80.

**Spielberger State Trait Inventory for Children-trait subscale** (STAIC-trait). The STAIC-trait subscale (Spielberger, Edwards, Lushene, Montuori, & Platzer, 1973) has 20 items and measures trait anxiety level in children aged 7-14. The adult version of the scale (STAI-trait; Spielberger, 1983) was used in the current study with children aged 15 years and older. Scores on the STAIC-trait range from 20-60; on the STAI-trait the range is 20-80. Higher scores reflect higher levels of trait anxiety in both scales. The STAIC-trait and STAI-trait have been widely used and shown to have satisfactory psychometric properties (see for the Dutch versions respectively Bakker, Van Wieringen, Van der Ploeg, & Spielberger, 1989 and Van der Ploeg, 2000). The Cronbach’s α’s in the current study were .88 for the STAIC-trait and .89 for the STAI-trait.

**Revised Child Anxiety and Depression Scale-child version** (RCADS). The RCADS (Chorpita, Yim, Moffitt, Unemoto, & Francis, 2000) is a 47-item self-report questionnaire which measures anxiety and depression symptoms in children and adolescents. Higher scores (range 0-141) reflect more symptoms. The RCADS possesses good internal reliability (with Cronbach’s α’s of .73-.82), moderate to good one-week test-retest reliability, and good convergent and discriminant validity (Chorpita et al. 2000; Chorpita, Moffitt, & Gray, 2005). The Cronbach’s α in the current sample was .95.

**Children’s Depression Inventory** (CDI). The CDI (Kovacs, 1992) was included in the current study to explicitly measure depressive symptoms. It is a 27-item self-report questionnaire (range 0-54), with higher scores reflecting more depressive symptoms. The CDI has demonstrated adequate to good psychometric properties (Kovacs, 1992). The Cronbach’s α in the current sample was .85.

Data Analysis and Overall Procedure

After parents and children had received written information about the study, informed consent was obtained from all parents and children. In accordance with the participating schools and
the Clinical Psychology department Ethics Committee (University of Amsterdam), the majority of parents (70.6%) gave passive consent. Parents completed the SDQ and a demographics questionnaire. The CATS-N/P, STAI(C)-trait, RCADS and CDI were administered to the children in their classroom under supervision by research assistants. It took children about 40 minutes to complete all questionnaires. A subsample of 139 children who had given informed consent completed a second CATS-N/P in order to examine test-retest reliability. Due to variability per school in the starting date of the summer vacation, some children completed the second CATS-N/P at school and others completed the questionnaire at home. Although children were reminded twice (in writing and by telephone) to return the questionnaires as soon as possible, there was considerable variation in the return of the retest questionnaire (range 7-21 weeks after the initial administration, \( M = 9.66, SD = 2.36 \)). Therefore, we divided the retest data in two groups based on the retest period median (9 weeks). After the study, participants were informed about the results by an article in the school paper.

Confirmatory factor analysis (CFA) was performed using Amos 16.0 (Arbuckle, 2007). We chose a confirmatory factor analysis over an exploratory analysis, given the strong theoretical assumptions about the factor structure based on earlier studies (Schniering & Rapee, 2002). A confirmatory analysis allows scale items to be forced into certain, pre-determined factors (Brown, 2006). The internal reliability of the CATS-N/P was calculated with Cronbach's alpha and the test-retest reliability with Pearson's \( r \). ANOVAs were used to detect age and sex differences in the subscales of the CATS-N/P.

**Results**

**Confirmatory Factor Analysis**

Amos 16.0 was used to determine which of three alternative models provided the best explanation for the data relative to a null model. Each of the alternative models was based on a theoretical conceptualization and earlier results of studies into the factor structure of the CATS (Schniering & Rapee, 2002). Model 1 was the original four-factor model found by Schniering & Rapee (2002). This model contained the four subscales found in the original CATS: physical threat, social threat, failure, and hostility. By including this model, we could examine whether the original structure of the 40 CATS items could be found in a Dutch population. Model 2 was a five-factor model which contained the four subscales found in the original CATS, and a fifth factor containing positive thoughts. Model 3 was a hierarchical model, with one higher-order "negative thoughts" factor and a separate yet correlated first-order "positive thoughts" factor. Four first-order factors, namely physical threat, social threat, failure, and hostility, were allowed to covariate and contribute to the higher-order factor.
Tests of normality showed that the data were not normally distributed: the majority of items showed positive skewness and kurtosis. Most children reported low frequencies of negative thoughts. This finding was consistent with the type of sample used: non-referred children with low anxiety levels. When data violate the assumption of multivariate normality, estimation methods like maximum likelihood cannot be used for CFA (Anderson & Gerbing, 1988; Brown, 2006). Therefore, we used the method of unweighted least-squares (UWLS), which uses the correlation matrix (Brown, 2006; Schniering & Rapee, 2004).

To evaluate model fit, a range of fit indices was used. There are many classes of fit indices available and different indices are recommended in different situations, depending on estimation method, model parsimony, and sample size (Hu & Bentler, 1999). Absolute fit indices assess model fit at an absolute level and provide an indication of the extent to which the observed data match the predicted model of the population (Brown, 2006; Hu & Bentler, 1998). Of these, we used chi-square, the goodness-of-fit index (GFI), and the adjusted goodness-of-fit index (AGFI). Chi-square should be non-significant and small relative to the degrees of freedom. However, chi-square is very sensitive to sample size and almost always significant when used in large samples (Bentler, 1990; Breckler, 1990). GFI and AGFI values greater than .95 indicate good model fit (Kline, 2005); although others use a more lenient cut-off of .90 or even .85 (see Schniering & Rapee 2004).

Another class is the relative fit indices, which give an indication of the proportional improvement of the model relative to a more restricted, nested baseline model, usually the "null" model. We used the normed fit index (NFI) and the relative fit index (RFI). NFI and RFI values greater than .90 demonstrate good model fit (Bentler & Bonett, 1980).

As Table 2 shows, the original factor structure (model 1) was found in our Dutch sample. Fit indices were satisfactory, but lower than those found in the original sample (Schniering & Rapee, 2002). The fit of model 2, in which positive items were added to the existing negative items, was quite good. However, the NFI and RFI were just below the recommended cut-off of .90. The proposed higher-order model (model 3) could not be examined because the fit of the underlying first-order model (model 2) was not satisfactory (Brown, 2006). Instead, we examined theoretically relevant Modification Indices (MI) provided by AMOS. The MI is an index of the improvement of a model when certain constraints are made. The use of MIs is permitted when investigating just one theoretically-justified constraint at a time (Brown, 2006; Kline, 2005). After allowing items 13 and 44 to load both on hostility and social threat, and allowing item 34 to load both on hostility and physical threat, the first-order model (model 2a) showed good fit. All fit indices exceeded .94 and the model explained the data better than model 2. All items were fixed to the four factors as outlined in Table 1.
Table 2. Goodness of Fit indices and comparison of different models

<table>
<thead>
<tr>
<th>Model</th>
<th>χ²</th>
<th>df</th>
<th>P</th>
<th>GFI</th>
<th>AGFI</th>
<th>NFI</th>
<th>RFI</th>
<th>Target coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>3343</td>
<td>734</td>
<td>.000</td>
<td>.933</td>
<td>.925</td>
<td>.910</td>
<td>.904</td>
<td></td>
</tr>
<tr>
<td>Null model</td>
<td>5207</td>
<td>1225</td>
<td>.000</td>
<td>.264</td>
<td>.234</td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>5465</td>
<td>1165</td>
<td>.000</td>
<td>.923</td>
<td>.915</td>
<td>.895</td>
<td>.890</td>
<td></td>
</tr>
<tr>
<td>Model 2a*</td>
<td>2928</td>
<td>1162</td>
<td>.000</td>
<td>.959</td>
<td>.955</td>
<td>.944</td>
<td>.941</td>
<td></td>
</tr>
<tr>
<td>Model 4</td>
<td>3219</td>
<td>1166</td>
<td>.000</td>
<td>.955</td>
<td>.950</td>
<td>.938</td>
<td>.935</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Note. GFI = goodness-of-fit index; AGFI = adjusted goodness-of-fit index; NFI = normed fit index; RFI = relative fit index. *Because item 13 had a nonsignificant loading on the hostility factor in model 2a, we tested another model where item 13 was fixed to load only on the social threat factor. However, this model was not significantly better than model 2a (χ² change = 2, df change = 1, p = <.25), and item 13 was kept loading on two factors, which makes different studies using the CATS more comparable.

Next, we examined whether a higher-order factor explained the covariation among first-order factors in a more parsimonious way (Brown, 2006; Marsh & Hocevar, 1985). This is only possible when the first-order factors have high intercorrelations (> .80). Because hostility correlated only moderately with the other first-order factors, it was not included in the higher-order factor. The higher-order model (model 4) therefore included one higher-order factor which explained the first-order factors of social threat, physical threat, and failure. The first-order factors hostility and positive thoughts were allowed to correlate with this higher-order factor. As shown in Table 2, the model fit was good, with fit indices above .93. The target coefficient T (Marsh & Hocevar, 1985) was used to compare the higher-order model to the first-order model. T represents the ratio of the chi-square of a first-order model to the chi-square of the more restrictive model. A target coefficient close to 1 indicates that the higher-order model can effectively explain the correlation between the first-order factors (Marsh & Hocevar). In the current study, the target coefficient was sufficient (T = 0.91). The standardized loadings of each first-order factor on the higher-order factor were all high (see Table 3), ranging from .85 to .97. The percentage of variance explained by the higher-order factor was also high (.73–.95).

In order to facilitate comparisons between different studies, both the original total score of the CTS (“Total negative thoughts”) and the total score of the CATS-N/P without items from the “hostility” and “positive thoughts” factors (Total internalizing negative thoughts) will be reported in the remainder of this article.

Internal Reliability

Internal reliability was calculated with Cronbach’s alpha for all subscales and the original higher-order negative thought scale. Alphas were all satisfactory to good (Physical threat .84; Social threat .89; Failure .87; Hostility .83; Positive thoughts .86; and Total negative thoughts .94). The alpha for the Total internalizing negative thoughts scale was .94.
Intercorrelations between the scales were also calculated (see Table 3). As expected, Social threat, Physical threat, and Failure were highly correlated. Low to moderate correlations were found between Hostility and Positive thoughts and the other first-order factors. Moderate correlations were found between Hostility and Positive thoughts and the higher-order factor.

Table 3. Intercorrelations of factors, standardized loadings of first-order factor on higher-order factor and percentage of explained variance by higher-order factor

<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Standardized loading of first-order factor on higher-order factor</th>
<th>% of variance explained by higher-order factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical threat</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.91</td>
<td>82</td>
</tr>
<tr>
<td>2. Social threat</td>
<td>.76</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>.86</td>
<td>73</td>
</tr>
<tr>
<td>3. Failure</td>
<td>.89</td>
<td>.84</td>
<td>-</td>
<td></td>
<td></td>
<td>.97</td>
<td>95</td>
</tr>
<tr>
<td>4. Hostility</td>
<td>.43</td>
<td>.22</td>
<td>.32</td>
<td>-</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Positive beliefs</td>
<td>-.26</td>
<td>-.39</td>
<td>-.36</td>
<td>.26</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Higher-order</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.34</td>
<td>.38</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Age and Gender Differences
To examine age and gender differences in scores on the CATS-N/P, ANOVAs were carried out for each subscale and the two total scores. A Bonferroni correction was applied to avoid inflation of the type I error rate (α was set at .0071). Normative data for each (sub) scale are presented in Table 4. Significant main effects for age were found for the Total internalizing negative thoughts scale, $F(1, 550) = 22.37, p < .001$, Total negative thoughts, $F(1, 550) = 16.35, p < .001$, Physical threat, $F(1, 550) = 12.75, p < .001$, Social threat, $F(1, 550) = 14.75, p < .001$, and Failure, $F(1, 550) = 27.53, p < .001$. Younger children (aged 8-11 years) reported more negative thoughts on these (sub) scales than adolescents (aged 12-18 years).

A significant main effect for sex was found on the Hostility scale, $F(1, 550) = 35.18, p < .001$, and the Positive thoughts scale, $F(1, 550) = 13.52, p < .001$, indicating that boys reported more hostile but also more positive thoughts than girls.
Table 4. Means (and SD) for the total sample and separate for different age levels and gender

<table>
<thead>
<tr>
<th>Scale</th>
<th>Gender</th>
<th>Age</th>
<th>Total sample</th>
<th>Effect, p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>8-11 years</td>
<td>12-18 years</td>
<td>(M, SD)</td>
</tr>
<tr>
<td>Total negative</td>
<td>Boys</td>
<td>36.82 (24.18)</td>
<td>27.06 (19.35)</td>
<td>30.18 (21.46)</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>31.92 (19.33)</td>
<td>26.34 (21.70)</td>
<td>28.24 (21.05)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>34.25 (21.85)</td>
<td>26.71 (20.54)</td>
<td>29.19 (21.26)</td>
</tr>
<tr>
<td>Total internal</td>
<td>Boys</td>
<td>23.26 (18.77)</td>
<td>13.58 (14.06)</td>
<td>16.68 (16.64)</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>21.57 (15.02)</td>
<td>17.31 (17.32)</td>
<td>18.76 (16.80)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>22.38 (16.88)</td>
<td>15.45 (16.11)</td>
<td>17.74 (16.67)</td>
</tr>
<tr>
<td>Physical</td>
<td>Boys</td>
<td>7.10 (6.73)</td>
<td>4.39 (5.32)</td>
<td>5.26 (5.93)</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>5.81 (4.67)</td>
<td>4.87 (5.88)</td>
<td>5.19 (5.51)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>6.43 (5.76)</td>
<td>4.63 (5.61)</td>
<td>5.23 (5.72)</td>
</tr>
<tr>
<td>Social</td>
<td>Boys</td>
<td>8.09 (6.75)</td>
<td>5.29 (5.88)</td>
<td>6.19 (6.29)</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>9.16 (6.64)</td>
<td>7.34 (7.28)</td>
<td>7.96 (7.11)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>8.65 (6.69)</td>
<td>6.32 (6.69)</td>
<td>7.09 (6.77)</td>
</tr>
<tr>
<td>Failure</td>
<td>Boys</td>
<td>8.07 (7.03)</td>
<td>3.89 (5.06)</td>
<td>5.23 (6.07)</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>6.60 (5.23)</td>
<td>5.09 (6.67)</td>
<td>5.61 (6.25)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>7.30 (6.18)</td>
<td>4.49 (5.94)</td>
<td>5.42 (6.16)</td>
</tr>
<tr>
<td>Hostility</td>
<td>Boys</td>
<td>13.55 (7.15)</td>
<td>13.48 (7.66)</td>
<td>13.50 (7.49)</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>10.34 (6.27)</td>
<td>9.04 (7.00)</td>
<td>9.48 (6.78)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>11.87 (6.87)</td>
<td>11.25 (7.66)</td>
<td>11.46 (7.41)</td>
</tr>
<tr>
<td>Positive</td>
<td>Boys</td>
<td>22.02 (7.55)</td>
<td>24.61 (7.44)</td>
<td>23.78 (7.56)</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>21.34 (8.31)</td>
<td>20.02 (8.35)</td>
<td>20.47 (8.34)</td>
</tr>
<tr>
<td></td>
<td>Combined</td>
<td>21.67 (7.94)</td>
<td>22.30 (8.22)</td>
<td>22.09 (8.13)</td>
</tr>
</tbody>
</table>

Test-Retest Reliability

A sub-sample of 139 (25.1%) children filled out a second CATS-N/P. These children were comparable to the total community sample in terms of sex ($\chi^2(1) = 0.54$, p > .05), mean scores on the CATS-N/P at T1 and mean scores on anxiety measures at T1 (p all > .05). However, children who participated in the retest were slightly younger ($M = 12.13$) than children who did not participate in the retest ($M = 12.69$, $t(552) = 2.65$, p < .05). The reliability of all factor scores and total scores at 7-9 weeks (n = 91, 65.5%) and 10-21 weeks (n = 48, 34.5%) is reported in Table 5. Test-retest reliability at 7-9 weeks was satisfactory (Pearson’s r = .62-.77). Mean scores at the first and second administration only differed for Total negative thoughts ($M = 32.05$ for T1 and $M = 28.04$ for T2, $t(90) = 2.41$, p < .05) and Total internalizing negative thoughts ($M = 19.98$ for T1 and $M = 16.07$ for T2, $t(90) = 2.17$, p < .05). Test-retest reliability at 10-21 weeks was moderate to good (Pearson’s r = .40-.62). Mean scores at the first and second administration
only differed for Total negative thoughts ($M = 26.46$ for T1 and $M = 21.02$ for T2, $t(47) = 2.33, p < .05$) and Social threat ($M = 6.88$ for T1 and $M = 5.23$ for T2, $t(47) = 2.05, p < .05$).

<table>
<thead>
<tr>
<th></th>
<th>Pearson’s $r$ 7-9 weeks</th>
<th>Pearson’s $r$ 10-21 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>.64**</td>
<td>.62**</td>
</tr>
<tr>
<td>Social</td>
<td>.76**</td>
<td>.77**</td>
</tr>
<tr>
<td>Failure</td>
<td>.62**</td>
<td>.40’</td>
</tr>
<tr>
<td>Hostility</td>
<td>.72**</td>
<td>.48’</td>
</tr>
<tr>
<td>Positive</td>
<td>.64**</td>
<td>.62**</td>
</tr>
<tr>
<td>Total negative</td>
<td>.74**</td>
<td>.59**</td>
</tr>
<tr>
<td>Total internal negative</td>
<td>.77**</td>
<td>.61**</td>
</tr>
</tbody>
</table>

* $p < .05$, ** $p < .01$

**Relationship with Symptom Measures**

The convergent and discriminant validity of the CATS-N/P was examined using Pearson’s correlations with self-report and parent-report measures of anxiety and emotional disturbance (Table 6). The mean score on the RCADS was 25.24 ($SD = 17.43$, $n = 542$), and on the CDI 7.74 ($SD = 6.07$, $n = 548$). The mean anxiety score as measured by the STAIC-trait was 34.90 ($SD = 8.71$, $n = 209$); on the STAIC-trait the mean anxiety score was 30.49 ($SD = 7.03$, $n = 343$). A total of 41 children (10.2%) had a score in the clinical range on the SDQ total ($M = 6.75$, $SD = 5.13$).

All correlations were significant and in the expected direction. However, correlations did not differentiate between anxiety and depression measures.

**Discussion**

In this study we investigated an adapted version of the Children’s Automatic Thoughts Scale, the CATS-Negative/Positive (CATS-N/P), in a non-referred community sample. In order to enhance the applicability of the CATS in studying the cognitions of children with different disorders, we added an extra subscale containing positive thoughts. The main research question of the current study was whether the factor structure and the psychometric properties of the new CATS-N/P were satisfactory.

Although some modifications in the factor structure were made, the factor structure and internal reliability of the CATS-N/P in the current sample was almost equal to the results of earlier studies using the CATS (Schniering & Rapee, 2002, 2004). Although the fit indices found
in the current study were a little smaller than in earlier studies (Schniering & Rapee, 2002, 2004), the original four-factor structure of the CATS was supported in a Dutch sample. The major difference between the findings of the current study and earlier results was the addition of an extra “positive thoughts” factor. In addition, three Hostility items were found to cross-load on other factors. Closer examination of the three items revealed that these cross-loadings seemed to have face validity. The three items were all negative thoughts about hostility directed at the child itself (e.g., “Most people are against me”). In contrast, the remaining seven Hostility items described thoughts about hostility directed at other persons and focused on revenge or other people being bad or stupid (“Bad people deserve to be punished”). Another difference between the current study and earlier results is that in the current study the Hostility factor only correlated modestly with the other factors. Therefore, it was not appropriate to use a higher-order factor including items from the Hostility factor or to calculate a Total score including Hostility items. Indeed, in earlier studies the Hostility factor was also found to display the lowest intercorrelations and factor loadings relative to other factors (Schniering & Rapee, 2002, 2004). However, the three aforementioned items were not seen to be problematic in earlier studies (Schniering & Rapee, 2002, 2004). The results found in this study regarding the Hostility items may reflect a shift in the underlying structure caused by the addition of the positive items. Another possibility is that due to the translation, children interpreted the items slightly different than in the English version. Based on the current findings, and to facilitate comparisons between different studies using the CATS, we recommend using and reporting two different negative thoughts Total scores: one with and one without Hostility items. Indeed, this is in line with the findings from other studies using the CATS, which have found that children with internalizing disorders (anxiety and depression) report more negative thoughts concerning Physical threat, Social threat, and Failure, while children with behavior disorders score higher on Hostile intent (Schniering & Rapee, 2002).

The new positive items showed good internal reliability and high factor loadings. As expected, the Positive thoughts scale correlated negatively with almost all other subscales. However, the Positive thoughts scale was positively correlated with the Hostile thoughts scale. A possible explanation for this finding may be that both types of items share a common feature: assertive/extrovert or externalizing thoughts. Indeed, the higher-order model found in the current study seems to suggest that the CATS-N/P has three different types of items: items reflecting negative, internalizing self-statements (including separate social threat, physical threat, and failure items); items reflecting negative externalizing self-statements (hostility) and items reflecting positive self-statements.

The second research question in this study was whether the test-retest reliability of the CATS-N/P was satisfactory. Although the short-term reliability of the CATS-N/P was good and comparable to earlier results with the CATS (Schniering & Rapee, 2002), the reliability at a longer interval was only moderate to good. However, there were some practical constraints which may have influenced the results of the test-retest analysis. First, the retest occurred across
a broad time frame, which makes it difficult to interpret the results. Second, because of the school holidays, some children did the retest at home without supervision. The administration of the measure in different settings might have influenced the answers (e.g., at home there was less group pressure). Moreover, during the school holidays, children were probably less exposed to events involving threat, potential failure, and hostility from peers than during normal school days. This may have resulted in a temporary decrease in the occurrence of their negative thoughts. Third, there was a selection bias, in that children did not automatically participate in the second part of the study and had to give separate consent for the retest. Due to the aforementioned constraints, the stability of the CATS-N/P over longer periods of time should be further investigated.

The third research question explored in this study was whether the convergent and discriminant validity of the CATS-N/P was satisfactory. As expected, the Positive thoughts subscale was negatively associated with measures assessing anxious and depressive symptoms. Furthermore, the correlations between Physical Threat, Social Threat, Failure, and Total scores and the anxiety and depression measures were all high. Hostility correlated only moderately with these measures. This result was in line with previous studies which demonstrated that Hostility distinguished between children with internalizing problems and children with behavior problems (Schniering & Rapee, 2002). The low correlations between the CATS-N/P subscales and the emotional subscale of the SDQ may be explained by the fact that the SDQ measures global emotional problems. Moreover, the SDQ was filled out by the parents, while the CATS-N/P was filled out by the children.

Unexpectedly, the correlations found between the CATS-N/P and both anxiety and depression measures were equally strong. This result was in contrast to earlier research, which found that the CATS subscale Failure discriminated between depressed and anxious children (Schniering & Rapee, 2002). In the current study, however, the assessment of the validity of the CATS-N/P was based on correlations between different subscales of the CATS-N/P and different symptom measures in a non-referred sample, rather than differences between clinically anxious, depressed, or behaviorally disturbed children. Therefore, the current sample may have been too homogeneous to find differences between anxiety and depression. This may especially have been the case, given that the correlation between anxiety and depression symptoms is known to be high (Costello et al., 2003). Of course, another possibility is that the CATS-N/P is not able to discriminate between anxiety and depression.

Finally, we examined age and gender differences in mean scores on the different CATS-N/P subscales. First of all, the mean scores are substantially lower overall (about 8 points for Total score and 2 points for all subscales) than in the community sample as described by Schniering and Rapee (2002). Although the groups used in the current study and the study by Schniering and Rapee (2002) seem comparable in terms of age, gender, and socioeconomic status, the difference in mean scores between the two studies might be explained by cultural differences. Moreover, the translation and extra positive items might have influenced responding style.
However, the means found in the current study are higher (about 11 points for the Total score) than the means found in a Dutch control sample described by Bodden and Bögels (2006). This difference in mean scores cannot be due to the translation, but interregional variations and the smaller sample size used by Bodden and Bögels may account for the difference. In clinically anxious groups, large differences in mean scores between separate studies have also been found (e.g., Bodden & Bögels; Schniering & Lyneham, 2006; Schniering & Rapee, 2002). Further research should aim to investigate the possibility that the CATS or CATS-N/P may be very sensitive to sample characteristics.

The age differences in this study were rather unexpected. In contrast with earlier results (Bodden & Bögels, 2006; Schniering & Lyneham, 2006), younger children reported more negative thoughts on some scales than older children. Although one would expect older children to worry more about social threat and failure, the group setting in which these data were collected may have led to underreporting thoughts because of social concerns. As for sex differences, the results of the current study are similar to those found in earlier studies, in that boys reported more hostile thoughts and positive thoughts than girls. These findings may reflect that boys in general display more externalizing behavior (Costello et al., 2003) and are more self-confident than girls (Birndorf, Ryan, Auinger, & Aten, 2005).

Because some cross-cultural differences were found regarding the overall mean scores and differences between age groups, the generalizability of the CATS and CATS-N/P to other countries and/or cultures is uncertain. Therefore, norm tables from different samples should be interpreted cautiously. Another limitation of this study is that the factor structure and psychometric properties of the measure were not evaluated in a clinical group. Future studies should therefore focus on further establishing the discriminant validity and psychometric properties of the CATS-N/P, for example by comparing non-clinical and clinical groups with different disorders (e.g., anxiety disorders, depression, behavior disorders). Moreover, it would be interesting to examine whether the CATS-N/P can predict treatment change and whether the Positive thoughts subscale can discriminate between clinically anxious and depressed children.

The CATS-N/P is an adapted and innovative version of the CATS designed specifically to measure positive and negative thoughts in children. This was the first study to apply the CATS-N/P in a large community sample in the Netherlands. The psychometric properties of the new measure were found to be good and the added positive items formed a psychometrically sound factor. Therefore, the CATS-N/P can be a valuable tool for the facilitation of research into the role of cognitive factors in the development and maintenance of different childhood disorders. Moreover, the use of the CATS-N/P in a clinical setting might improve the insight of the clinician in the amount of dysfunctional thoughts of a child pre-treatment and whether cognitions change over the course of treatment (especially after cognitive restructuring).
Acknowledgement

We would like to thank all participating schools, children, and parents for their help, as well as the students who helped collect the data: T. Koolstra, M. Oudega, and A. Tillema. We are grateful to D. Bracke, C. Braet, C. Schniering, and R. Rapee for allowing us to use (parts of) their questionnaires; G. de Boo for her suggestions regarding the CFA; F. M. Sauter for reviewing the article and the positive items, and all reviewers for their clear and thoughtful comments.
Chapter 6

Positive thinking in anxiety disordered children reconsidered

Abstract

Negatively valenced thoughts are assumed to play a central role in the development and maintenance of anxiety. However, the role of positive thoughts in anxiety is rather unclear. In the current study we examined the role of negative and positive self-statements in the anxiety level of anxious and non-anxious children. Participants were 139 anxiety disordered children and 293 non-anxious children (8-18 years). Compared to non-anxious children, anxious children reported more negative thoughts, less positive thoughts and lower State of Mind (SOM) ratios (ratio of positive to negative thoughts). Negative thoughts and SOM ratios were the strongest predictors of anxiety level in anxious children; whereas both negative and positive thoughts were the strongest predictors of anxiety level in non-anxious children. To conclude, a lack of positive thoughts might be more than just an epiphenomenon of anxiety level and might deserve a place in the cognitive model of anxiety.
Introduction

Cognitions play an important role in theories about the development and treatment of anxiety disorders. The cognitive model was originally developed for adults and assumes that anxious individuals process external and internal stimuli in a biased way, resulting in a variety of cognitive errors (e.g., overgeneralization, personalizing, selective abstraction; Beck, 2005). Negatively valenced thoughts (exaggerated perception of danger and threat) and an underestimation of one’s ability to cope with these threats (Kendall & Chansky, 1991) are associated with these biased interpretations. Cognitive therapy is based on the cognitive model and focuses on identifying and restructuring biased negative thoughts and interpretations.

The cognitive model has been adopted to explain the development of anxiety in children and adolescents (hereafter children) and cognitive-behavioral techniques are used in the treatment of childhood anxiety disorders. The main focus of studies examining the cognitive model in children has been on negative thoughts, and not on positively valenced thoughts. Kendall (Kendall, 1984) observed that “…various operationalizations of psychological adjustment are related not so much to positive thinking as to the absence of negative thinking” (p. 61). In addition, he suggests that improvement during treatment is associated with a reduction of negative thoughts rather than an increase of positive thoughts. This phenomenon has been called the “Power of Nonnegative Thinking” (Kendall & Chansky, 1991).

Indeed, studies have found a connection between the presence of negative thoughts and anxiety, for example in clinically anxious adults (Beazley, Glass, Chambless, & Arnkoff, 2001), in clinically anxious children (Kendall & Chansky, 1991; Schniering & Rapee, 2002) and in non-referred children (Muris, Merckelbach, Mayer, & Snieder, 1998). However, when both negative and positive thoughts are considered, results have been inconclusive (Alfano, Beidel & Turner, 2002). Several studies support the Power of Nonnegative Thinking hypothesis and report that anxiety is associated with more negative thoughts, but not with less positive thoughts, for example in non-referred students (Calvete & Connor-Smith, 2005; Wong, 2010), in clinically anxious children (Kendall & Treadwell, 2007; Treadwell & Kendall, 1996) or in non-referred children (Brophy & Erickson, 1990; Prins, 1986; Prins & Hanewald, 1997). However, other studies have found that anxiety is associated with both more negative thoughts and less positive thoughts, for example in anxious children (Ronan & Kendall, 1997) or in normal children (Calvete & Cardenoso, 2002; Zatz & Chassin, 1985).

It may well be that not the absolute number of negative and positive thoughts are predictive of psychological well-being, but rather the relative balance of positive and negative thoughts, as Schwartz and Garamoni (Schwartz, 1986; Schwartz & Garamoni, 1989) suggest in their States of Mind (SOM) model. In the original SOM model, the optimal balance between positive and negative thoughts (amount of positive thoughts divided by the sum of positive and negative thoughts) was .62, in a theoretical range of 0 to 1.00. In a reformulated version of the model (Schwartz, 1997) seven distinct SOM categories are included that differentiate between optimal,
healthy, subnormal and pathological balances of positive and negative thoughts (see Table 1 for an overview). The Positive dialogue, with a ratio between .67 and .90 is considered the most optimal ratio. The Conflicted dialogue, with a ratio between .42 and .58 is supposed to be associated with anxiety and depression. The SOM ratio has several advantages over the use of separate negative and positive thoughts: it examines the relative balance of positive and negative thoughts, fewer variables (i.e. just one composite score) are needed in statistical analyses and the ratio is standardized (Amsel & Fichten, 1998).

Table 1. States of Mind (SOM) categories with ranges of SOM ratios, set points and their meaning

<table>
<thead>
<tr>
<th>SOM Category</th>
<th>Range</th>
<th>Set point</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Monologue</td>
<td>.91-1.00</td>
<td>None</td>
<td>Unhealthy balance: excessive positivity, mania, unrealistic optimism.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.81 (optimal)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.72 (normal)</td>
<td></td>
</tr>
<tr>
<td>Successful Coping</td>
<td>.59-.66</td>
<td>.63</td>
<td>Subnormal balance: realistic and positive balance in healthy persons in stressful situations.</td>
</tr>
<tr>
<td>Conflicted Dialogue</td>
<td>.42-.58</td>
<td>.50</td>
<td>Associated with doubt, ambivalence and mild anxiety / depression.</td>
</tr>
<tr>
<td>Failed Coping Dialogue</td>
<td>.34-.41</td>
<td>.38</td>
<td>Associated with moderate anxiety / depression, worry, guilt.</td>
</tr>
<tr>
<td>Negative Dialogue</td>
<td>.10-.33</td>
<td>.28 (low negative)</td>
<td>Associated with hopelessness and severe anxiety / depression.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.19 (moderate)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.13 (high negative)</td>
<td></td>
</tr>
<tr>
<td>Negative Monologue</td>
<td>.00-.09</td>
<td>None</td>
<td>Unstable ratio, associated with pure and immediate panic and profound anxiety / depression.</td>
</tr>
</tbody>
</table>

Studies have supported the SOM model in a range of adult samples including healthy students or adults (Calvete & Connor-Smith, 2005; Garamoni et al., 1991), people with test-anxiety (Diaz, Glass, Arnkoff, & Tanofsky-Kraff, 2001) or subclinical social fear (Sturmer, Bruch, Haase, & Amico, 2002); but also in adult clinical samples with social phobia (Beazley et al., 2001), agoraphobia (Michelson, Schwartz, & Marchione, 1991) or depression (Garamoni et al., 1991). These studies have consistently shown that lower SOM ratios (in the Conflicted dialogue, Failed Coping dialogue or Negative dialogue, see Table 1) are associated with more psychological problems, that SOM ratios can differentiate between clinical and control samples (e.g. Garamoni et al., 1991; Nasby & Russell, 1997), and that SOM ratios are treatment sensitive...
As far as we know, the SOM model has been tested seven times in children or adolescents: in five non-referred samples (Calvete & Cardenoso, 2002; Calvete & Cardenoso, 2005; Daleiden, Vasey, & Williams, 1996; Prins & Hanewald, 1997; Ronan & Kendall, 1997) and in two clinically anxious samples (Kendall & Treadwell, 2007; Treadwell & Kendall, 1996). The results were similar to adult studies: all found a significant relation between SOM ratios and internalizing problems. SOM ratios of the two clinically anxious samples were .59 in one study (Kendall & Treadwell, 2007) and .58 in the other (Treadwell & Kendall, 1996), which is on the boundary between the Successful Coping dialogue and the Conflicted dialogue category. SOM ratios of non-anxious or low-anxious children ranged between .61 and .73, which is in the Successful Coping dialogue or the Positive dialogue (see Table 1). However, all studies with clinical samples only included children with a restricted age range, e.g. 8-13 years old. Further, most studies used a questionnaire that measures affect and therefore fail to distinguish between thoughts and anxiety symptoms. This is important as the overlap in item content might artificially inflate the correlation between the “cognition” measure and the symptom measure, especially for negative thoughts as most symptom measures do not incorporate positively valenced items. Finally, the SOM ratios in some studies (including those with clinical child samples) were restricted to a range of .17 to .83 (instead of 0 to 1) because SOM ratios were not based on an answering scale with an end point of 0. Amsel and Fichten (1998) proved that answering scales with end points of 1 to 5 restrict the range of the SOM ratio. They therefore recommended calculating the SOM ratio based on an answering scale with an end point of 0 to 4.

To summarize, there are only a few studies that examined the role of both negative and positive thoughts and the SOM ratio in clinically anxious children and most of these used a questionnaire that measured affect instead of thoughts. In the present study we investigated the role of positive and negative thoughts in anxiety by comparing a large group of anxiety disordered children with a non-anxious control sample on negative and positive thoughts and SOM ratio. We used a questionnaire with an answering scale between 0 and 4 that measured different negative and positive thoughts. First, following the cognitive model and the Power of Nonnegative Thinking hypothesis we expected anxious children to have more negative, but not less positive thoughts than normal controls. Second, we expected anxious children to have a lower SOM ratio than normal controls. In addition, for anxious children we expected SOM ratios to fall in the “Conflicted dialogue”, associated with anxiety or depression. For the control sample we expected a SOM ratio in the “Positive dialogue” or “Successful Coping dialogue”, associated with healthy psychological adjustment or coping with stressful situations. Finally, we expected that in both groups negative thoughts and SOM ratios would be better predictors of anxiety level than positive thoughts.
Method

Participants
The anxious group consisted of 140 children (mean age 12.55, SD = 2.84, range 8-18 years) referred to one of two centers for child and adolescent psychiatry in the Netherlands (UCKJP/ Accare and AMC/de Bascul). They participated in a larger study on the mechanisms of change of cognitive behavioral therapy (CBT) in childhood anxiety disorders. Children were included in the study when they were diagnosed with a primary anxiety disorder according to the Anxiety Disorders Interview Schedule for Children (ADIS-C; Silverman & Albano, 1996) with exception of OCD or PTSS. Exclusion criteria were suicidal ideation, use of an SSRI, earlier CBT in the previous half year, an IQ below 80, or problems with drugs or alcohol. Written informed consent was obtained from all parents, and children older than eleven years. Informed assent was obtained from children younger than twelve years.

The control group initially consisted of 554 children and adolescents from several public secondary schools and elementary schools in rural and urban areas of the Netherlands. This group participated in a validation study of the Children’s Automatic Thoughts Scale-Negative/Positive (CATS-N/P). Detailed sample characteristics of this group are described elsewhere (Hogendoorn et al., 2010). Children in this group were screened for emotional problems with the SDQ (Strength and Difficulties Questionnaire, Goodman, 1997; Dutch version Van Widenfelt, Goedhart, Treffers, & Goodman, 2003) and the STAIC-trait (Spielberger State Trait Inventory for Children-trait subscale; Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973). Children with a clinical score on the Emotional subscale or the Total problems scale of the SDQ and/or who scored in the highest range of the STAIC trait (decile 9 or 10) were excluded. The SDQ and STAIC were available for 399 children (72.0%). Of those, 62 children received a clinical score on the SDQ and 39 children scored in decile 9 or 10 on the STAIC-trait. Consequently, the final control sample consisted of 298 children with a mean age of 12.57 years (SD = 2.13, range 8-18 years), of whom 142 (47.7%) were boys.

Measures
Anxiety Disorders Interview Schedule for DSM-IV- Child Version (ADIS-C; Silverman & Albano, 1996). All children in the anxious sample were diagnosed with the ADIS-C. The ADIS-C is a widely used, reliable and valid semi-structured interview that assesses the prevalence and severity of different DSM-IV disorders, with a focus on anxiety disorders. Children and parents were separately interviewed by trained and experienced psychologists. Clinicians rated severity of symptoms based on interference with daily life and internal distress on a 9-point scale, ranging from 0 to 8. A CSR (Clinician Severity Rating) of four or higher is indicative of a clinical diagnosis.

Spielberger State Trait Inventory for Children-trait subscale (STAIC-trait; Spielberger et al., 1973). The STAIC trait subscale has 20 items and measures trait anxiety level in children aged
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7-14 years old. The adult version of the scale (STAI-trait; Spielberger, 1983) was used in the current study with children aged 15 years and older. Scores on the STAI-trait range from 20-60. On the STAI-trait the range is 20-80. Higher scores reflect higher levels of trait anxiety in both scales. The STAIC-trait and STAI-trait have been widely used and shown to have satisfactory psychometric properties (see for the Dutch versions respectively Bakker, Van Wieringen, Van der Ploeg, & Spielberger, 1989 and Van der Ploeg, 2000). The Cronbach's alphas in the current study were .85 (anxious sample) and .71 (control sample) for the STAIC-trait and .93 (anxious sample) and .78 (control sample) for the STAI-trait.

Revised Child Anxiety and Depression Scale-Child Version (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000). The original RCADS is a 47-item self-report questionnaire which measures anxiety and depression symptoms in children and adolescents. The RCADS possesses good internal reliability (with Cronbach's alphas of .73-.82), moderate to good one-week test-retest reliability, and good convergent and discriminant validity (Chorpita et al., 2000; Chorpita, Moffitt, & Gray, 2005). We adapted the RCADS for this study in two ways. First, we only used the subscales that reflected the primary anxiety diagnoses of the children (Separation Anxiety Disorder, Social Phobia, Generalized Anxiety Disorder and Panic Disorder). The subscales Obsessive Compulsive Disorder and Major Depressive Disorder were not used. Second, a "cognition free" version of the RCADS was used, because there is a substantial overlap in item content between the RCADS and CATS-N/P (see below). Four authors (SH, EdH, PP, FB) independently classified each item of the RCADS as being an anxious thought or a symptom of anxiety. Next, items were discussed until agreement was reached. The resulting "cognition free RCADS scale" consists of 19 items. Higher scores (range 0 to 57) reflect more anxiety symptoms. Cronbach's alpha in the current sample was .88 for the anxious children and .81 in the control group.

Children's Automatic Thoughts Scale-Negative/Positive (CATS-N/P, Hogendoorn et al., 2010). The CATS-N/P was used to measure negative and positive thoughts across both internalizing and externalizing problems. The CATS-N/P is an adaptation of the CATS developed by Schniering & Rapee (2002). The self-report questionnaire consists of 50 items which are scored on a five-point scale from "not at all" (0) to "all the time" (4). Four subscales (ten items each) represent negative thoughts with different cognitive content corresponding to Physical threat, Social threat, Personal failure and Hostility. The original CATS was composed of these four subscales. For the CATS-N/P we added ten items with positive thoughts (see Hogendoorn et al., 2010), which form the subscale Positive thoughts. The positive thoughts were selected from the Flemish PNG-k (Positieve en Negatieve Gedachten bij kinderen; Bracke & Braet, 2000). The subscales Physical threat, Social threat and Personal failure are summed up to form a Total score (CATS-N/P Total score). The Positive thoughts subscale is independent of the other four subscales and of the CATS-N/P Total score. The SOM ratio was calculated by dividing the amount of positive thoughts by the amount of positive and negative thoughts (positive /

14 Correlations between the cognition free RCADS and the CATS-N/P were lower than between the original RCADS and CATS-N/P, decreasing the problem of multicollinearity. However, all results were the same for both RCADS versions.
positive + negative thoughts). We did this separately for the three anxiety related subscales with negative thoughts (SOM-Physical threat, SOM-Social threat and SOM-Personal failure). The same positive thoughts (from the CATS-N/P Positive subscale) were used in the calculation of each SOM ratio. As is recommended by Amsel & Fichten (1998), a score of 1 was added to the subscale when children reported neither positive nor negative thoughts. Otherwise, the ratio would be restricted to 0 (when there are zero positive thoughts) or 1 (when there are zero negative thoughts).

The CATS-N/P possesses good internal reliability (Cronbach’s alphas range from .83 to .94), moderate to good test-retest reliability (Pearson’s $r = .61-.77$ for the Total score) and satisfactory convergent validity (Hogendoorn et al., 2010). Cronbach’s alphas in the current sample ranged from .86 to .94 in the anxious group and from .79 to .89 in the control group.

**Procedure and Data Analysis**

Anxious children and their parents were interviewed with the ADIS-C/P by experienced psychologists. Children filled out the questionnaires under supervision, prior to the start of their treatment. Children in the control group completed the questionnaires in their classroom under supervision of research assistants. Supervision entailed an instruction how to complete the questionnaires and explaining unknown words when necessary. Their parents completed the SDQ and a demographic questionnaire at home.

Prior to analysis, data were screened for outliers and violations of normality, including skewness, kurtosis, and homogeneity of variance. When data were not normally distributed, nonparametric tests were used. A Bonferroni correction was applied to avoid inflation of the type I error rate. Alpha was set at .0083 when comparing the different subscales of the CATS-N/P and it was set at .017 when comparing SOM ratios. Cohen’s $d$ is reported as an effect size for the between-group comparisons. Cohen’s $d$ of .20, .50 and .80 are considered as small, medium and large effects respectively.

**Results**

**Sample Descriptives**

Inspection of the data revealed that there were six multivariate outliers (score > 3 $SD$) on different measures and subscales of the CATS-N/P: one in the anxious group and five in the control group. These cases were removed, which resulted in a sample size of 139 anxious children and 293 children in the control group. In general, data were positively skewed and homogeneity of variance was violated in most cases, therefore non-parametric tests were used.

All anxious children had an anxiety disorder according to the ADIS-C. Mean CSR score for the primary diagnosis was 6.33 ($SD = 1.05$), range 4 to 8. Primary diagnoses were Social Phobia (SP, 33.8%), Separation Anxiety Disorder (SAD, 11.5%), Specific Phobia (Phobia, 23.7%),
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Generalized Anxiety Disorder (GAD, 21.6%) and Panic Disorder with or without Agoraphobia (PD, 9.4%). The total number of diagnoses per child ranged from 1 to 6 (mean 2.23, SD 1.33). Fifty-four children (38.8%) had only one anxiety disorder; 66 children (47.5%) had one or more comorbid anxiety disorders, 12 children (8.6%) had a comorbid mood disorder (Major Depression or Dysthymia) and 7 children (5%) had a comorbid behavior disorder (ADHD).

Table 2. Sample characteristics, anxiety level and CATS-N/P scores for the anxious and the control sample

<table>
<thead>
<tr>
<th></th>
<th>Anxious  (n = 139)</th>
<th>Control (n = 293)</th>
<th>Difference test, effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td>138</td>
<td>278</td>
<td>χ²(1)=5.27, V = .11</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Educational Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>33</td>
<td>73</td>
<td>χ²(3)=6.75, V = .13</td>
</tr>
<tr>
<td>Medium</td>
<td>58</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>39</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td>Father</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>31</td>
<td>69</td>
<td>χ²(3)=3.99, V = .10</td>
</tr>
<tr>
<td>Medium</td>
<td>42</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>45</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>61</td>
<td>140</td>
<td>χ²(1)=0.58, V = .04</td>
</tr>
<tr>
<td>Girls</td>
<td>78</td>
<td>153</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>12.55 (2.84)</td>
<td>12.00 (2.14)</td>
<td>U=20276.50, d = 0.00</td>
</tr>
<tr>
<td>STAI-C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxious</td>
<td>46</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td>103</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATS-N/P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical threat</td>
<td>6.96 (7.03)</td>
<td>5.00 (4.11)</td>
<td>U=14612.50***, d = 0.63</td>
</tr>
<tr>
<td>Social threat</td>
<td>8.08 (8.06)</td>
<td>5.23 (4.40)</td>
<td>U=17065.50**, d = 0.49</td>
</tr>
<tr>
<td>Failure</td>
<td>7.56 (7.53)</td>
<td>3.61 (3.74)</td>
<td>U=14003.50***, d = 0.75</td>
</tr>
<tr>
<td>Hostility</td>
<td>7.91 (7.03)</td>
<td>9.91 (6.60)</td>
<td>U=16884.00***, d = 0.30</td>
</tr>
<tr>
<td>Positive</td>
<td>15.92 (8.84)</td>
<td>23.05 (7.51)</td>
<td>U=13068.00***, d = 0.90</td>
</tr>
<tr>
<td>Total score</td>
<td>22.62 (19.27)</td>
<td>12.50 (10.31)</td>
<td>U=14035.50***, d = 0.73</td>
</tr>
<tr>
<td>SOM-Ph</td>
<td>0.70 (0.22)</td>
<td>0.74 (0.12)</td>
<td>U=11192.00***, d = 1.00</td>
</tr>
<tr>
<td>SOM-Soc</td>
<td>0.67 (0.25)</td>
<td>0.73 (0.14)</td>
<td>U=13749.50***, d = 0.78</td>
</tr>
<tr>
<td>SOM-Fail</td>
<td>0.68 (0.24)</td>
<td>0.73 (0.12)</td>
<td>U=11333.50***, d = 1.06</td>
</tr>
</tbody>
</table>

Note. SOM-Ph = SOM ratio for Physical threat; SOM-Soc = SOM ratio for Social threat; SOM-Fail = SOM ratio for Failure. d = Cohen’s d, V = Cramer’s V.

*a* for STAI: Anxious n = 46; Controls n = 103; *n* for STAIC: Anxious n = 93; Controls n = 190. *** p < .001; ** p < .01.
There were no differences between the anxious group and the control group on age, gender, nationality or educational level of parents (see Table 2). Most children were Dutch; other backgrounds were Turkish or Moroccan. Anxious children had significantly higher anxiety scores on the RCADS and the STA1-(C) trait subscale.

**Negative and Positive Thoughts in Anxious and Control Children**

Differences between anxious and control children on thoughts as measured with the CATS-N/P were analyzed with Mann-Whitney tests (see Table 2). Anxious children reported more negative thoughts concerning physical threat, social threat and failure, and more negative thoughts in general (total score). Further, anxious children reported less positive thoughts and less hostile thoughts than children in the control sample. The effect sizes were in the moderate to large range (see Table 2). We also examined the interaction with age level in multiple two-way factorial ANOVAs with CATS-N/P subscales as dependent variable and group (anxious/control) and age (≤ 12 years / ≥ 12 years) as independent variables. The interaction effect was not significant for physical threat, social threat and total negative thoughts, indicating that anxious children, independent of their age, reported more negative thoughts in total and concerning physical threat and social threat. However, the interaction effect was significant for the failure, hostile and positive subscales. Anxious children reported more failure thoughts and less hostile thoughts and less positive thoughts, but only when they were twelve years old or older. In younger children there were no differences between groups on these subscales.

Anxious children had lower SOM ratios on all subscales (physical threat, social threat and failure) than non-anxious children (see Table 2). Again, the interaction effect with age was significant: the difference between anxious and non-anxious children was larger in the older age group than in the younger group. The SOM ratios of anxious children ranged between .67 and .70, which corresponds to the Positive dialogue category. The SOM ratios of the non-anxious children (range .81-.86) were significantly higher, but also in the Positive dialogue category. All scores (medians) were tested against three different set points within the Positive dialogue with the Wilcoxon Signed Rank test. The SOM ratios for the anxious children were not significantly different from the normal set point (.72): SOM-physical $W = 4607.00, p > .05$; SOM-social $W = 4173.00, p > .05$; SOM-failure $W = 4213.00, p > .05$. However, the ratios were significantly smaller than the optimal (.81) and superoptimal (.88) set point (all $ps < .001$). For the non-anxious group, SOM ratios were related to different set points. The SOM-physical and SOM-failure were not different from the superoptimal set point, respectively $W = 19898.00, p > .05$ and $W = 19986.00, p > .05$. They were larger than the normal and optimal set point (all $ps < .001$). The SOM-failure in the control group was not different from the optimal set point, $W = 23030.00, p > .05$. It was larger than the normal set point ($p < .001$) and smaller than the superoptimal set point ($p < .001$).
Table 3. Summary of hierarchical multiple regression analysis for variables predicting anxiety level in anxious and control children, \(N = 425\)

<table>
<thead>
<tr>
<th>Step 1</th>
<th>(\beta (\text{SE}))</th>
<th>(\beta)</th>
<th>Model</th>
<th>(\Delta R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>(F(3,421) = 65.40^{**})</td>
<td>.32^{**}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.24 (2.01)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>8.31 (0.68)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.29 (0.13)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>3.89 (0.64)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>(F(4,420) = 146.72^{**})</td>
<td>.27^{**}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-4.64 (1.58)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>5.38 (0.56)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.35 (0.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>2.52 (0.51)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATS-N/P Negative</td>
<td>0.30 (0.02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>(F(5,419) = 119.85^{**})</td>
<td>.01*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-1.86 (1.96)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>4.92 (0.59)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.30 (0.11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>2.31 (0.51)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATS-N/P Negative</td>
<td>0.29 (0.02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATS-N/P Positive</td>
<td>-0.08 (0.03)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 4</td>
<td>(F(8,416) = 77.87^{**})</td>
<td>.01*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.06 (4.27)</td>
<td></td>
<td></td>
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<tr>
<td>Group</td>
<td>4.75 (0.60)</td>
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</tr>
<tr>
<td>Age</td>
<td>0.30 (0.11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>2.34 (0.51)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATS-N/P Negative</td>
<td>0.30 (0.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATS-N/P Positive</td>
<td>-0.11 (0.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOM-Ph</td>
<td>-6.26 (2.93)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOM-Soc</td>
<td>4.85 (2.55)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOM-Fail</td>
<td>2.77 (2.86)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. CATS-N/P Negative = CATS-N/P Total score including negative thoughts concerning Physical threat, Social threat and Personal failure. SOM-Ph = SOM ratio for Physical threat; SOM-Soc = SOM ratio for Social threat; SOM-Fail = SOM ratio for Failure.

*** \(p < .001\), ** \(p < .01\), * \(p < .05\).

Predictors of Anxiety Level

To examine whether negative thoughts, positive thoughts or SOM ratios were predictive of anxiety level, three different regression analyses were performed. First, a hierarchical multiple
regression analysis was performed with anxiety level (cognition free RCADS) as dependent variable. All children (anxious and control) were included in this study. To correct for the possible influence of group status, age and gender, these variables were entered in the first step. Negative thoughts (CATS-N/P Total score, composed of the subscales Physical threat, Social threat and Personal Failure) were entered in the second step; positive thoughts (CATS-N/P Positive thoughts) were entered in the third step and SOM ratios (SOM-physical threat; SOM-social threat; and SOM-personal failure) were entered in the fourth step. SOM ratios were entered together as we did not have a priori expectations of the importance of one SOM ratio over another. Results for the different models are displayed in Table 3. The final model significantly predicted anxiety level, $F(8, 416) = 77.87, p < .001$ and explained 60% of the variance in anxiety level. Children with an anxiety disorder ($\beta = .28$), older children ($\beta = .09$) and girls ($\beta = .15$) had higher anxiety levels. However, controlling for these variables, higher anxiety level was predicted by more negative thoughts ($\beta = .55$), less positive thoughts ($\beta = -.12$) and lower SOM ratios of thoughts concerning physical threat ($\beta = -.14$).

To examine whether thoughts differentially predicted anxiety level in the clinically anxious or the non-anxious sample, two separate hierarchical multiple regression analyses were performed with anxiety level (cognition free RCADS score) as dependent variable. The predictors were the same, except for group status which was not added in the first step. The results are displayed in Table 4. In the anxious sample the final model explained 58% of the variance in RCADS scores, $F(7, 131) = 40.84, p < .001$. More negative thoughts ($\beta = .62$) and a lower SOM ratio of physical threat thoughts ($\beta = -.31$) were significantly related to more anxiety symptoms. Positive thoughts were not predictive of anxiety level ($\beta = -.03$). In the non-anxious sample the final model explained 33% of the variance in RCADS scores, $F(4, 281) = 33.91, p < .001$. Age and gender predicted anxiety level: older children ($\beta = .12$) and girls had higher scores ($\beta = .26$). More negative thoughts ($\beta = .44$) and less positive thoughts ($\beta = -.15$) were also significantly predictive of anxiety level. The inclusion of SOM ratios had no additional value ($\beta$s ranged from -.01 to .07).

**Discussion**

This study examined the role of negative and positive thoughts as incorporated in the Power of Nonnegative Thinking hypothesis and in the SOM model in anxious and non-anxious children. We found support for the role of negative thoughts in childhood anxiety: anxious children reported more negative thoughts than non-anxious children. Anxious children also reported less positive thoughts and lower SOM ratios than non-anxious children, but only when they were twelve years or older. Furthermore, negative thoughts and SOM ratios were the strongest predictors of anxiety level in anxiety disordered children; but both negative and positive thoughts were the strongest predictors of anxiety level in non-anxious children.
Table 4. Summary of multiple hierarchical regression analyses for variables predicting anxiety level (RCADS scores) in an anxious sample (n = 139) and a control sample (n = 286)

<table>
<thead>
<tr>
<th>Step</th>
<th>Anxious Sample</th>
<th>Control Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (SE)</td>
<td>B</td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.49 (4.13)</td>
<td>.09**</td>
</tr>
<tr>
<td>Age</td>
<td>0.45 (0.28)</td>
<td>.13</td>
</tr>
<tr>
<td>Gender</td>
<td>4.88 (1.60)</td>
<td>.25**</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.65 (2.94)</td>
<td>.46***</td>
</tr>
<tr>
<td>Age</td>
<td>0.32 (0.20)</td>
<td>.09</td>
</tr>
<tr>
<td>Gender</td>
<td>1.40 (1.18)</td>
<td>.07</td>
</tr>
<tr>
<td>CATS-Neg</td>
<td>0.35 (0.03)</td>
<td>.70***</td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>2.30 (3.55)</td>
<td>.00</td>
</tr>
<tr>
<td>Age</td>
<td>0.30 (0.21)</td>
<td>.09</td>
</tr>
<tr>
<td>Gender</td>
<td>1.43 (1.18)</td>
<td>.07</td>
</tr>
<tr>
<td>CATS-Neg</td>
<td>0.35 (0.03)</td>
<td>.69***</td>
</tr>
<tr>
<td>CATS-Pos</td>
<td>-0.02 (0.07)</td>
<td>-.02</td>
</tr>
<tr>
<td>Step 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>6.26 (6.60)</td>
<td>.04**</td>
</tr>
<tr>
<td>Age</td>
<td>0.31 (0.21)</td>
<td>.09</td>
</tr>
<tr>
<td>Gender</td>
<td>1.47 (1.15)</td>
<td>.08</td>
</tr>
<tr>
<td>CATS-Neg</td>
<td>0.31 (0.07)</td>
<td>.62***</td>
</tr>
<tr>
<td>CATS-Pos</td>
<td>-0.03 (0.12)</td>
<td>-.03</td>
</tr>
<tr>
<td>SOM-Ph</td>
<td>-13.55 (4.91)</td>
<td>-.31**</td>
</tr>
<tr>
<td>SOM-Soc</td>
<td>5.00 (4.37)</td>
<td>.13</td>
</tr>
<tr>
<td>SOM-Fail</td>
<td>4.32 (5.62)</td>
<td>.11</td>
</tr>
</tbody>
</table>

Note: CATS-Neg = CATS-N/P Total score including negative thoughts concerning Physical threat, Social threat and Personal failure. CATS-Pos = CATS-N/P Positive thoughts subscale. SOM-Ph = SOM ratio for Physical threat; SOM-Soc = SOM ratio for Social threat; SOM-Fail = SOM ratio for Failure. Anxious sample: Model 1: F(2, 136) = 6.64, p < .01; Model 2: F(3, 135) = 53.66, p < .001; Model 3: F(4, 134) = 40.01, p < .001; Model 4: F(7, 133) = 40.74, p < .001. Control sample: Model 1: F(2, 283) = 16.80, p < .001; Model 2: F(3, 282) = 41.20, p < .001; Model 3: F(4, 281) = 34.91, p < .001; Model 4: F(7, 278) = 19.55, p < .001. *** p < .001, ** p < .01, * p < .05.

Contrary to what was expected based on the Power of Nonnegative Thinking hypothesis; anxious children reported both more negative and less positive thoughts than non-anxious children. This is in line with one earlier study (Ronan & Kendall, 1997), but not with two other studies (Kendall & Treadwell, 2007; Treadwell & Kendall, 1996). It is difficult to interpret the mixed evidence. It cannot be related to the choice of operationalization, as the three earlier studies...
Chapter 6

(Kendall & Treadwell, 2007; Ronan & Kendall, 1997; Treadwell & Kendall, 1996) used the same questionnaire (the Negative Affectivity Self-Statement Questionnaire, NASSQ), and yet obtained different results. One possible explanation is the age of the participants. In the Kendall & Treadwell (2007) and Treadwell & Kendall (1996) studies the age range was 8-13 years. The larger age range of our sample (8-18 years old) allowed the finding that especially older anxious children are inclined to report less positive thoughts and lower SOM ratios, although Ronan and Kendall (1997) found a difference on positive thoughts in younger children (8-14 years old). The role of age and positive thoughts in the psychopathological model of childhood anxiety clearly needs further research attention.

Consistent with earlier research, anxious children had lower SOM ratios (.67-.70) than non-anxious children (.81-.86), indicating a lower ratio of positive to negative thoughts. This, again, was especially the case for older children. Contrary to our expectation, both anxious and non-anxious children had SOM ratios in the Positive Dialogue, which is the most optimal balance according to Schwartz (1997). However, SOM ratios of the anxious children were related to a lower set point within the Positive Dialogue (.72, the normal set point) than SOM ratios of non-anxious children, which were related to the optimal (.81) or super optimal (.88) set point. Moreover, older anxious children had SOM ratios in the Successful Coping Dialogue (.59-.66). The only studies that examined SOM ratios in clinically anxious children reported much lower SOM ratios (.58 and .59) in the Conflicted dialogue and Successful coping dialogue (Kendall & Treadwell, 2007; Treadwell & Kendall, 1996). There are some possible explanations for these findings. First, in both studies Kendall and Treadwell used a questionnaire with item end points of 1 to 5, resulting in a theoretically smaller range of SOM ratios. Amsel and Fichten (1998) showed that end points of 1 to 5 instead of 0 to 4 impact SOM ratios dramatically. End points of 0 to 4 (as used in the current study) can substantially increase SOM ratios and standard deviations and widen the range of SOM ratios, resulting in a distribution that follows the theoretical model with negative skew (Amsel & Fichten, 1998). Another explanation is that the SOM model is not directly applicable to children. Children (and especially younger children) might under-report their negative thoughts and/or over-report positive thoughts, resulting in a generally elevated baseline mood as compared to adults, and thus higher SOM ratios (Kendall & Chansky, 1991). In our design we were only able to compare anxious and non-anxious children, but not children and adults. The SOM model should be studied more thoroughly in children, especially regarding the ranges of the different SOM categories.

Finally, negative and positive thoughts and SOM ratios differentially predicted anxiety level conditional upon group status. As expected, negative thoughts and SOM ratios (only concerning physical threat) were the strongest predictors of anxiety level in anxiety disordered children, with a large effect for negative thoughts and a medium effect for SOM ratio. This pattern was different for non-anxious children. In this group, both negative thoughts (large effect) and positive thoughts (small effect) predicted anxiety level. This suggests that next to more negative thoughts, less positive thoughts are a first indicator of elevated anxiety level in normal children.
As anxiety level increases and reaches the level of an anxiety disorder, negative thoughts might become more important and more interfering. However, at this point we cannot be certain of this, as we did not assess the temporal precedence of negative or positive thoughts and anxiety.

**Clinical Implications**

Our study suggests that a lack of positive thoughts might not only be an epiphenomenon of anxiety. Although more research is needed, it cannot be ruled out that a lack of positive thoughts is equally important in the development or manifestation of anxiety as an excessive amount of negative thoughts. It should be noted however that our study was correlational and that we did not assess the temporal precedence of positive thoughts and anxiety. Another limitation of our study is our focus on cognitive content (i.e. expressed thoughts), leaving out cognitive processes and other components of the cognitive model (e.g. coping ability or cognitive coping). Further, another method to assess thoughts in children (e.g. thought listing) might have resulted in a different outcome. However, we chose to use a questionnaire approach because that is a more valid and reliable way to compare thoughts between different groups of children and because children (especially anxious children) tend to underreport positive thoughts when using thought listing (Kendall & Chansky, 1991; Prins & Hanewald, 1997).

When a lack of positive thoughts indeed is part of anxiety, this may also have implications for treatment. The Power of Nonnegative Thinking hypothesis supposes that psychopathology is associated with more negative but not less positive thoughts, and the hypothesis also predicts that improvement in treatment is associated with a reduction of negative thoughts rather than an increase in positive thoughts (Kendall, 1984). Based on our results, restructuring negative thoughts and enhancing positive thoughts may both be important in the treatment of anxiety disordered children. On the other hand, enhancing positive thoughts might only be more effective in the prevention of anxiety disorders as the amount of positive thoughts were only predictive of anxiety level in our control sample. It remains unclear whether both negative and positive thoughts are important mechanisms of change in the treatment of anxiety disorders. Research in this area has been scarce, especially in children, but is needed to clarify this issue.

To conclude, in this study a cognition questionnaire was used to simultaneously measure the amount of negative and positive thoughts in two large samples of anxious and non-anxious children. Negatively and positively valenced thoughts and their ratio all seem to be related to the level of anxiety symptoms. However, negative thoughts and the SOM ratio are the strongest predictors of anxiety level in clinical anxiety, while both negative and positive thoughts are related to lower levels of anxiety. Future research should clarify which is most effective in treating anxiety: restructuring negative thoughts and / or enhancing positive thoughts. Further, more research is necessary concerning the validity of the SOM model in children. For now, it cannot be ruled out that a lack of positive thoughts is more than just an epiphenomenon of heightened anxiety and may deserve a place in the cognitive model of childhood anxiety.
Chapter 7
Mediators of Cognitive Behavioral Therapy for anxiety disordered children and adolescents

Abstract

Objective: To investigate whether a change in putative mediators (negative and positive thoughts, coping strategies and perceived control over anxious situations) precedes a change in anxiety symptoms in anxiety disordered children and adolescents receiving Cognitive Behavioral Therapy (CBT).

Method: Participants were 145 Dutch children (8-18 years old, \( M = 12.5 \) years, 57% girls) with a primary anxiety disorder. Assessments were completed pre-treatment, in-treatment, post-treatment and at three-month follow-up. Sequential temporal dependencies between putative mediators and parent- and child reported anxiety symptoms were investigated in AMOS using longitudinal Latent Difference Score Modeling (LDSM).

Results: During treatment an increase of positive thoughts preceded a decrease in child-reported anxiety symptoms. An increase in three coping strategies (direct problem solving, positive cognitive restructuring and seeking distraction) preceded a decrease in parent-reported anxiety symptoms. A reciprocal effect was found for perceived control: a decrease in parent-reported anxiety symptoms both preceded and followed an increase in perceived control.

Conclusion: Using a longitudinal design a temporal relationship between several putative mediators and CBT-outcome for anxious children was explored. The results suggest that a change in positive thoughts, but not negative thoughts, and several coping strategies precedes a change in symptom reduction and, therefore, at least partly support theoretical models of anxiety upon which the anxiety intervention is based.
Introduction

Cognitive Behavioral Therapy (CBT) has been found to be efficacious in the treatment of childhood anxiety disorders, with reported remission rates between 54% and 74% (James, Soler, & Weatherall, 2009; Silverman, Pina, & Viswesvaran, 2008). However, the fact that three to four out of ten children remain clinically anxious after treatment underscores the need to improve treatment efficacy. A necessary condition to enhance treatment efficacy is a better understanding of why CBT works. This can be established by examining putative mediators, i.e. the mechanisms or processes through which a treatment might achieve its effects (Kraemer, Wilson, Fairburn, & Agras, 2002).

Several theories describe the etiological processes that lead to the development of anxiety disorders, including biological, behavioral, interpersonal and cognitive models (Weems & Stickle, 2005). These theories have guided the development of treatment programs such as CBT, for example by including cognitive restructuring in order to change dysfunctional thoughts. However, it is unknown through which (mediating) processes these treatment programs and components bring about the desired changes. In this study, we examined several putative mediators that fall under the scope of the cognitive perspective, including negative and positive thoughts, perceived control and coping.

Biases in cognition, such as dysfunctional cognitive schemata and negative thoughts, are thought to play a central role in the development and maintenance of anxiety disorders. Anxious persons tend to overestimate the likelihood and severity of threatening situations and underestimate their coping abilities (Beck, 2005). It is assumed that a change in cognitive schemata and thoughts is essential to reduce anxiety symptoms. More specifically, the Power of Nonnegative Thinking hypothesis assumes that improvement during treatment is associated with a decrease in negative thoughts rather than an increase in positive thoughts (Kendall & Chansky, 1991). Negative thoughts have been associated with greater levels of anxiety in clinically anxious children (Kendall & Chansky, 1991; Schniering & Rapee, 2002) and non-clinically anxious children (Muris, Merckelbach, Mayer, & Snieder, 1998). Further, negative thoughts have been found to decrease after treatment (Silverman et al., 1999) and to predict treatment outcome (Muris, Mayer, den Adel, Roos, & Van Wamelen, 2009). The role of positive thoughts in anxiety is less clear. In some studies psychopathology was associated with less positive thoughts (Calvete & Cardenoso, 2002; Ronan & Kendall, 1997) but in other studies this relationship has not been found (Kendall & Treadwell, 2007; Prins & Hanewald, 1997; Treadwell & Kendall, 1996). An indication for a mediating role of negative thoughts has been demonstrated in cross-sectional design studies by Treadwell and Kendall (1996), Kendall and Treadwell (2007), and Lau, Chan, Li, and Au (2010). Whether positive thoughts mediate treatment effect is not clear (Kendall & Treadwell; Treadwell & Kendall).

Anxiety is not only defined by the interpretation of a situation as threatening, but also by the extent to which a child feels in control over its fear or the feared situation. According to Chorpita & Barlow (1998), a perceived lack of control over threatening situations is central to
the development of anxiety disorders. Perceived control is not directly targeted in treatment. However, it is reasonable to assume that improved coping and problem solving skills can enhance perceived control (“I know what I can do when I am scared”) which subsequently will decrease anxiety. On the other hand, increased perceived control may follow mastery experiences in successful exposure exercises, and follow upon decreased anxiety. Clinically anxious children have been found to have lower levels of perceived control than non-referred children (Weems, Silverman, Rapee, & Pina, 2003). Furthermore, a reduction of anxiety symptoms after treatment has been associated with an increase in self-reported perceived control (Muris et al., 2009). However, to our knowledge, perceived control has never been formally evaluated as a possible mediator of CBT in anxious children.

Finally, anxious persons not only tend to report more negative thoughts and less perceived control, but may also have less adaptive coping abilities. Coping is described as “conscious volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances” (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001, p. 89). Active, problem-focused coping is associated with better adjustment and increased coping efficacy, but avoidant coping is associated with psychological problems and decreased coping efficacy (Compas et al., 2001). As one of the goals in CBT is to improve problem-solving and coping skills, a change from passive to active emotion regulation strategies might be essential for the effect of treatment (De Boo & Wicherts, 2009). In one study by Lau et al. (2010) coping appeared to mediate treatment effect on child anxiety.

Although it is assumed that specific elements of CBT (e.g. cognitive restructuring, exposure, problem solving strategies) bring about the desired change in anxiety symptoms, there is a surprising lack of research regarding the mechanisms involved in bringing about this change (Prins & Ollendick, 2003; Weersing & Weisz, 2002). Most studies focus on treatment efficacy, but so far only a small portion of researchers seek to understand why treatment works. To our knowledge, only five studies specifically examined mediators in the treatment of childhood anxiety disorders. Treadwell & Kendall (1996) and Kendall & Treadwell (2007) found that a decrease in negative self-statements and an increase in the ratio of positive and negative self-statements mediated treatment outcome in clinically anxious children. Alfano et al. (2009) showed that a decrease in loneliness mediated change in social anxiety in children with a social phobia. Lau et al. (2010) found that a decrease in negative thoughts and an increase in coping strategies mediated treatment effects. Finally, Maric, Heyne, MacKinnon, Van Widenfelt, and Westenberg (2012) showed that post-treatment increases in school attendance and a decrease of fear were mediated by increased self-efficacy.

One of the requirements to establish mediation is to demonstrate that a change in the assumed mediator follows administration of the treatment and precedes a change in the outcome variable (MacKinnon, 2008). This requires a temporal or longitudinal design, with more than two assessment points, including at least one during treatment (Kraemer et al., 2002; Weersing & Weisz, 2002). Ideally, the in-treatment assessment of the mediator should occur at a time point when maximum change in the treatment outcome is assumed (Maric, Wiers, & Prins,
Mediators of Cognitive Behavioral Therapy for anxiety disordered children and adolescents | 107

2012). Further, all relevant variables should be measured at all assessment points (Weersing & Weisz, 2002). A longitudinal design is also preferred over a cross-sectional design because mutual relationships need time to unfold and therefore cross-sectional studies may overlook an effect. The magnitude of this effect might be different for different time intervals (Selig & Preacher, 2009). Four of the above-mentioned studies (Alfano et al., 2009; Kendall & Treadwell, 2007; Lau et al., 2010; Treadwell & Kendall, 1996) only used a pre-post design and none of the studies included an assessment point during treatment. This precluded strong conclusions about temporal precedence.

In the present study, we examined the temporal relationship between change in several putative mediators and change in anxiety symptoms, by using a design with multiple assessment points before, during and after treatment. We expected that an increase in positive thoughts, perceived control, and problem-focused coping and a decrease in negative thoughts and avoidant coping preceded a change and decrease in anxiety symptoms.

Method

Design and Procedure

Participants were Dutch children and adolescents from different rural and urban areas who were referred for treatment to one of two academic centers for child and adolescent psychiatry (de Bascule in Amsterdam and Accare in Groningen). Between October 2006 and December 2009, all children who presented with anxiety symptoms were screened for eligibility. Anxiety symptoms were assessed and children and their parents were separately interviewed with the ADIS-IV C/P (Silverman & Albano, 1996). Written informed consent was obtained from both parents and children when children met all inclusion criteria and were willing to participate. Referred children were included if they were 8 to 18 years old, suffered primarily from an anxiety disorder (except posttraumatic stress disorder or obsessive compulsive disorder), had not received protocolized evidence based CBT during the past half year and did not use an SSRI (Selective Serotonin Reuptake Inhibitor). Exclusion criteria were suicidal ideation, psychosis, selective mutism, an IQ below 80 or problems with drugs or alcohol. Participating children were awarded with a gift coupon worth 10 Euros at each assessment point (maximum of 40 Euros). The study was approved of by the Medical Ethical Committees of both centers.

All children received twelve individual, weekly sessions of CBT with the Coping Cat protocol (Nauta & Scholing, 2007). Children were assessed within one week before treatment (pre-treatment, T1), after eight sessions of treatment (in-treatment, T2), after twelve sessions of treatment (post-treatment, T3) and three months after T3 (follow-up, T4). The timing of the in-treatment assessment was chosen at a point when all relevant anxiety management strategies had been practiced, as we did not have a priori expectations about the time point of maximum change in treatment outcome. In the adult literature, changes have both been found
in early and final phases of treatment (Maric et al., 2012). All instruments were used at all time points, except for the ADIS-IV C/P which was not administered at T2. The current study also included an eight-week waitlist condition to determine treatment efficacy, the results are not presented here. As expected, treatment proved to be more effective than the waitlist condition in decreasing anxiety symptoms (see the appendix for more details). Only treatment, and not waitlist, data were included in our longitudinal analyses.

Participants

Figure 1 displays a flow chart of participant inclusion, attrition rates and reasons for attrition. Analyses were performed with all anxiety-disordered children (N = 145) that were assessed pre-treatment. Their mean age was 12.51 (SD = 2.83, range 8-18) and 56.6% were girls. Primary diagnoses were Social Phobia (n = 49, 33.8%), Separation Anxiety Disorder (n = 17, 11.7%), Specific Phobia (n = 33, 22.8%), Generalized Anxiety Disorder (n = 32, 22.1%) and Panic Disorder with or without Agoraphobia (n = 14, 9.6%). Eighty-six children (59.3%) had one or more comorbid disorders: anxiety disorder (n = 59), mood disorder (n = 6), a combination of anxiety and mood disorder (n = 16), a combination of anxiety and externalizing disorder (n = 3), or a combination of anxiety, mood and externalizing disorders (n = 2). The total number of diagnoses per child ranged from 1 to 6 (M = 2.23, SD = 1.33). Mean ADIS-IV C/P Clinical Severity Rating (CSR) score for the primary diagnosis was 6.31 (SD = 1.05, range 4-8).

Figure 1. Flowchart of inclusion and attrition of participants

Informed Consent (n = 161)

T1: Pre-intervention (n = 145)

T2: Intermediate (n = 118)
Lost to T2 (n = 27)
- Refused further assessments (n = 8)
- Started other treatment (n = 7)
- Deterioration of symptoms (n = 5)
- Started medication or inpatient treatment (n = 7)

T3: Post-intervention (n = 113)
Lost to T3 (n = 5)
- Refused further assessments (n = 2)
- Started medication or inpatient treatment (n = 3)

T4: Follow-up (n = 101)
Lost to T4 (n = 12)
- Refused further assessments (n = 11)
- Started medication or inpatient treatment (n = 1)

Excluded (n = 16):
- Refused to participate (n = 3)
- Failed to meet inclusion criteria (n = 3)
- Interrupted contact (n = 5)
- Started treatment elsewhere (n = 3)
- No self-report (n = 1)
- Recovered before treatment (n = 1)
The two participating centers included respectively 33.8% (n = 49, de Bascule) and 66.2% (n = 96, Accare) of the participants. Most children came from two-parent families (83.4%) and had one or more siblings (86.9%). Educational level of mothers and fathers was low (respectively 25.2%; 26.0%), medium (45.2%; 35.8%) and high (29.6%; 38.2%). Almost all children (99.3%), mothers and fathers (both 97.9%) had the Dutch nationality. Half of the children (55.2%) had received professional help in the past for a range of problems, including anxiety problems (n = 26), symptoms of Attention Deficit Hyperactivity Disorder (n = 9), Pervasive Developmental Disorder (n = 7), learning problems (n = 3), speech/language problems (n = 5) or other problems (n = 8). No children had received protocollized CBT for anxiety problems in the past half year. A minority of children (n = 20) reported the use of medication before treatment, including drugs for anxiety problems (e.g. benzodiazepines or herbal drugs, but no SSRIs; n = 5), ADHD related behaviors (methylphenidate or risperidone, kept constant over study; n = 7), or other conditions (e.g. sleep problems, allergies, stomach aches; n = 7). One child used puberty suppressors for gender dysphoria.

Measures

**Anxiety Disorder Interview Schedule for Children-Child and Parent version (ADIS-IV C/P).**

The ADIS-IV C/P (Silverman & Albano, 1996) is a widely used, reliable (including high test-retest reliability) and valid semi-structured interview that assesses the prevalence and severity of different DSM-IV disorders, with a main focus on anxiety disorders. Children and parents were separately interviewed by experienced and trained clinicians (not their therapist). Interviewers were trained by observing and scoring live and videotaped interviews. Clinicians rated severity of symptoms based on interference in school, peer relationships, family life and internal distress on a 9-point scale, ranging from 0 to 8. A clinician severity rating (CSR) of four or higher is indicative of a diagnosis. Combined CSRs from the parent and child interview were generated following the ADIS-C/P manual: for each diagnosis the highest CSR was taken. Treatment responders were defined as having a combined CSR below four for any anxiety disorder after treatment. Nineteen videotaped interviews were re-rated by one of four experienced and trained psychologists. The mean inter-rater agreement for the primary diagnosis (kappa) was .94.

**Revised Child Anxiety and Depression Scale - Child and Parent version (RCADS-C/P).**

The RCADS-C/P (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) is a questionnaire (47 items) which measures symptoms of DSM-IV anxiety disorders and depression. The RCADS-C/P has six subscales: separation anxiety disorder (SAD), social phobia (SP), generalized anxiety disorder (GAD), obsessive compulsive disorder (OCD), panic disorder (PD) and major depressive disorder (MDD). In this study we report a total score composed of only those subscales (SAD, SP, GAD, and PD) that correspond to the primary anxiety disorders of the children. Therefore, the total score consisted of 31 items, scored on a 4-point scale (0 = never, 1 = sometimes, 2 = often, 3 = always), with higher scores reflecting more symptoms. The RCADS possesses good internal reliability (with Cronbach’s α of .73 to .82), moderate to good one-
week test-retest reliability, and good convergent and discriminant validity (Chorpita, Moffitt, & Gray, 2005; Chorpita et al., 2000). In the current study Cronbach’s alphas for the total score on different assessment points ranged between .88 - .92 for the parent version and was .93 for all assessment points for the child version.

Because of a substantial overlap in item content between the RCADS-C/P and the measure of positive and negative thoughts (CATS-N/P) we decided to use a "cognition-free" RCADS score in the models combining both measures. Four authors (SH, EdH, PP, FB) independently rated each item of the RCADS as being an anxious thought or being an anxiety symptom. Items which three or four out of the four authors considered an anxious thought were removed, e.g. “I worry about making mistakes”. Disagreements were discussed until all raters agreed. The resulting cognition-free RCADS score consisted of 19 items. Cronbach’s alphas of both the child and parent version of the cognition-free RCADS were satisfactory with a range over assessment points of respectively .87-.89 and .82-.87. The cognition-free RCADS score correlated very high with the original score: between .96 and .97 for the child version; and .91-.94 for the parent version. More importantly, the correlation with the CATS negative thoughts subscale decreased, reducing the problem of multicollinearity.

**Children’s Automatic Thoughts Scale—Negative/Positive (CATS-N/P).**

The CATS-N/P (Hogendoorn et al., 2010) was used to measure negative and positive thoughts. The subscales Physical threat (e.g. “I’m going to have an accident”), Social threat (e.g. “I’m going to look silly”) and Personal failure (e.g. “I am a failure”) measure negative thoughts and are summed up to form a Total score (30 items). Ten items measure positive thoughts (e.g. “I feel good about myself”) and are summed up to form the subscale Positive thoughts. Items are scored on a five-point scale, ranging from 0 (not at all) to 4 (all the time). Higher scores reflect more negative or positive thoughts. The CATS-N/P possesses good internal reliability (Cronbach’s α .83-.94), good factorial validity, moderate test-retest reliability (Pearson’s r = .61-.77 for the Total score), satisfactory convergent validity (Hogendoorn et al., 2010) and good discriminant validity (Hogendoorn et al., 2012). Cronbach’s α in the current sample ranged between .90-.96 for the Total score and between .84-.93 for the Positive thoughts subscale.

**Anxiety Control Questionnaire for Children (ACQ-C).**

The ACQ-C (Weems et al., 2003) was used to measure perceived lack of control over anxiety-related situations related to external threats (e.g. “I can usually deal with hard problems”) or anxiety-related internal bodily reactions (“If I begin to shake or tremble I can stop myself”). The ACQ-C is a self-report questionnaire that consists of 30 items, scored on a 5-point scale from 0 (none) to 4 (very very much). Lower scores reflect less perceived control. For the purpose of this study the ACQ-C was translated into Dutch. The authors (EdH, SH, LV, LW, PP) independently translated the items and translations were compared until uniform agreement was reached. The original author (Weems) was consulted during the translation process for the exact meaning of some items. Finally, the Dutch version was back-translated by a native English speaker. The total scale showed good internal consistency (Cronbach’s α of .92 to .94), good discriminant validity, good factorial validity (with one factor) and adequate test-retest reliability in both the Dutch and original sample.
Mediators of Cognitive Behavioral Therapy for anxiety disordered children and adolescents

(Hogendoorn et al., 2011; Weems et al. 2003; Weems, Costa, Watts, Taylor, & Cannon, 2007). Cronbach’s α in the current sample ranged between .88-.95.

Children’s Coping Strategies Checklist (CCSC-R1). Different coping strategies were examined with the Dutch CCSC-R1 (De Boo & Wicherts, 2009). The CCSC-R1 is a self-report questionnaire assessing coping with problems in general. Items are summed to form five subscales: Direct problem solving (DPS, e.g. “You try to figure out why things like this happen”), Positive cognitive restructuring (PCR, e.g. “You tell yourself that you know what to do”), Distraction strategies (DS, e.g. “You play sports”), Avoidance strategies (AS, e.g. “You just forget about it”) and Support seeking strategies (SSS, “You tell others how you like to solve the problem”). The 54 items are scored on a 4-point scale from 1 (never) to 4 (always). Higher scores indicate more strategies of the specific subscale. Different factor structures were examined and the 5-factor model of the Dutch CCSC-R1 proved to be invariant across age and gender. Further, test-retest reliability was moderate and internal reliability was acceptable (Cronbach’s α .72 to .88; De Boo & Wicherts, 2009). Reliability in the current sample was adequate for the different subscales: Cronbach’s alpha ranged between .87-.90 for DPS, between .87-.92 for PCR, between .74-.81 for DS, between .73-.86 for AS and between .86 -.91 for SSS.

Treatment

Children were individually treated with the Dutch version (Nauta & Scholing, 2007) of the Coping Cat protocol (Kendall, 1990). The adaptations made by Nauta & Scholing include a reduction of the therapy to a 12-session program and an earlier start of the exposure exercises (in session 4 instead of session 9). The first eight treatment sessions consisted of psycho education, exploration of somatic symptoms and relaxation training, exploration of dysfunctional thoughts and cognitive restructuring, coping strategies, problem solving skills and self-rewarding behavior. Sessions 8 to 12 included exposure exercises using and repeating the previously learned skills. All sessions lasted for 45 to 60 minutes. The treatment included parent sessions after sessions 2 and 7. The Coping Cat protocol and the Dutch version of Coping Cat have been found to be effective in several randomized controlled trials (e.g. Kendall, 1994; Nauta, Scholing, Emmelkamp, & Minderaa, 2001). To assess treatment integrity in the current study, session reports of 95 randomly selected sessions were reviewed by two raters (one child psychologist, one child psychiatrist). A scale was developed to assess achievement of treatment goals per session with 1 (not obtained), 2 (a bit), 3 (satisfactory), and 4 (good). Interrater agreement (kappa) was .75 and treatment goals were largely obtained (M = 3.42, SD = 0.64).

Therapists

All therapists (n = 31) were master’s level clinicians (psychologists, clinical psychologists, health care psychologists) with a mean of 6.17 years (range 1-20) of experience in child- and adolescent psychiatry. They were all experienced in treating anxiety disorders with CBT (mean number of years: 3.31, range 0.5-12). All therapists but one were female. Therapists treated 1 to 24 patients
each \( M = 5 \). At the beginning of the study, most therapists had experience in using the Coping Cat. Nevertheless all therapists received one-day training in using the manual and attended monthly supervision sessions.

**Data Analytic Strategies**

**Preliminary Analyses.** All children were included in the analyses following the intent-to-treat approach. Children who dropped out at different time points were compared on baseline scores and change scores. Patterns of missing data were inspected using the Missing Value Analysis (MVA) command and Little’s Missing Completely At Random (MCAR) test in SPSS. Missing data were accounted for in different ways. First, missing items in each questionnaire were imputed by the individuals’ (sub) scale mean with a maximum of 20% missing items per subscale. If more items were missing, the questionnaire was coded as missing completely. Next, missing data points (missing questionnaires or complete missing data points in the case of drop-out) were imputed using the Expectation-Maximization procedure in SPSS 18.0. Results displayed in the tables are imputed scores.

Variables were screened for (multivariate) normality by inspecting skewness and kurtosis, boxplots, Kolmogorov-Smirnov statistics, and Mahalanobis Distances. Repeated measures ANOVAs were used to evaluate change in mediators and symptoms over time on a group level (T1 to T4). Eta squared \( (\eta^2) \) is reported as effect size with small (.01), medium (.06) and large (.14) effects. Individual Reliable Change scores (RC_indiv, Hageman & Arrindell, 1999) were computed from the pre- and post-treatment scores on the RCADS-C/P.

**Modeling temporal change: Latent Difference Score (LDS) modeling.** To evaluate whether and how changes in the putative mediators preceded changes in anxiety symptoms, multiple bivariate Latent Difference Score (LDS) models were evaluated. LDS models combine features of autoregressive models and latent growth curve models (McArdle, 2001; Selig & Preacher, 2009). The observed variables are explained by latent true score variables and error terms (see Figure 2). The latent difference score for an individual is equal to the difference between the current latent score and the previous latent score. The latent difference score is a function of three components and therefore the model accounts for different types of change. First (as in latent growth curve models) the model accounts for additive change in the variables across time, represented by coefficient \( a \) of the latent slopes \( y_n \) and \( m_{vn} \). Other parts of a latent growth curve model are represented by latent intercepts and covariances between slopes and intercepts. Second, LDS models account for proportional change, or the effect of the latent true score of one assessment on the difference score in the next assessment. This is represented by the autoregressive coefficient \( \beta \). Third, LDS models include cross-lagged or coupling effects, \( y_1 \) between the latent score of one variable and the difference score of the other variable on the subsequent assessment point. With these three components, the LDS model accounts for inter (between) individual change, intra (within) individual change and individual differences in intraindividual change.

Figure 2. Bivariate LDS models of putative mediators and treatment outcome

Note. Path diagram of the bivariate LDS model, in which change in the putative mediator (Med) precedes change in the outcome variable (Anxiety symptoms, Anx). Squares represent observed variables, circles represent latent variables, single-headed arrows represent regression coefficients, unlabeled arrows are constrained to 1, and double-headed arrows represent a correlation or covariance. \( \alpha_m \) and \( \alpha_y \) represent constant change over time for respectively the mediator and outcome variable; \( \beta_m \) and \( \beta_y \) represent proportional change over time; \( \gamma_m(t) \) and \( \gamma_y(t) \) represent coupling parameters from respectively the mediator to the outcome variable and the outcome variable to the mediator. Measurement errors \( e(t) \) were constrained to have a mean of zero and a nonzero variance which was constrained to be equal over time. Errors were uncorrelated with other scores in the model, but errors from different variables were correlated (one arrow is shown in the figure). Means of the intercepts (iMed, iAnx) and slopes (sMed, sAnx) and the variance of the intercept are non-zero; the variances of the slopes are constrained to 1 for identification purposes. Latent scores and latent difference scores do not have disturbance terms. For LDS models, standardized path coefficients are not applicable.
In our study, sixteen different bivariate models were examined: one for each putative mediator (negative thoughts, positive thoughts, perceived control and five coping strategies) and separate for two outcome variables: child reported anxiety (RCADS-C) and parent reported anxiety (RCADS-P). Data from all time points (T1, T2, T3 and T4) were used. Per variable we examined univariate LDS models to see whether time-varying or time-invariant $\alpha$ and $\beta$ parameters best modeled growth. We did not want to impose too many restrictions, but did not have a priori expectations about whether $\alpha$ or $\beta$ parameters should be time-variant (or time-invariant). The best fitting univariate models were combined in the bivariate analysis. For each of the bivariate models, different nested sub models with different restrictions on the parameters were compared: 1) No Coupling model: no dynamic coupling exists between mediator M and anxiety level Y ($\gamma_{m1} = \gamma_{m2} = \gamma_{y1} = \gamma_{y2} = 0$), 2) $M \rightarrow Y$ model: unidirectional coupling exists from mediator M to subsequent change in anxiety level Y ($\gamma_{y1} = \gamma_{y2} = 0; \gamma_{m1}$ and $\gamma_{m2}$ $\neq$ 0), 3) $Y \rightarrow M$ model: unidirectional coupling exists from anxiety level Y to subsequent change in M ($\gamma_{m1} = \gamma_{m2} = 0; \gamma_{y1}$ and $\gamma_{y2}$ $\neq$ 0) and 4) Coupling model: interactive coupling exists between M and Y ($\gamma_{m1}, \gamma_{m2}, \gamma_{y1}$ and $\gamma_{y2}$ $\neq$ 0).14

Analyses were performed using Structural Equation Modeling (SEM) in AMOS 18.0 (Arbuckle, 2007). Missing data were handled by using Full Information Maximum Likelihood (FIML), as suggested by Allison (2003). Model fit was considered adequate when Chi-square ($\chi^2$) was low and preferably non-significant; the Tucker Lewis Index (TLI) and the Comparative Fit Index (CFI) were > .95 and the Root Mean Square Error of Approximation (RMSEA) was < .05 or .08 (Kline, 2005; Hu & Bentler, 1999). Nested models were compared using $\chi^2$ difference tests and the best fitting model with the smallest AIC (Akaike Information Criterion) was chosen.

Results

Preliminary Analyses

Several children dropped out during treatment ($n = 32$) or during the follow-up period ($n = 12$, see Figure 1). Attrition rates were 18.6% at T2, 22.1% at T3 and 30.3% at T4. There were four different reasons to withdraw from treatment. Seven patients started a different treatment after a few sessions, because of a shift in primary diagnosis or because another treatment was more convenient (e.g. treatment at school). Five children did not need further treatment because their anxiety problems decreased to a nonclinical level. Eleven children dropped out because their

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14 We chose the option in which $\gamma$ couples two change scores because this better reflected our research question. However, we also examined another option regarding the coupling parameter $\gamma$. In this model, $\gamma$ is coupling the latent true scores (instead of the latent change scores) of one variable with the latent change scores of the other variable. Results between the two variants were comparable, except for perceived control. Data may be obtained from the first author upon request.
anxiety problems were so severe that they needed inpatient treatment or medication. Finally, 21 children dropped out because they did not want to participate in the study any longer (e.g. they found it too time-consuming). Children who dropped out at different points in time (at T2, T3 or T4) were compared on their pre-treatment scores on the putative mediators, outcome variables, age and gender. There were no significant differences between the groups. Although Little’s MCAR test revealed that the pattern of missing data was likely to be MCAR, χ²(2270) = 2275.08, p > .05, some attrition was likely to be associated with the level of anxiety. Therefore, missing data was assumed to be at least Missing at Random (MAR). The distribution of all variables was reasonably normal.

Treatment Efficacy

Separate repeated measures ANOVAs (see Table 1) showed that all outcome measures and most putative mediators (except support seeking coping strategies) changed over treatment at the group level.

After treatment and at follow-up respectively 56.9% (66 / 116) and 63.2% (67 / 106) of treatment completers were free from any diagnosis (CSR <4). The individual Reliable Change index revealed that, when assessed with the RCADS-C, 51.7% (n = 75) of the children improved directly after treatment; 45.5% (n = 66) showed no reliable change; and 2.8% (n = 4) deteriorated. Using parent reported symptoms (RCADS-P), 40.0% (n = 58) improved, 54.5% (n = 79) showed no reliable change, and 5.5% (n = 8) deteriorated.

Temporal Relationship Between a Change in Putative Mediators and Anxiety Symptoms

Prior to fitting the bivariate models we completed univariate LDS models for each variable to determine the best pattern of change. Univariate models with both time-invariant α and β parameters showed the best fit for the ACQ-C, CATS-positive thoughts, CCSC-R1 problem focused coping and support seeking, indicating that both additive and proportional change was similar over time. For the CCSC-R1 positive restructuring, distraction seeking and avoidance coping the univariate model had the best fit when α was time-variant and β was time-invariant. Finally, for the CATS-negative thoughts and all RCADS child and parent variables, univariate models with time variant βs and time-invariant αs had the best fit.

A summary of the results for the 16 bivariate models are displayed in Table 2. Detailed parameter estimates of salient models are reported in Table 3. Further details can be obtained from the first author. No relationship over time was found between negative thoughts (CATS-N/P negative) and child or parent reported anxiety symptoms (RCADS-C/P). Similarly, no relation was found between support seeking strategies (CCSC-R1 SSS) and child or parent reported anxiety symptoms.
Table 1. Means (and SD’s) and repeated measure ANOVAs of anxiety measures and putative mediators over four different time-points

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-treatment</th>
<th>In-treatment</th>
<th>Post-treatment</th>
<th>Follow-up</th>
<th>Repeated measure ANOVAs (n = 145)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T3</td>
<td>T4</td>
<td></td>
</tr>
<tr>
<td>CSR (ADIS-C/P)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>5.50 (1.93)</td>
<td>n/a</td>
<td>1.84 (2.59)</td>
<td>1.44 (2.37)</td>
<td>$F(1,87, 269.71) = 272.00, p &lt; .001, \eta^2 = .65$</td>
</tr>
<tr>
<td>Parent</td>
<td>6.09 (1.32)</td>
<td>n/a</td>
<td>2.39 (2.74)</td>
<td>1.92 (2.50)</td>
<td>$F(2, 288) = 269.83, p &lt; .001, \eta^2 = .65$</td>
</tr>
<tr>
<td>Total</td>
<td>6.31 (1.05)</td>
<td>n/a</td>
<td>2.42 (2.79)</td>
<td>2.05 (2.58)</td>
<td>$F(2, 288) = 269.00, p &lt; .001, \eta^2 = .65$</td>
</tr>
<tr>
<td>RCADS-C/P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>26.02 (16.04)</td>
<td>21.48 (13.27)</td>
<td>16.37 (13.12)</td>
<td>14.43 (11.88)</td>
<td>$F(2, 06, 296.21) = 67.11, p &lt; .001, \eta^2 = .32$</td>
</tr>
<tr>
<td>Parent</td>
<td>15.86 (9.81)</td>
<td>13.00 (8.06)</td>
<td>9.93 (7.86)</td>
<td>9.13 (7.32)</td>
<td>$F(2,08, 300.06) = 68.61, p &lt; .001, \eta^2 = .32$</td>
</tr>
<tr>
<td>Parent Cogn.free</td>
<td>28.72 (12.63)</td>
<td>29.54 (13.11)</td>
<td>22.58 (13.67)</td>
<td>19.31 (11.73)</td>
<td>$F(2, 69, 386.66) = 62.42, p &lt; .001, \eta^2 = .30$</td>
</tr>
<tr>
<td>CATS-N/P</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>16.09 (8.87)</td>
<td>17.83 (9.67)</td>
<td>17.97 (9.24)</td>
<td>19.38 (8.72)</td>
<td>$F(2,68, 386.55) = 9.34, p &lt; .001, \eta^2 = .06$</td>
</tr>
<tr>
<td>Negative</td>
<td>23.19 (20.66)</td>
<td>19.88 (18.90)</td>
<td>13.02 (15.92)</td>
<td>12.05 (14.69)</td>
<td>$F(2,36, 340.31) = 42.45, p &lt; .001, \eta^2 = .23$</td>
</tr>
<tr>
<td>ACQ-C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>48.55 (18.89)</td>
<td>60.91 (18.96)</td>
<td>65.88 (20.77)</td>
<td>66.78 (18.80)</td>
<td>$F(2,71, 389.80) = 73.96, p &lt; .001, \eta^2 = .34$</td>
</tr>
<tr>
<td>CCSC-R1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPS</td>
<td>2.08 (0.51)</td>
<td>2.27 (0.51)</td>
<td>2.25 (0.56)</td>
<td>2.26 (0.50)</td>
<td>$F(2,30, 331.75) = 10.14, p &lt; .001, \eta^2 = .07$</td>
</tr>
<tr>
<td>PCR</td>
<td>1.87 (0.31)</td>
<td>2.06 (0.54)</td>
<td>2.02 (0.60)</td>
<td>2.02 (0.55)</td>
<td>$F(2,63, 378.22) = 7.95, p &lt; .001, \eta^2 = .05$</td>
</tr>
<tr>
<td>DS</td>
<td>1.73 (0.44)</td>
<td>1.84 (0.43)</td>
<td>1.74 (0.43)</td>
<td>1.73 (0.38)</td>
<td>$F(2,69, 386.99) = 8.61, p &lt; .001, \eta^2 = .05$</td>
</tr>
<tr>
<td>AS</td>
<td>2.18 (0.45)</td>
<td>2.19 (0.42)</td>
<td>2.03 (0.43)</td>
<td>2.04 (0.40)</td>
<td>$F(2,34, 336.51) = 13.64, p &lt; .001, \eta^2 = .09$</td>
</tr>
<tr>
<td>SSS</td>
<td>1.91 (0.51)</td>
<td>1.91 (0.52)</td>
<td>1.97 (0.63)</td>
<td>2.00 (0.55)</td>
<td>$F(3, 432) = 1.27, p &lt; .05, \eta^2 = .01$</td>
</tr>
</tbody>
</table>

Note: CSR = Clinical Severity Rating; RCADS = Revised Child Anxiety and Depression Scale; CATS-N/P = Children’s Automatic Thoughts Scale – Negative/Positive; ACQ-C = Anxiety Control Questionnaire-Child; CCSC-R1 = Coping Strategies Checklist for Children-Revised; DPS = Direct problem solving; PCR = Positive cognitive restructuring; DS = Distraction strategies; AS = Avoidance strategies; SSS = Support seeking strategies. Eta squared ($\eta^2$) is reported as effect size. Values with different superscripts differ significantly over time. n/a = not available at T2.
anxiety symptoms. An effect was found for positive thoughts (CATS-N/P positive) and child-reported anxiety symptoms. The M->Y model had the best fit ($\chi^2 = 32.55$, $df = 21$, TLI = .96, CFI = .98, RMSEA = .06, $p$ close > .05, 95% confidence interval [CI] = .00-.10). An increase in positive thoughts during treatment preceded a decrease in anxiety symptoms post-treatment ($\gamma_{m1} = -2.30$, $p < .05$); and an increase in positive thoughts post-treatment preceded a decrease in anxiety symptoms at follow-up ($\gamma_{m2} = -2.12$, $p < .05$). For positive thoughts and parent reported anxiety the Coupling model fit well and model parameter $\gamma_{m1}$ was significant, indicating that an increase in positive thoughts during treatment preceded a decrease in anxiety symptoms post-treatment. However, the Coupling model was not better than the No coupling model.

Table 2. Results for bivariate LDS models with eight putative mediators and child and parent reported anxiety symptoms as outcome

<table>
<thead>
<tr>
<th>Mediator</th>
<th>Model</th>
<th>Best model</th>
<th>Coupling?</th>
<th>Parameter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Thoughts (CATS-N/P pos)</td>
<td></td>
<td>M -&gt; Y</td>
<td>Yes (γ_m1, γ_m2)</td>
<td></td>
</tr>
<tr>
<td>Negative Thoughts (CATS-N/P neg)</td>
<td></td>
<td>No coupling</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Perceived Control (ACQ-C)</td>
<td></td>
<td>No coupling</td>
<td>No</td>
<td>M -&gt; Y and Y -&gt; M (γ_y1)</td>
</tr>
<tr>
<td>Direct Problem Solving (CCSC-R1 DPS)</td>
<td></td>
<td>No coupling</td>
<td>No</td>
<td>M -&gt; Y (γ_m1)</td>
</tr>
<tr>
<td>Positive Cognitive Restructuring (CCSC-R1 PCR)</td>
<td></td>
<td>No coupling</td>
<td>No</td>
<td>M -&gt; Y (γ_m1)</td>
</tr>
<tr>
<td>Distraction Seeking (CCSC-R1 DS)</td>
<td></td>
<td>No coupling</td>
<td>No</td>
<td>M -&gt; Y (γ_m1)</td>
</tr>
<tr>
<td>Avoidant Strategies (CCSC-R1 AS)</td>
<td></td>
<td>Y -&gt; M</td>
<td>No (γ_y2 $p = .06$)</td>
<td>No coupling</td>
</tr>
<tr>
<td>Support Seeking (CCSC-R1 SSS)</td>
<td></td>
<td>No coupling</td>
<td>No</td>
<td>No coupling</td>
</tr>
</tbody>
</table>

Note: Model M -> Y represents a model with unidirectional coupling from the mediator to the outcome variable, from in-treatment to post-treatment ($\gamma_{m1}$) or post-treatment to follow-up ($\gamma_{m2}$); model Y -> M represents a model with unidirectional coupling from the outcome variable to the mediator, from in-treatment to post-treatment ($\gamma_{y1}$) or post-treatment to follow-up ($\gamma_{y2}$); No coupling represents a model with no dynamic coupling between the mediator and outcome variable. *For these mediating variables the cognition-free RCADS was used as outcome variable.
### Table 3. Parameter estimates and critical ratios for salient Latent Difference Score models for both child- and parent reported anxiety symptoms

<table>
<thead>
<tr>
<th>Model</th>
<th>Anxiety (child); Positive thoughts</th>
<th>Anxiety (child); Avoidant Coping</th>
<th>Anxiety (parent); Perceived control</th>
<th>Anxiety (parent); Perceived control</th>
<th>Anxiety (parent); Problem solving coping</th>
<th>Anxiety (parent); Positive cognitive Distraction coping</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Means</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mediator intercept</td>
<td>16.11* (20.64)</td>
<td>2.17* (54.39)</td>
<td>48.54* (29.06)</td>
<td>48.57* (30.12)</td>
<td>2.08* (46.46)</td>
<td>1.87* (40.89)</td>
</tr>
<tr>
<td>Anxiety intercept</td>
<td>15.99* (19.64)</td>
<td>26.28* (19.73)</td>
<td>28.63* (25.00)</td>
<td>28.64* (25.87)</td>
<td>28.78* (25.41)</td>
<td>28.70* (25.16)</td>
</tr>
<tr>
<td>Anxiety slope</td>
<td>0.64 (0.18)</td>
<td>1.04+ (2.57)</td>
<td>4.10* (11.24)</td>
<td>3.65* (11.29)</td>
<td>4.39* (11.48)</td>
<td>0.76** (2.91)</td>
</tr>
<tr>
<td>Anxiety intercept</td>
<td>-1.5** (-8.29)</td>
<td>-1.04* (-4.54)</td>
<td>-2.38* (-10.07)</td>
<td>-1.93* (-9.40)</td>
<td>-1.97* (-9.63)</td>
<td>-2.15* (-9.88)</td>
</tr>
<tr>
<td><strong>Variances</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mediator intercept</td>
<td>64.20* (6.48)</td>
<td>0.16* (6.15)</td>
<td>259.98* (5.75)</td>
<td>240.71* (5.32)</td>
<td>0.18* (5.44)</td>
<td>0.18* (5.37)</td>
</tr>
<tr>
<td>Anxiety intercept</td>
<td>84.75* (7.52)</td>
<td>222.39* (7.45)</td>
<td>144.14* (6.69)</td>
<td>129.72* (6.53)</td>
<td>138.65* (6.65)</td>
<td>142.22* (6.69)</td>
</tr>
<tr>
<td>Anxiety slope</td>
<td>27.23* (11.09)</td>
<td>0.05* (9.38)</td>
<td>137.00* (10.64)</td>
<td>127.81* (9.70)</td>
<td>0.08* (9.57)</td>
<td>0.09* (9.67)</td>
</tr>
<tr>
<td>Anxiety intercept</td>
<td>9.86* (7.51)</td>
<td>31.55* (10.10)</td>
<td>26.36* (8.13)</td>
<td>30.89* (9.06)</td>
<td>27.31* (8.47)</td>
<td>26.27* (8.13)</td>
</tr>
<tr>
<td><strong>Regression Coeff.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Constant change</td>
<td>methods</td>
<td>1.58** (2.87)</td>
<td>0.22* (5.97)</td>
<td>9.97* (6.09)</td>
<td>13.08* (6.21)</td>
<td>0.39* (6.73)</td>
</tr>
<tr>
<td>anxiety_a</td>
<td>a_m1</td>
<td>-0.00 (-0.02)</td>
<td>-</td>
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<tr>
<td>anxiety_a</td>
<td>a_m2</td>
<td>-0.26* (6.19)</td>
<td>-</td>
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<tr>
<td>anxiety_a</td>
<td>a_m3</td>
<td>-</td>
<td>-</td>
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<td></td>
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<tr>
<td>Proportional change</td>
<td>methods</td>
<td>5.80* (-3.69)</td>
<td>6.06* (-5.61)</td>
<td>-10.27* (-6.27)</td>
<td>-8.72* (-5.74)</td>
<td>-9.10* (-6.85)</td>
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<tr>
<td>Mediator μ _m</td>
<td>0.00 (0.01)</td>
<td>-0.09** (-3.03)</td>
<td>-0.60* (-6.17)</td>
<td>-0.73* (-5.68)</td>
<td>-0.76* (-6.22)</td>
<td>-0.02 (-1.50)</td>
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<tr>
<td>anxiety_β</td>
<td>y</td>
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<td>-0.42* (-5.00)</td>
<td>-0.82* (-5.56)</td>
<td>-0.56* (-4.51)</td>
<td>-0.61* (-5.65)</td>
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<tr>
<td>β</td>
<td>y</td>
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<td>-0.51* (-4.81)</td>
<td>-0.88* (-6.36)</td>
<td>-0.80* (-6.77)</td>
<td>-0.81* (-7.39)</td>
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<td>β</td>
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<td>-0.52* (-4.19)</td>
<td>-1.08* (-7.75)</td>
<td>-0.91* (-6.06)</td>
<td>-0.95* (-7.15)</td>
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<tr>
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<tr>
<td>y</td>
<td>m1</td>
<td>-2.30 (-2.18)</td>
<td>-0.49** (-2.88)</td>
<td>-9.91** (-2.31)</td>
<td>-10.43** (-2.67)</td>
<td>-19.37** (2.71)</td>
</tr>
<tr>
<td>y</td>
<td>m2</td>
<td>-2.12 (-2.21)</td>
<td>-0.84 (-1.99)</td>
<td>-12.85 (-0.83)</td>
<td>47.93 (1.14)</td>
<td>31.59 (1.31)</td>
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<td>y</td>
<td>y</td>
<td>-0.01 (-1.34)</td>
<td>0.92 (2.48)</td>
<td>-</td>
<td>-</td>
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<tr>
<td>y</td>
<td>y</td>
<td>0.02 (1.89)</td>
<td>-0.33 (1.17)</td>
<td>-</td>
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</table>

**Note.** Numbers in parentheses represent critical ratios (CRs). CRs greater than 1.96 are salient. *p < .001, **p < .01, + p < .05. Reported estimates are unstandardized.
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For perceived control (ACQ-C) and child reported anxiety, the No coupling model fit best. For parent reported anxiety and perceived control the Coupling model was not identified.

However, both the Y → M model ($\chi^2 = 38.18$, $df = 21$, TLI = .93, CFI = .96, RMSEA = .08, $p$ close $> .05$, CI .04-.11) and the M → Y model ($\chi^2 = 39.60$, $df = 21$, TLI = .93, CFI = .96, RMSEA = .08, $p$ close $> .05$, CI .04-.12) were significantly better than the No coupling model, indicating a reciprocal effect between both variables. A decrease in anxiety symptoms during treatment preceded a subsequent increase in perceived control ($\gamma_{y1} = 0.92$, $p < .05$) post-treatment. At the same time, an increase in perceived control during treatment preceded a subsequent decrease in anxiety symptoms post-treatment ($\gamma_{m1} = -0.49$, $p < .01$) and an increase in perceived control post-treatment preceded a decrease in anxiety symptoms at follow-up ($\gamma_{m2} = -0.84$, $p < .05$).

An increase during treatment in direct problem solving strategies (DPS), positive cognitive restructuring (PCR) and distraction strategies (DS) preceded a decrease of parent reported anxiety symptoms post-treatment. No such relation was found for child reported anxiety symptoms. The best model for direct problem solving (DPS) was the M → Y model ($\chi^2 = 36.46$, $df = 21$, TLI = .94, CFI = .96, RMSEA = .07, $p$ close $> .05$, CI .03-.11). Change in DPS at T2 preceded change in anxiety symptoms at T3 ($\gamma_{m1} = -9.91$, $p < .05$). The M → Y model was also the best for positive cognitive restructuring (PCR, $\chi^2 = 15.30$, $df = 19$, TLI = 1.02, CFI = 1.00, RMSEA = .00, $p$ close $> .05$, CI .00-.11). Change in PCR at T2 preceded change in anxiety symptoms at T3 ($\gamma_{m1} = -10.43$, $p < .01$). For distraction strategies (DS), the M → Y model proved to have the best fit ($\chi^2 = 17.22$, $df = 19$, TLI = 1.01, CFI = 1.00, RMSEA = .00, $p$ close $> .05$, CI .00-.06). Change in DS at T2 preceded change in anxiety symptoms at T3 ($\gamma_{m1} = -19.37$, $p < .01$).

Finally, a change in child-reported anxiety symptoms was found to precede subsequent change in avoidant coping strategies. The Y → M model showed to have the best fit ($\chi^2 = 24.05$, $df = 19$, TLI = .98, CFI = .99, RMSEA = .04, $p$ close $> .05$, CI .00-.09). Post-treatment decreases in anxiety symptoms preceded a decrease in avoidant coping strategies at follow-up with borderline significance ($\gamma_{y2} = 0.02$, $p = .06$).

Discussion

The present study was a new step in determining mechanisms of change in CBT for anxiety disordered children, and explored the temporal relationships between change in several putative mediators and change in anxiety symptoms. Hereby our study expanded previous studies that have used pre-post designs. The results suggest that a change and increase in positive thoughts and several coping strategies preceded and contributed to a decrease in anxiety symptoms. A change in negative thoughts did not precede (nor follow) symptom reduction. These findings are partly consistent with the moderate effect sizes for positive change in cognitive and coping processes which were found in a review and meta-analysis of CBT for anxious children (Chu &
Harrison, 2007; Prins & Ollendick, 2003), and in previous treatment outcome studies indicating that negative thoughts and coping strategies are mediators of treatment effect (Kendall & Treadwell, 2007; Lau et al, 2010; Treadwell & Kendall, 1996).

Based on cognitive theory and more specifically on the Power of Nonnegative Thinking hypothesis, which predicts that an improvement in treatment is associated with a reduction of negative thoughts rather than an increase in positive thoughts, negative thoughts were expected to mediate treatment outcome. Surprisingly, a change in positive thoughts, but not negative thoughts, was found to precede change in anxiety symptoms. The Power of Nonnegative Thinking hypothesis has been supported in two mediation studies with a non-longitudinal design (Kendall & Treadwell, 2007; Treadwell & Kendall, 1996). Although the present results do not support these earlier findings, we cannot rule out that the design of our study, although longitudinal and with four assessment waves, was not sensitive enough to capture temporal precedence in the case of simultaneous growth in two variables. Negative thoughts decreased up to the end of treatment, parallel to the decrease in anxiety symptoms. An additional assessment point earlier in time (e.g. after session two or four) might have shown that a change in negative thoughts does precede a change in anxiety symptoms. Nevertheless, our results indicate that, contrary to what has been proposed so far, positive thoughts may play a mediating role in the treatment of anxiety disorders. This is supported by studies that have shown that anxious children tend to report less positive thoughts than non-anxious children (Calvete & Cardenoso, 2002; Hogendoorn et al, 2012, Ronan & Kendall, 1997) and that the amount of positive thoughts can predict anxiety level (Hogendoorn et al., 2012). These findings warrant the reconsideration of the Power of Nonnegative Thinking hypothesis, at least in children. Adult models of the role of cognition in anxiety may not be readily applicable to children, as was also mentioned by Field, Cartwright-Hatton, Reynolds and Creswell (2008). Especially the role of positive thoughts needs more attention in future studies.

Our study was the first to investigate the role of perceived control in CBT for child anxiety disorders in a longitudinal design. The findings only partly supported our hypothesis: we found evidence for a reciprocal effect where an increase in perceived control both preceded and followed upon a decrease in anxiety. Although it is generally assumed that low perceived control contributes to heightened anxiety (Chorpita & Barlow, 1998) there are, as far as we know, no longitudinal or experimental studies that clearly indicate the direction from perceived control to anxiety. Although perceived control generally increases after treatment of anxiety, it could also be a consequence of mastery experiences in successful coping and exposure exercises and follow upon a decrease in anxiety. Our results indeed indicate a bidirectional relationship, and further studies are needed to draw conclusions about the precise role of perceived control in the development and treatment of anxiety disorders.

Four out of five coping strategies which we examined in this study were related to anxiety symptoms. Only support seeking strategies were not related to anxiety symptoms and did not change over time. We found support for the hypothesis that an increase in direct problem solving
strategies, positive cognitive restructuring and distraction strategies preceded a reduction in (parent-reported) anxiety symptoms. This finding is consistent with the Lau et al. (2010) study that found coping strategies to contemporaneously mediate treatment effect. Although further studies are needed to establish that coping strategies are indeed mechanisms of change in the treatment of anxiety, the evidence so far suggests that improving coping skills may be essential to obtain treatment effect. Our hypothesis regarding avoidant coping strategies was not supported. On the contrary, we found a marginally significant opposite effect: a reduction of anxiety symptoms preceded the reduction of avoidant coping strategies. Avoidant strategies included avoidant actions (staying away from the problem), repression (just forgetting about it) and wishful thinking (imagine how you would like things to be). It is possible that avoidant coping strategies do not necessarily have to change before anxiety can diminish, and may even be a consequence of changes in anxiety level. However, this result should be interpreted with caution due to the marginal significant effect. Further, this is the only effect we found that exclusively took place during the follow-up period. Although the study design included a treatment-free period between the post-treatment and follow-up assessments, it turned out that this was not always possible due to ethical reasons. When this was the case, the preferred option was to continue with the Coping Cat protocol and continue the use of exposure exercises and previously learned skills.

It should be noted that different effects were found for child- or parent reported outcome. Most effects (i.e. for perceived control, direct problem solving coping, positive cognitive restructuring, distraction seeking) were found for parent-reported symptom change, although there were trends in the same direction for perceived control and child reported anxiety symptoms. Alternatively, effects for positive thoughts and avoidant coping strategies were found for child-reported anxiety, although there was a trend in the same direction for positive thoughts and parent-reported anxiety. Moreover, parents consistently reported more anxiety symptoms over time than children. Further, repeated measure ANOVAs revealed that anxiety symptoms decreased from pre-treatment up to follow-up for child-report, but only from mid-treatment to follow-up for parent-report. One possible explanation for the different conclusions based on parent or child report could be a statistical one. The fact that there was no change in parent-reported anxiety between pre- and mid-treatment, while change occurred in the putative mediators within this time-frame, makes it easier to detect a temporal effect. However, it may also be possible that the difference between informants is a real difference which means that children and parents experience, observe or report anxiety problems in a different way. Many studies have found informant discrepancies between child and parent measures (e.g. Choudhury, Pimentel, & Kendall, 2003). Informant discrepancies seem to be constant over time and larger discrepancies have found to predict worse treatment outcome (Reyes, 2011).
Strengths and Limitations

The present study was the first to examine putative mediators in the treatment of childhood anxiety disorders with a longitudinal design including an in-treatment assessment. This is important, as one of the requirements to establish mediation is to assess temporality (Weersing & Weisz, 2002). Further, the design allowed examining reciprocal effects between variables, which is important to exclude a different order of causal relations (Maric, Wiers et al., 2012). Using this design we were able to show that a change in four putative mediators in the first eight treatment sessions preceded a change in anxiety symptoms in the last four sessions. Further, we indeed found a reciprocal effect for perceived control. However, other requirements to really establish mediation or to permit causal interpretations were not included in our design. For example, we did not include a control condition in the LDS models. As Maric, Wiers & Prins (2012) indicate, this does not provide full evidence for mediation as no evidence can be found that changes in the mediator are caused by the active treatment and not, for example, the passage of time. Although our study included a waitlist condition, we were not able to include this in our longitudinal models due to the shorter waitlist period (eight weeks versus twelve weekly treatment sessions). This limits conclusions about mediation. However, we did not consider it ethical to use a 12 week (equal to treatment length) or 24 week (equal to treatment plus follow-up period) waitlist period.

A further design limitation is that we only included one assessment point during treatment which means that we might have missed other (reciprocal) effects that unfolded earlier or later in time. Future studies should include multiple in-treatment assessment points, also because it is unknown what the best timing is to measure change (e.g., in the beginning, middle, or end of treatment). Note, however, that compared to earlier studies so far conducted, inclusion of four assessment waves is already an important asset of the current investigation.

Another strength of the current study may at the same time be considered a limitation. We examined eight different potential mediators that are thought to be related to the development and treatment of anxiety disorders. As we included both parent and child reported anxiety as an outcome variable, the total amount of models examined was sixteen. Although it is important to examine different possible mediators using different informants (Maric, Wiers et al., 2012), this also complicates interpretation and increases the possibility of type I errors. We found significant relations between the putative mediator and outcome for six of the eight mediators in six of the sixteen models. Our models included so many parameters that almost all change was accounted for, indicated by the very high values of the fit statistics and small degrees of freedom. This means that the difference between nested models was so small that it was already difficult to find significant differences. For this reason, and because of the fact that this was the first study to longitudinally examine putative mediators of treatment outcome in anxious children, we chose not to include a Type I correction. Obviously, results should be replicated with other samples.
Unfortunately, our sample size was too small and our models too complex to examine mutual relationships between different mediators simultaneously; or to take additional variables into account, for example developmental level, specific diagnosis, comorbid diagnoses, symptom severity or gender. It would be very interesting and also necessary to examine whether the temporal dependencies that were found between different putative mediators and anxiety level would be similar for different age groups, or even better, (cognitive) developmental levels. It could be hypothesized that for example cognitive restructuring is a more potent mechanism of change in older than in younger children because they are more able to reflect on their thoughts. For younger children other processes, such as parental control, could be mechanisms of change. Also, children with for example social phobia might profit from other treatment components (e.g. social skills training), than children with other anxiety diagnoses (Kendall, Settipani, & Cummings, 2012).

Another strength of our study was that the included children were representative of the children that are seen in centers for child- and adolescent psychiatry, at least with regard to type and severity of anxiety disorder, gender, age and place of residence (rural/urban). Our sample, however, was mainly Caucasian and might not be representative for other ethnic groups. Moreover, results should be replicated in other countries. Further, the attrition rate in our study was considerable: 22% of the children did not complete the post-treatment assessment. However, this is comparable to other studies. For example, Kolko, Brent, Baugher, Bridge, and Birmaher (2000) reported an attrition rate of 24%. Moreover, preliminary analysis revealed no pre-treatment differences in children who dropped out and who did not. We also controlled for missing observations by our statistical analysis (imputing missing data and using full-information maximum likelihood).

Clinical Implications and Future Directions
The current study was a new step in determining mechanisms of change in empirically supported treatments for anxiety disorders and adds to the previous pre-post design mediation studies. The results suggest that a change in positive thoughts, but not negative thoughts, and several coping strategies precedes a change in symptom reduction and therefore at least partly supports theoretical models of anxiety upon which the anxiety intervention is based. Because this is one of the first studies to investigate the temporal precedence of multiple putative mediators in CBT for anxiety disordered children in a longitudinal design, it is premature to advice for or against the use of certain treatment components. Although we found for instance that an increase in positive thoughts and coping strategies preceded symptom improvement, this does not necessarily has a direct relation with cognitive restructuring and teaching coping strategies, respectively. For example, positive thoughts could also have changed due to learned coping strategies, as a result of higher self-efficacy or as an epiphenomenon of exposure. More importantly, our study investigated only some requirements to establish mediation.
Therefore, future studies should employ an experimental or dismantling design in which certain components of the treatment protocol are eliminated in order to examine the relative impact of each component (Maric, Wiers et al., 2012). Finally, we know from other studies that change can occur very early in treatment (e.g. Wilson, 1999). Therefore, it is recommended that future studies incorporate more assessment points, especially earlier in treatment.

**Acknowledgements**

The authors would like to thank Marija Maric and David MacKinnon for their suggestions regarding the mediational analysis. We would further like to thank all participating children, parents and therapists for their time and effort.
The studies presented in this dissertation aimed at two main goals: 1) To improve the measurement of potential mediators in children by developing two types of instruments (an indirect measure and a repeated measure) that are currently underrepresented in research with children, and 2) To examine mediators of evidence-based, cognitive behavioral treatment of anxiety disordered youth. In this final chapter, the findings from the studies presented in Chapters 2 through 7 are summarized and discussed. Furthermore, strengths and limitations of the studies are described and clinical implications of the results are discussed, followed by recommendations for future research.

It is interesting to note how the focus and goals of a study can change over time due to changing insights in methodological and statistical issues. When our study described in this dissertation began in 2005, we set out to measure several moderators and potential mediators in both direct (questionnaires) and indirect (computer tasks) ways. The question was whether changes in specific constructs (e.g. perceived control) were reflected in direct and indirect measures simultaneously or successively, and whether mediators could be identified in both a direct and indirect way. However, while keeping up with the quickly expanding literature on implicit measures, we discovered that the development of those measures, when applied to children, was still largely in its infancy. It appeared that indirect measures might become useful as a diagnostic tool in the future, but are currently still in an experimental phase. Our goal to use indirect measures in an analysis of potential mediators therefore had to be adjusted to the goal to develop valid and developmentally sensitive indirect measures for use with children. In this dissertation we report on the development of one of these measures, the Perceived Control IAP.

Vervoort (2010) in her dissertation, has described several other instruments that we developed to assess response inhibition in neutral and threatening situations (the emotional Stop Task), automatic stimulus evaluations (a pictorial Extrinsic Affective Simon Task, EAST) and threat-related attentional processes (pictorial dot probe detection task, see also Wolters et al., 2012).

A second change in our plans concerned the analysis of mediators. Initially, the method to evaluate mediators as described by Baron and Kenny (1986) and later refined by Kraemer, Wilson, Fairburn, and Agras (2002) was used as a frame of reference for the statistical analyses. We therefore decided to include a waitlist control group which had to wait sufficiently long, but not too long for ethical reasons. A waitlist period of eight weeks was considered acceptable and had been employed in other studies (e.g. Kendall, 1994; Kendall et al., 1997). As the waitlist condition was eight weeks, we decided to plan the in-treatment assessment in the treatment group between session eight and nine (i.e. after approximately eight weeks of treatment). However, what holds for the literature about indirect measures, also holds for the literature about statistical mediation analysis: quite a number of studies conducting mediation analyses have been published between 2005 and 2010. Many different and advanced statistical methods with regard to mediation analysis have become available next to the use of regression analysis, as is described in depth by MacKinnon (2008). We decided that Latent Difference Score (LDS) Modeling was the optimal method to examine our research question: does a change in
the putative mediator precede a change in the outcome variable. Choosing the LDS method meant that it was not possible to include the waitlist condition anymore, as this condition and the treatment condition were of unequal length. However, we were still able to establish the efficiency of CBT relative to a waitlist condition in our particular sample.

Summary of the Findings

In Chapter 2 and 3 we described the development and use of the Perceived Control IAP, a computer task to indirectly measure perceived control in children. The rationale for developing an indirect measure of perceived control was that indirect measures are generally less sensitive to social desirability or introspective abilities and might be an aid to predict relapse. We showed that the IAP was able to discriminate between non-referred children with higher and lower anxiety levels (Chapter 2) and between anxiety disordered and non-anxious children (Chapter 3). Higher anxious non-referred children or anxiety disordered children reported less perceived control on both the direct measure (questionnaire) and indirect measure (IAP). However, the effect on one of the IAP scores was only found for children younger than twelve years old: in older children we did not find a difference on indirect perceived control between either non-referred children with higher and lower anxiety levels (Chapter 2), or between anxious and non-anxious children (Chapter 3). In both studies, the direct and indirect measures were weakly associated. This is in line with previous research and the notion that direct and indirect measures assess related, but distinct constructs. The internal reliability of the IAP proved to be weak to moderate and test-retest reliability was moderate. We conclude that the IAP can become a valuable supplement to understand perceived control in children, but the task is not sensitive enough yet to measure intraindividual changes.

Repeated assessment is not only valuable to determine temporal relations between variables in mediation studies, but it can also be valuable in individual treatments. In Chapter 4 the development of the Anxiety Severity Interview for Children and Adolescents (ASICA) is described. We developed this instrument to sensitively and repeatedly assess components of the anxiety response (physiological, cognitive, and behavioral) over the course of treatment. The ASICA fits in "patient-oriented research", which is more focused on individual than group differences. The ASICA proved to be sensitive to treatment change and was able to effectively discriminate between anxious and non-anxious children. We believe that the use of the ASICA by therapists can help them to monitor treatment progress and provide their clients with an insight into their treatment progress.

Chapter 5 and 6 dealt with the role of positive thoughts in theoretical and treatment models of anxiety. So far, too little attention has been paid to the role of positive thoughts in childhood anxiety. We expanded an existing questionnaire (the CATS), which measures negative thoughts, with items developed to measure positive thoughts. We chose the CATS
because this questionnaire was developed using children’s self-statements, contains items that measures thoughts rather than anxiety symptoms, and has good psychometric properties. The resulting questionnaire, the CATS-N/P, proved to have factorial validity and good reliability in a non-anxious sample (Chapter 5) and was able to discriminate between anxious and non-anxious children (Chapter 6). Anxious children reported more negative, but also less positive thoughts than non-anxious children. Further, using the CATS-N/P, we showed that both the amount of negative and positive thoughts was predictive of anxiety level, indicating that a relative shortage of positive thoughts may contribute to anxiety disorders in children.

In Chapter 7 we evaluated several putative mediators in the treatment of anxiety disorders using state of the art statistical analysis. The main characteristic that distinguished our design from other studies was the longitudinal approach with an in-treatment assessment point. By modeling the interaction between change in the putative mediators and change in anxiety symptoms, we showed that a change in positive thoughts and several coping strategies preceded change in anxiety level. Surprisingly, our model did not support a role of negative thoughts as a mediator. We found a reciprocal effect for perceived control where an increase in perceived control both preceded and followed upon a decrease in anxiety. Finally, an avoidant coping style turned out to be a consequence rather than a cause of change in anxiety level.

**Strengths and Limitations**

**Strengths**  
The main strength of our study is that, as far as we know, we are the first to investigate multiple putative mediators of the treatment of anxiety disordered children in a temporal design. This is an important step forward from the usual cross-sectional designs. Although we are well aware that ascertaining true causality is very difficult and that we only investigated one of the requirements to establish mediation, a longitudinal design provides more insight into cause-and-effect relations than pre-post designs where temporal relations between variables cannot be established (Nock, 2007). The use of a longitudinal design distinguishes our study from earlier studies that examined possible mediators of the treatment of anxiety in children (Alfano et al., 2009; Kendall & Treadwell, 2007; Lau, Chan, Li, & Au, 2010; Maric, Heyne, MacKinnon, Van Widenfelt, & Westenberg, 2012; Treadwell & Kendall, 1996). These studies used a pre-post design (Alfano et al., 2009; Kendall & Treadwell, 2007; Lau et al., 2010, Treadwell & Kendall, 1996) or a longitudinal design without an in-treatment assessment (Maric, Heyne et al., 2012) and were therefore unable to examine temporal relations between possible mediators during treatment and outcome.

Additionally, with the statistical analysis used, not only did we model inter individual differences, but also intra individual changes and differences in intra individual change. This is important, as individuals’ time courses can differ substantially from each other. Another
advantage of our design is that we were able to examine reciprocity and reverse causality, in which change in the outcome secondarily produces change in the putative mediator. In fact, we did find evidence for reciprocity in the case of perceived control and evidence for reverse causality for avoidant coping strategies.

Another strength of our study was that we paid extra attention to the use of valid and reliable measurement instruments. This is important in any study, but especially when employing complex statistical models where unreliable instruments can have a large impact on the outcome. We used existing measures (e.g. the ADIS-IV CP or CCSC-R1) when psychometric properties of the Dutch versions were satisfactory. In other cases we were not satisfied with the existing measures and decided to make adaptations (e.g. CATS-N/P) or a translation (ACQ-C; Hogendoorn et al., 2011). Psychometric properties of all developed and translated measures were examined in both a large sample (over 550 children) of non-referred children and in a clinically anxious sample. Further, we also developed and investigated an indirect measure that provided an alternative way to measure perceived control in children. In the future this measure might be used to examine whether indirectly assessed perceived control might mediate treatment outcome.

Finally, we included a clinically representative group of anxious children. Some studies recruit children via advertisements in papers, which is an effective way, but the anxiety level of children recruited that way is often low to moderate. Other studies employ very strict inclusion-or exclusion criteria, limiting their generalizability. Our sample consisted of children who were referred to the outpatient clinics of either one of two academic centers for child and adolescent psychiatry. Many children had severe anxiety disorders, including 19% that did not attend school anymore. Some of these children only rarely left their house and were severely impaired in their social and academic life. More than 50% of the children in our sample reported more than one (anxiety) disorder. The therapists differed in time of experience: some just graduated and others had more than ten years of experience. We therefore think that our results generalize to common clinical practice.

Limitations
Our study had several limitations. Although we included a clinically representative group of anxious children in our study, it should be noticed that there was essentially no cultural diversity in our sample, as most children were of Dutch origin. Further, although our initial sample size was satisfactory, attrition rates were fairly high. Some children dropped out due to the severity of their disorder and they needed more than the outpatient treatment we could offer them. Another reason for parents and children to drop out was burden of time involved: assessments sometimes took up three to four hours. Although the attrition rate was fairly high, it was comparable to the attrition rates in other studies (e.g. Kolko, Brent, Baugher, Bridge, & Birmaher, 2000). Further, the drop out or the timing of drop out (e.g. at mid-treatment or at follow-up) did correspond to pre-treatment characteristics (e.g. anxiety level, age, gender).
A major limitation was that some children received further treatment during the follow-up period. Originally we planned a treatment-free period for three months after the twelve sessions of the treatment protocol. However, it turned out that this was not always possible, because some children still had serious complaints. When this was the case, the preferred option was to continue with the Coping Cat protocol and continue the use of exposure exercises and previously learned skills. In some instances it was necessary to add medication or to even refer to inpatient treatment. As a result, the follow-up period was not as “pure” as the treatment period. However, most mediating effects occurred during the first treatment period and were most likely the result of the initial treatment.

So far, we stressed the importance of a longitudinal design. However, the timing of the in-treatment assessment (after session 8) might not have been optimal and too late to capture early changes. This idea is supported by studies in adults, which have found that changes can occur very early in therapy and sometimes quite suddenly (e.g. Penava, Otto, Maki, & Pollack, 1998; Wilson, 1999). However, other studies report that changes can also occur in the final phases of treatment (Maric, Wiers, & Prins, 2012). For future studies we recommend more and earlier assessment points, preferably at every session or every other session.

Although we examined several mediators in our study, the model used in our study is most likely still oversimplified. The mediators that we incorporated were chosen for their importance in theories about the development and treatment of anxiety disorders. However, many more mediators could have been examined, for example interpretation bias, anxiety sensitivity, self-efficacy, etc. Additionally, although we assessed several possible moderating variables – such as age, gender, number of diagnoses, behavioral inhibition, and executive functioning – we did not include these in the model (moderated mediation). In earlier studies, it has been found that higher levels of child- and parental psychopathology (especially parental anxiety and depression) and older age of the child were associated with less favorable treatment response (e.g. Silverman, Pina, & Viswesvaran, 2008; Southam-Gerow, Kendall, & Weersing, 2001), although in other studies age has not proven to be a significant moderator (e.g. Rapee, Schniering, & Hudson, 2009). On the other hand, other factors do not seem to predict treatment response, for example child ethnicity, gender, therapeutic relationship, family income or family composition (Rapee et al., 2009; Silverman et al., 2008; Southam-Gerow et al., 2001). In future studies we recommend to combine mediators and moderators in the same model to be able to investigate possible moderated mediation or mediated moderation. For example, it is conceivable that negative or positive thoughts are mechanisms of change, but perhaps only in older children.

A final remark is that our conclusions are based on just a single measurement instrument for most variables. In future studies we recommend using multiple questionnaires for the same construct (e.g. positive thoughts) to see whether the effects are stable. Of course, different modalities (e.g. indirect measures, behavioral observation) may be included as well (see also Maric, Wiers et al., 2012).
Implications

Theoretical Implications

Cognitive model. The results of the described studies have implications for the cognitive model of anxiety disorders. Our findings raise, for example, questions about the validity of the “Power of Nonnegative Thinking” hypothesis and the Tripartite model of anxiety and depression in children. The Power of Nonnegative Thinking hypothesis states that only negative thoughts play a role in anxiety and suggests that it is not necessary to change positive thoughts during treatment (Kendall & Chansky, 1991). Contrary to this hypothesis, in our study positive thoughts did seem to play a role in the treatment of anxiety disorders: anxious children reported less positive thoughts than non-anxious children, the amount of positive thoughts predicted anxiety level, and a change in positive thoughts preceded a change in anxiety symptoms in the treatment of anxiety disorders. The theoretically proposed role of negative thoughts was only partially supported by our studies. Anxious children reported more negative thoughts than non-anxious children (Chapter 5); the amount of negative thoughts was predictive of anxiety level (Chapter 6) and negative thoughts decreased during and following treatment (Chapter 7). However, a decrease in negative thoughts did not temporarily precede a change in anxiety symptoms (Chapter 7). Note that methodological issues (late in-treatment assessment) might have precluded finding an effect for negative thoughts. Our results add to other studies which have found that higher anxious children report less positive thoughts than less anxious children (Calvete & Cardenoso, 2002; Ronan & Kendall, 1997; Zatz & Chassin, 1985).

The Tripartite model of anxiety and depression assumes that both anxiety and depression share a heightened negative affect, but that physiological hyperarousal is specific for anxiety while a lack of positive affect is specific for depression (Clark & Watson, 1991). So far, the Tripartite model has not been examined frequently in children, but results from previous studies seem to indicate that a lack of positive affect is associated with both depression and social phobia (e.g., Anderson & Hope, 2008; Hughes & Kendall, 2009). Our study adds to these findings and although some children reported comorbid mood disorder, this was only a small part of the sample (16%) and will not explain the effect. Exploratory analysis of our data revealed however, that children with comorbid mood disorder or children with social phobia or panic disorder reported even less positive thoughts than children with a single anxiety disorder, no social phobia or no panic disorder, respectively. To summarize, adult models of the role of cognition in anxiety may not be readily applicable to children, as was also mentioned before by Field, Cartwright-Hatton, Reynolds and Creswell (2008). Especially the role of positive thoughts in childhood anxiety needs more attention. Note that we only investigated parts of the cognitive model and did not look at other components of the model such as interpretation or attention biases.

Perceived control. Perceived control was examined as a mediator because it is supposed to play a central role in the development of anxiety disorders (Chorpita & Barlow, 1998),
because anxious children have been found to report lower levels of perceived control (Weems, Silverman, Rapee, & Pina, 2003) and because perceived control has been found to increase after treatment (Muris, Mayer, den Adel, Roos, & Van Wamelen, 2009). Although we replicated the findings of Muris et al. (2009), perceived control did not act as a mediator in treatment. We found evidence for a reciprocal effect in which an increase in perceived control both preceded and followed upon a decrease in anxiety. This is interesting, as it is generally assumed, but as far as we know not yet experimentally or longitudinally examined, that low perceived control contributes to heightened anxiety and not vice versa. Although perceived control generally increases after treatment, it could also be a consequence of mastery experiences in successful coping and exposure exercises and follow upon a decrease in anxiety. Our results suggest that the association between perceived control and anxiety might be more complex than has been thought so far. Evidently, our results should be replicated and future studies could examine the temporal relationship between, for example, increased active coping strategies, perceived control and symptom reduction. Finally, the experimental status of the perceived control IAP precluded an examination of the role of indirectly assessed perceived control in treatment. It would be interesting to examine whether perceived control as measured by the IAP increases after treatment and whether this change precedes or follows a change in anxiety level.

Clinical Implications
In this study we found an indication that a change in positive thoughts and coping strategies mediate treatment effects in the treatment of anxiety in children, and seem to contribute to a decrease in anxiety symptoms. However, we want to stress again that we investigated mediators, but not the treatment components that bring about this change. Because different therapeutic techniques, like cognitive restructuring and exposure, were not studied separately, we cannot identify which technique caused the change. Although a change in positive thoughts turned out to precede symptom improvement, we still do not know why the amount of these thoughts increased. Thoughts can change for example due to cognitive restructuring, due to changed coping strategies, due to mastery experiences during exposure, or due to (a combination of) all three. Additionally, we do not know which techniques brought about the change in coping strategies. Based on our results we cannot advise to omit or increase the use of certain therapeutic techniques such as cognitive restructuring in the treatment of childhood anxiety. However, we can advise therapists to specifically pay attention to the amount and function of positive thoughts a child reports, or to the used coping strategies.

The measurement instruments we developed in this study can be used by clinicians to assess components of anxiety disorders and the progress of treatment. The ASICA proved to be a reliable and clinically useful instrument to monitor treatment progress. Therapists can use the ASICA to identify specific problems of the child pre-treatment and to plan treatment. Some children will report many anxiety-related physiological responses, while others will report many anxious thoughts. Some children may report that they never try to do anything about their fears,
while others do try to resist their avoidant behavior or fears, but do not manage yet to control them. The repeated assessment of the ASICA during treatment can be used to set and evaluate treatment goals. For example, some children cannot report any negative or positive thoughts pre-treatment. In this case, a first goal can be to learn to distinguish thoughts from feelings, and a second goal to change these thoughts and feelings. The repeated assessment of the ASICA can help to monitor this process. Finally, we know from clinical practice that the plotting of ASICA scores in a graph can be a real incentive for children: they report to be motivated to “see the lines go down”. Due to the amount of other variables we used to investigate putative mediators in this study, we did not incorporate the ASICA in our LDS models. However, the ASICA could be used to examine mediation in future studies and could be especially relevant in n=1 designs which incorporate multiple repeated assessments.

The other developed or translated instruments (e.g. the CATS-N/P, ACQ-C) can also be used to inform therapists about the status of the patient at the start of treatment or to evaluate treatment progress. For example, when a child does not report many negative self-statements in the beginning, the therapist can decide to invest less time in cognitive therapy, but more in exposure. On the other hand, when a child is not able to report any anxious thoughts, the CATS-N/P can be used to give examples of negative and positive self-statements.

### Directions for Future Research

Although both researchers and therapists who work in the field of clinical psychology have the same goal, namely to treat emotional and behavioral disorders rapidly, effectively and efficiently, their interests may differ. Researchers want to control as many external influences as possible, ask therapists to strictly adhere to the treatment protocol and generally examine treatment changes in groups rather than in individuals, requiring large sample sizes. On the other hand, therapists want to know which treatment or what treatment components are most effective for a particular individual and want to be able to flexibly deliver treatment protocols. In the future we would ideally be able to screen a referred child for certain characteristics and offer it a tailor-made treatment with the highest chance of fast and enduring success. There are several ways to reach this goal, for example by further examining mediators or by investigating treatment components.

### Mechanisms of Change

There are still many steps to take in the study of the active mediators of treatment. Our study was one of the first to investigate change over time in the treatment of anxiety in children. The results suggest that a change in positive thoughts and coping strategies precede a change in anxiety level. However, important questions remain to be answered. First, we only investigated part of the requirements that are needed to establish whether a certain variable is a mediator,
or mechanism of change (see Kazdin & Nock, 2003). In this study we focused especially on temporal precedence and possible reciprocal effects between putative mediators and treatment outcome, and did not include a control condition in the analysis. This precludes definitive conclusions about whether the investigated variables are mediators. Future studies could at least combine a temporal design with the use of an experimental and control condition. Second, the results of our study should be replicated in another sample. Third, the generalizability of the results to other treatment packages or other treatment modalities (e.g. group delivery, internet delivery, etc.) should be examined. Fourth, the specificity of our results is unclear and we do not know if we would find the same or other results for positive thoughts and coping in, for example, childhood depression. Fifth, we advise to investigate the role of both positive and negative thoughts and perceived control more thoroughly by longitudinal designs with more assessment points. Sixth, other possible mediators should be studied in a longitudinal design, for example interpretation bias, social skills (see Alfano et al., 2009) or self-efficacy (see Maric, Heyne et al., 2012). Additionally, putative mediators (e.g. positive thoughts) and moderators (e.g. age, kind of anxiety disorder) could be combined in future studies.

Treatment Components

As we mentioned before, we only studied temporal precedence of putative mediators and could not link them to specific treatment components. A next step is to implement so called “dismantling” studies where specific treatment components are investigated. Specific components that can be identified in most CBT programs for anxiety problems are relaxation exercises, cognitive restructuring, teaching problem solving skills and exposure exercises. Although it is sometimes very difficult to disentangle the components, a dismantling study could for example compare “cognition free” treatment with “exposure free” treatment. Subsequently, the changes in cognition, coping and perceived control in both conditions could be monitored. In this way it could be determined whether a change in thoughts is a mediator in both or in only one condition. Of course, other components such as social skills training, targeting parent anxiety or the inclusion of parents could be examined. Dismantling studies are not new, but they often do not measure mediators (Hudson, 2005). Most dismantling studies show that different components can bring about change in the same variables or that the same component can bring about change in different variables. Further, underlying mechanisms might be different for different anxiety disorders (Davis III, May, & Whiting, 2011). Therefore we recommend combining dismantling studies with the examination of treatment mediators.
General Conclusions

In this dissertation several putative mediators in the treatment of anxiety disorders in children were examined. Parallel to this, two additional instruments were developed to improve the measurement of mediators. The main conclusions are: 1) An increase in positive thoughts and coping strategies precedes a decrease in anxiety level during the treatment of childhood anxiety disorders; 2) Both positive thoughts and negative thoughts are related to anxiety disorders in children, which has implications for the use of the Power of Nonnegative Thinking hypothesis and Tripartite model in children; 3) A decrease in negative thoughts does not seem to precede a decrease of anxiety level during the treatment of anxiety disorders in children; 4) Changes in perceived control do not only precede, but also follow upon a change in symptom level during the treatment of childhood anxiety; 5) A change in an avoidant coping style does not precede a change in symptom level in the treatment of childhood anxiety, but instead follows upon a change in anxiety level; 6) The Perceived Control Implicit Association Procedure (IAP) can be used to indirectly assess perceived control in children, but it cannot be applied yet to measure intraindividual change; 7) The Anxiety Severity Interview for Children and Adolescents (ASICA) can be used to repeatedly assess anxiety severity during treatment and its use is valuable both for the clinician and the client; 8) The Children's Automatic Thoughts Questionnaire-Negative/Positive (CATS-N/P) is a valid and reliable instrument to measure both negative and positive thoughts in children; 9) Further research is needed to establish which treatment techniques bring about change in putative treatment mediators.
Samenvatting
(Summary in Dutch)
Angststoornissen komen veelvuldig voor bij kinderen en adolescenten, met prevalentiecijfers van 9.7% bij 13- tot 18 jarige Nederlandse adolescenten (Verhulst, Van der Ende, Ferdinand, & Kasius, 1997). Hoewel uit verschillende studies blijkt dat Cognitieve Gedragstherapie (CGT) effectief is bij 54% tot 74% van de kinderen (o.a. James, Soler, & Weatherall, 2009), betekent dit dat drie tot vier van de tien kinderen aanzienlijk angstig blijven na behandeling. Een manier om de behandeling van angststoornissen bij kinderen en jongeren te verbeteren is het onderzoeken van de mediatoren van de behandeling. Wat maakt dat de behandeling werkt? Een mediator is een variabele in de causale relatie tussen een onafhankelijke variabele (in dit geval behandeling) en een afhankelijke variabele (hier afname van angstsymptomen). Hoewel er theorieën zijn over welke mediatoren bijdragen aan het behandeleffect, is hier nog nauwelijks onderzoek naar gedaan. Voor zover wij weten zijn er tot op heden vijf studies uitgevoerd die nader keken naar mediatoren van de angstbehandeling bij kinderen. Uit deze studies blijkt dat een afname van negatieve cognities (Kendall & Treadwell, 2007; Lau, Chan, Li, & Au, 2010; Treadwell & Kendall, 1996), een toename van coping vaardigheden (Lau et al., 2010), een afname van eenzaamheid (Alfano et al., 2009), en een toename van "self-efficacy" (Maric, Heyne, MacKinnon, Van Widenfelt, & Westenberg, 2012) mogelijk behandeluitkomst mediëren. Hoewel deze studies goede aanknopingspunten bieden is een nadeel dat zij geen metingen hebben gedaan tijdens de behandeling, wat conclusies over temporele afhankelijkheid moeilijk maakt (d.w.z. de vraag of de mediator veranderde vóór de verandering in angst). Een eerste doel van dit proefschrift was het onderzoeken van verschillende mediatoren van de behandeling van angststoornissen bij kinderen van 8 t/m 18 jaar in een longitudinaal design met herhaalde metingen. Meer specifiek werd hierbij gekeken of een verandering in het aantal gerapporteerde negatieve gedachten en positieve gedachten, een verandering in de mate van ervaren controle en een verandering in verschillende coping strategieën, voorafgingen aan een afname van angstsymptomen.

Een tweede doel van dit proefschrift was het verbeteren van de meting van potentiële mediatoren. Daartoe werden twee verschillende instrumenten ontwikkeld van een type dat momenteel nog niet veel gebruikt wordt bij kinderen en adolescenten, namelijk een indirecte maat (computertaak) en een interview om herhaaldelijk symptomen en ernst van angst vast te kunnen stellen.

Het onderzoek dat in dit proefschrift wordt beschreven is onderdeel van een grote multicenter studie uitgevoerd door twee centra voor Kinder- en Jeugdpsychiatrie: de afdeling voor Kinder- en Jeugdpsychiatrie van het AMC / de Bascule in Amsterdam en Accare in Groningen. Dit in samenwerking met de afdeling Ontwikkelingspsychologie van de Universiteit van Amsterdam, de afdeling Klinische Psychologie van de Universiteit van Groningen en de afdeling Psychiatrie van het Universitair Medisch Centrum in Groningen.
Overzicht van de Belangrijkste Bevindingen

In Hoofdstuk 2 en 3 worden de ontwikkeling en de psychometrische eigenschappen beschreven van een computertaak om ervaren controle te meten: de IAP (Implicit Association Procedure). Ervaren controle is het gevoel dat men controle uit kan oefenen over een beangstigende situatie. Chorpita en Barlow (1998) menen dat een gebrek aan ervaren controle centraal staat in de ontwikkeling van een angststoornis. De IAP maakt geen gebruik van een expliciete respons (zoals op een vragenlijst), maar van reactiviteiten om op indirecte wijze de mate van ervaren controle vast te stellen. De reden om op deze wijze te meten is dat indirecte maten in het algemeen minder sensitief zijn voor sociale wenselijkheid en minder afhankelijk van mogelijkheden tot introspectie. Bovendien wordt gedacht dat directe maten (vragenlijsten) vooral gecontroleerd en bewust gedrag voorspellen en dat indirecte maten (op basis van reactiviteiten) beter automatisch of ongecontroleerd gedrag voorspellen. Indirecte maten kunnen daarom mogelijk bijdragen aan het voorspellen van terugval na behandeling.

Bij de IAP moeten kinderen een joystick naar zich toe trekken of van zich af duwen al naar gelang het soort plaatje dat ze op het computerscherm zien (een Controle plaatje of een Geen controle plaatje). De reactiviteiten voor verschillende plaatjes worden van elkaar afgetrokken, resulterend in een IAP Controle en IAP Geen controle score. Een hogere score is indicatief voor meer ervaren controle. In Hoofdstuk 2 worden de resultaten op de IAP vergeleken met een vragenlijst (directe maat) voor ervaren controle, de ACQ-C (Anxiety Control Questionnaire for Children), bij 33 niet-geselecteerde kinderen. In Hoofdstuk 3 wordt de IAP nader onderzocht door een groep klinisch angstige kinderen (n = 136) te vergelijken met een groep niet-geselecteerde kinderen (n = 31). Daarnaast werd de validiteit van de gebruikte stimuli (afbeeldingen) onderzocht in een aparte niet-geselecteerde groep van 38 kinderen. Uit de resultaten bleek dat de IAP onderscheid kan maken tussen niet-geselecteerde kinderen met hogere en lagere angstniveaus (Hoofdstuk 2), en tussen kinderen met en zonder angststoornis (Hoofdstuk 3). Hoger angstige kinderen en kinderen met een angststoornis rapporteerden minder ervaren controle op zowel de indirecte maat (IAP) als de directe maat (ACQ-C). Voor de IAP Geen controle score gold dit echter alleen voor kinderen jonger dan twaalf jaar. In beide studies bleken de indirecte en directe maat een zwakke associatie te hebben. Dit komt overeen met eerdere studies die vonden dat beide soorten maten gerelateerde, maar afzonderlijke constructen meten. De interne en test-hertest betrouwbaarheid van de IAP bleken matig. Kinderen bleken goed in staat om de gebruikte plaatjes in te delen in Controle en Geen controle. Onze conclusie is dat de IAP een waardevolle toevoeging kan zijn om ervaren controle bij kinderen te meten, maar dat de maat nog niet sensitief genoeg is om intra individuele veranderingen te meten. De IAP is daarom ook niet meegenomen in de analyse van potentiële mediatoren.

In Hoofdstuk 4 wordt de ontwikkeling en klinische toepasbaarheid van de ASICA (Anxiety Severity Interview for Children and Adolescents) beschreven. De ASICA is een redelijk kort, semigestructureerd en door de clinicus gescoord interview dat herhaaldelijk kan worden
gebruikt door een therapeut om de ernst van angstsymptomen te meten tijdens de behandeling. De ASICA past daarmee binnen "patiënt georiënteerd" onderzoek, dat zich meer richt op individuele dan groepsverschillen. De ASICA meet drie hoofd componenten van angst: angstige (lichamelijke) gevoelens, vermijdend gedrag, en angstige gedachten. De psychometrische eigenschappen van de ASICA werden onderzocht bij 139 kinderen met een angststoornis en 40 niet-angstige kinderen. De ASICA bleek sensitief voor verandering in angst tijdens de behandeling en kon onderscheid maken tussen angstige en niet-angstige kinderen. De interne betrouwbaarheid was goed; de interbeoordelaarsbetrouwbaarheid uitstekend. We denken dat de ASICA therapeuten kan helpen om de voortgang van de behandeling te monitoren. Daarnaast kan het hun cliënten helpen om meer inzicht te krijgen in hun eigen voortgang in de therapie.

Gezien de hoeveelheid potentiële mediatoren dat werd onderzocht in Hoofdstuk 7, is besloten de ASICA niet mee te nemen in deze analyses. In de toekomst zou de ASICA echter wel gebruikt kunnen worden om op meer gedetailleerd niveau, bijvoorbeeld door middel van $n = 1$ studies, potentiële mediatoren te onderzoeken.

In Hoofdstuk 5 en 6 onderzoeken we de rol van positieve gedachten in theoretische en behandelmodellen van angst. In Hoofdstuk 5 beschrijven we de ontwikkeling en psychometrische eigenschappen van de CATS-N/P (Children's Automatic Thoughts Scale – Negative/Positive) bij 554 niet-geselecteerde kinderen. De CATS-N/P is een aanvulling op de CATS (Schniering & Rapee, 2002) die negatieve zelfspraak (of gedachten) meet bij kinderen en adolescenten. Om tegelijk positieve gedachten te kunnen meten vulden we de CATS aan met tien positieve items. In Hoofdstuk 6 wordt de CATS-N/P gebruikt om de rol van negatieve en positieve gedachten bij angst te onderzoeken in een groep van 139 kinderen met een angststoornis en 293 kinderen zonder angststoornis. De CATS-N/P bleek valide te zijn in een factoranalyse en had een goede betrouwbaarheid in een niet-angstige groep kinderen (Hoofdstuk 5). Daarnaast kon de CATS-N/P onderscheid maken tussen angstige en niet-angstige kinderen (Hoofdstuk 6). Ten slotte konden we met de CATS-N/P aantonen dat zowel het aantal negatieve als positieve gedachten angstniveau kan voorspellen. Dit is een aanvulling op bestaande cognitieve theorieën die ervan uitgaan dat vooral negatieve gedachten een rol spelen bij de ontwikkeling en behandeling van een angststoornis (Power of Nonnegative Thinking hypothese).

In Hoofdstuk 7 ten slotte worden de resultaten besproken van onze longitudinale studie waarin bij 145 kinderen met een angststoornis werd onderzocht of een verandering in negatieve en positieve gedachten, een verandering in de mate van ervaren controle en een verandering in vijf verschillende coping strategieën, voorafgingen aan een afname van angstsymptomen. Hierbij werd gebruik gemaakt van een gevanceerde statistische analyse (Longitudinal Difference Score Modelling). Metingen werden verricht voorafgaand aan de behandeling, na acht sessies, na de behandeling en 3 maanden daarna. Uit de resultaten bleek dat zoals verwacht een toename in positieve gedachten en een toename in drie coping strategieën (probleem oplossende coping, positieve cognitieve herstructurering, en alleiding zoeken), bijdragen aan en voorafgaan aan een afname in angstsymptomen. Tegen de verwachting in bleek een afname
in negatieve gedachten en een toename van steun zoeken niet vooraf te gaan aan een afname van angst. Daarnaast vonden we dat een afname van angst juist voorafging aan een afname van vermijdend coping gedrag, en dat een toename van ervaren controle zowel voorafging aan, als volgde op, een afname in angstniveau (reciproke effect).

Conclusies

In de studies beschreven in dit proefschrift werden, voor het eerst, op longitudinale wijze meerdere potentiële mediatoren van de behandeling van angststoornissen bij kinderen onderzocht. Dit is een belangrijke aanvulling op eerder onderzoek dat gebruik maakte van een pre-post design. Daarnaast werden twee instrumenten ontwikkeld om het (herhaald) meten van mediatoren te verbeteren. De kinderen die deelnamen aan het onderzoek waren representatief voor de kinderen die in het algemeen gezien worden in Nederlandse centra voor Kinder- en Jeugdpsychiatrie: de meeste kinderen ondervonden ernstige problemen door hun angsten, en 19% ging al enige tijd niet meer naar school. Een nadeel hiervan is dat de uitval van proefpersonen relatief groot was. De belangrijkste conclusies zijn: 1) Een toename van positieve gedachten en coping strategieën gaan vooraf aan een afname van angstyptomen tijdens de behandeling van angststoornissen van kinderen en adolescenten. 2) Zowel positieve als negatieve gedachten zijn gerelateerd aan angststoornissen bij kinderen. Dit heeft implicaties voor bestaande theorieën over de rol van cognities bij angst, zoals de Power of Nonnegative Thinking hypothese. Mogelijk zijn positieve gedachten niet slechts een bijproduct van angst, maar spelen ze ook een rol bij de ontwikkeling en behandeling van angststoornissen. Het geeft aan dat theorieën ontwikkeld voor volwassenen niet zomaar te gebruiken zijn bij kinderen. 3) Een afname van negatieve gedachten gaat niet vooraf aan een afname van angstniveau tijdens de behandeling van angststoornissen bij kinderen en adolescenten. Hierbij moet worden opgemerkt dat er maar eenmaal gemeten is tijdens de behandeling. Mogelijk was er wel een effect van negatieve gedachten, maar kan dat alleen worden opgemerkt als er vaker, en eerder was gemeten. 4) Veranderingen in ervaren controle gaan vooraf aan, maar volgen ook op een afname van angstniveau tijdens de behandeling van angststoornissen bij kinderen en adolescenten. Dit heeft mogelijke implicaties voor de theorie over de rol van ervaren controle bij angst. Tot nu toe werd ervan uitgegaan dat een gebrek aan ervaren controle bijdraagt aan een hoog angstniveau. Het is echter niet uit te sluiten dat deze relatie andersom is, of dat ervaren controle en angstniveau elkaar beïnvloeden. Dit moet nader onderzocht worden. 5) De computertaak IAP kan gebruikt worden om op indirecte wijze ervaren controle te meten bij kinderen, maar kan nog niet gebruikt worden om verandering binnen individuen te meten. 6) De ASICA kan worden gebruikt om op herhaalde wijze de ernst van angstklachten vast te stellen tijdens de behandeling. De ASICA is waardevol voor zowel de therapeut (voor indicatiestelling en monitoring van de behandeling) als de cliënt (inzicht in eigen voortgang en motiverend om scores te zien dalen). 7) De CATS-N/P is een valide
en betrouwbare vragenlijst om zowel negatieve als positieve gedachten te meten bij kinderen en adolescenten. 8) Verder onderzoek is nodig om vast te stellen welke behandeltechnieken verandering tot stand brengen in potentiele mediatoren van behandeling. De opzet van het huidige onderzoek kon bijvoorbeeld geen antwoord geven op de vraag of een verandering van positieve gedachten veroorzaakt wordt door cognitieve herstructurering, positieve ervaringen tijdens exposure opdrachten of aangeleerde coping vaardigheden. De aanbeveling is verder dat toekomstig onderzoek een gerandomiseerde studie combineert met een longitudinaal design met meerdere meetmomenten en dat er verder gekeken wordt naar de interactie tussen verschillen mediatoren (hoe werkt het) en moderatoren (voor wie werkt het).
References


References


Appendix
The effectiveness of the Coping Cat protocol in Dutch anxious youth: A Randomized Controlled Trial
Cognitive Behavioral Therapy (CBT) has generally been found to be efficacious in the treatment of childhood anxiety disorders, with reported remission rates between 54% and 74% (James, Soler, & Weatherall, 2009; Silverman, Pina, & Viswesvaran, 2008). More specifically, treatment efficacy of the Coping Cat protocol was established several times (see for instance Kendall, 1994; and for the twelve-week Dutch version Bodden et al., 2008; Nauta, Scholing, Emmelkamp, & Minderaa, 2001). However, in order to establish treatment efficacy of the Coping Cat protocol in the particular population we used in our study of putative mediators, we compared a twelve-week treatment condition with an eight-week waitlist condition using a Randomized Controlled Trial (RCT). We expected that CBT would be more beneficial than the waitlist condition on the primary outcome (anxiety diagnosis) and secondary outcome (anxiety symptoms) variables.

**Method**

**Design and Procedure**

The recruitment of participants and inclusion and exclusion criteria were the same as described in Chapter 7. Note that the number of children included in the study of putative mediators ($n = 145$), described in Chapter 7, differs from the number of children ($n = 148$) included in the RCT. The reason is that two children dropped out after the waitlist period and one child did not have a primary anxiety disorder anymore. These three children were excluded from the analysis described in Chapter 7.

In the RCT, children were randomized to an immediate, active treatment condition (twelve weeks CBT) or to an eight-week waitlist condition followed by CBT. Computerized and blind randomization was performed using a block-design with three levels: center (Accare / de Bascale), age (8-11 or 12-18 years old) and gender (boy/girl). Children who did not attend school due to the severity of their disorder were not randomized and immediately received treatment. Children in the waitlist condition were assessed pre- (T0) and post-waitlist (T1), after eight sessions of treatment (in-treatment, T2), after twelve sessions of treatment (post-treatment, T3) and three months after T3 (follow-up, T4). Children in the treatment condition were assessed at T1, T2, T3 and T4. In this appendix we only report the results of treatment efficacy using the pre and post-condition data (T0/T1 for the waitlist group and T1/T3 for the CBT group).
Participants
Figure 1 displays a flow chart of participant inclusion, attrition rates and reasons for attrition. Of the 161 informed patients, 155 were included in the study. A part of the sample (n = 31) was not randomized due to serious school refusal (n = 28) or because of technical problems with the randomization program. Two of the 61 children that were allocated to the waitlist condition were lost for the first assessment because they refused the waitlist condition and one because of missing self-report questionnaires. Three other children emerged to be school refusers and were
Appendix

replaced to the immediate treatment condition. In the intervention condition, four children never showed up for treatment or assessment and, therefore, were not included in the analysis.

The final sample consisted of 148 children and adolescents. Their mean age was 12.53 (SD = 2.84, range 8-18) and 56.8% were girls. Primary diagnoses were Social Phobia (n = 53, 35.8%), Separation Anxiety Disorder (n = 17, 11.5%), Specific Phobia (n = 32, 21.6%), Generalized Anxiety Disorder (n = 30, 20.3%) and Panic Disorder with or without Agoraphobia (n = 16, 10.8%). Eighty-eight children (59.5%) had one or more comorbid disorders, namely anxiety disorder (n = 61), mood disorder (n = 6), a combination of anxiety and mood disorder (n = 16), a combination of anxiety and externalizing disorder (n = 3), or a combination of anxiety, mood and externalizing disorder (n = 2). The total number of diagnoses per child ranged from 1 to 6 (M = 2.22, SD = 1.36). Mean ADIS-IV C/P Clinical Severity Rating (CSR) score for the primary diagnosis was 6.43 (SD = 1.03, range 4 to 8).

Demographic characteristics are outlined in Table 1. Half of the children (54.8%) had received professional help in the past for a range of problems, including anxiety problems (n = 26), symptoms of Attention Deficit Hyperactivity Disorder (n = 9), Pervasive Developmental Disorder (n = 8), learning problems (n = 3), language problems (n = 5) or other problems (n = 8).

No children received protocollized CRT for anxiety problems in the past half year. A minority of children (n = 20) reported the use of medication before treatment, including drugs for anxiety problems (e.g. benzodiazepines or herbal drugs, but no SSRIs and only sporadically; n = 6), ADHD related behaviors (methylphenidate or risperidone, kept constant over study; n = 7), or other conditions (e.g. sleep problems, allergies, stomach aches; n = 6). One child used puberty suppressors for gender dysphoria.

Measures

The measures used in the RCT were the same as described in Chapter 7. To examine treatment efficacy we used the Anxiety Disorder Interview Schedule for Children-Child and Parent version (ADIS-IV C/P; Silverman & Albano, 1996) to assess diagnostic status. Clinicians rated severity of symptoms based on interference in school, peer relationships, family life and internal distress on a 9-point scale, ranging from 0 to 8. A clinician severity rating (CSR) of four or higher is indicative of a diagnosis. The Revised Child Anxiety and Depression Scale-Child and Parent version (RCADS-C/P; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) was used to assess the level of anxiety symptoms as reported by children and parents.
Table 1. Demographic characteristics of the total group and separate for the waitlist group and the intervention group

<table>
<thead>
<tr>
<th></th>
<th>Waitlist n = 55</th>
<th>Intervention n = 93</th>
<th>Total group n = 148</th>
<th>Difference test, p, effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>12.04 (2.92)</td>
<td>12.82 (2.77)</td>
<td>12.53 (2.84)</td>
<td>t(146) = -1.62, p &gt; .05, d = 0.28</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>25 (45.5%)</td>
<td>39 (41.9%)</td>
<td>64 (43.2%)</td>
<td>χ²(1) = 0.17, p &gt; .05, V = 0.03</td>
</tr>
<tr>
<td>Girls</td>
<td>30 (54.5%)</td>
<td>54 (58.1%)</td>
<td>84 (56.8%)</td>
<td></td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 – 11 years</td>
<td>29 (52.7%)</td>
<td>34 (36.6%)</td>
<td>63 (42.6%)</td>
<td>χ²(1) = 3.70, p &gt; .05, V = 0.16</td>
</tr>
<tr>
<td>12 – 18 years</td>
<td>26 (47.3%)</td>
<td>59 (63.4%)</td>
<td>85 (57.4%)</td>
<td></td>
</tr>
<tr>
<td>Centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMC/Bascule</td>
<td>15 (27.3%)</td>
<td>35 (37.6%)</td>
<td>50 (33.8%)</td>
<td>χ²(1) = 1.66, p &gt; .05, V = 0.09</td>
</tr>
<tr>
<td>Accare</td>
<td>40 (72.7%)</td>
<td>58 (62.4%)</td>
<td>98 (66.2%)</td>
<td></td>
</tr>
<tr>
<td>Education M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>16 (32.0%)</td>
<td>19 (21.8%)</td>
<td>35 (25.5%)</td>
<td>χ²(2) = 2.04, p &gt; .05, V = 0.12</td>
</tr>
<tr>
<td>Medium</td>
<td>22 (44.0%)</td>
<td>40 (46.0%)</td>
<td>62 (45.3%)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>12 (24.0%)</td>
<td>28 (32.2%)</td>
<td>40 (29.2%)</td>
<td></td>
</tr>
<tr>
<td>Education P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>17 (36.2%)</td>
<td>16 (20.5%)</td>
<td>33 (26.4%)</td>
<td>χ²(2) = 4.03, p &gt; .05, V = 0.18</td>
</tr>
<tr>
<td>Medium</td>
<td>16 (34.0%)</td>
<td>29 (37.2%)</td>
<td>45 (36.0%)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>14 (29.8%)</td>
<td>33 (42.3%)</td>
<td>47 (37.6%)</td>
<td></td>
</tr>
<tr>
<td>Treatment history</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>27 (49.1%)</td>
<td>53 (58.2%)</td>
<td>80 (54.8%)</td>
<td>χ²(1) = 1.16, p &gt; .05, V = 0.09</td>
</tr>
<tr>
<td>Yes</td>
<td>28 (50.9%)</td>
<td>38 (41.8%)</td>
<td>66 (45.2%)</td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>49 (89.1%)</td>
<td>78 (84.8%)</td>
<td>127 (86.4%)</td>
<td>χ²(1) = 0.54, p &gt; .05, V = 0.06</td>
</tr>
<tr>
<td>Yes</td>
<td>6 (10.9%)</td>
<td>14 (15.2%)</td>
<td>20 (13.6%)</td>
<td></td>
</tr>
<tr>
<td>Medication type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADHD</td>
<td>1 (16.7%)</td>
<td>6 (42.9%)</td>
<td>7 (35.0%)</td>
<td></td>
</tr>
<tr>
<td>Anxiolytic</td>
<td>2 (33.3%)</td>
<td>4 (28.6%)</td>
<td>6 (30.0%)</td>
<td>χ²(1) = 1.41, p &gt; .05, V = 0.27</td>
</tr>
<tr>
<td>Other</td>
<td>3 (50.0%)</td>
<td>4 (28.6%)</td>
<td>7 (35.0%)</td>
<td></td>
</tr>
<tr>
<td>Family type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-parent</td>
<td>43 (78.2%)</td>
<td>80 (86.0%)</td>
<td>123 (83.1%)</td>
<td>χ²(1) = 1.51, p &gt; .05, V = 0.10</td>
</tr>
<tr>
<td>1-parent/other</td>
<td>12 (21.8%)</td>
<td>13 (14.0%)</td>
<td>25 (16.9%)</td>
<td></td>
</tr>
<tr>
<td>Siblings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48 (87.3%)</td>
<td>80 (86.0%)</td>
<td>128 (86.5%)</td>
<td>χ²(1) = 0.05, p &gt; .05, V = 0.02</td>
</tr>
<tr>
<td>No</td>
<td>7 (12.7%)</td>
<td>13 (14.0%)</td>
<td>20 (13.5%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Sample size per variable may differ because not all parents reported educational level or treatment history. M = Mother; P = Father; d = Cohen's d; V = Cramer’s V. Educational levels: low = primary school / lower general secondary education; medium = higher general secondary education / intermediate vocational education; high = higher vocational education or university.
Data Analytic Strategies

Baseline characteristics. All children with at least one assessment (T0 or T1, n = 148) were included in the analyses following the intent-to-treat approach. Children who dropped out at different time points were compared on baseline scores and change scores. We compared the waitlist and treatment group on first assessment scores (T0 or T1) to check whether the randomization procedure was successful. Missing data points (missing questionnaires or complete missing data points in the case of drop-out) were imputed using the Expectation-Maximization procedure in SPSS 18.0. Results displayed in the tables are imputed scores.

Treatment efficacy. First, diagnostic status (number of responders and non-responders) at outcome (post-waitlist and post-treatment) was compared between groups using a χ² test. Cramer’s V is reported as effect size: < .10 is negligible, < .20 is weak, < .40 is moderate, < .60 is relatively strong, < .80 is strong, and <1.00 is a very strong effect.

Second, Individual Reliable Change scores (RC_indiv, Hageman & Arrindell, 1999) were computed for the pre- and post-condition scores on the RCADS-C/P and total ADIS-IV C/P CSR score. The RC-score indicates whether a specific individual has shown benefit from treatment. RC-scores can be transformed into three categories (RC_index): improved (RC-score < -1.65); not reliably changed (- 1.65 ≤ RC-score ≥ 1.65); and deteriorated (RC-score > 1.65). A client whose RC-score indicates improvement and whose post-score on the outcome measure is outside the range of the dysfunctional population, is considered to have recovered or to show a clinically significant (CS) change. The individual CS-index was computed for the ADIS-IV C/P total CSR score using cutoff type a (Hageman & Arrindell, 1999). The individual CS-score is, analogous to the RC-score, the normal deviate of the cutoff score within the (conditional) distribution of true post-scores given the observed post-score.

Finally, treatment efficacy was evaluated using 2 x 2 mixed ANOVAs with condition (waitlist or direct CBT) as between-group variable and time (pre-post condition) as within-group variable. Separate ANOVAs were performed for different outcome variables (parent, child and total reported diagnostic status on the ADIS-IV CSRs; and parent and child reported symptoms on the RCADS). We report results of the main effect of time and the intended interaction effect of condition x time. To accommodate for Type I error, a Bonferroni correction was used and α was set at .05 / 5 = .01. For the ANOVAs eta squared (η²) is reported as effect size with small (.01), medium (.06), and large (.14) effects. Effect sizes of group difference at pre- and post-condition were computed using Cohen’s d, with a positive sign indicating improvement in the CBT group relative to the waitlist group. Effects can be small (.20), medium (.50), or large (.80).
Results

Baseline Characteristics
Several children dropped out during treatment ($n = 33$) or during the follow-up period ($n = 12$, see Figure 1). Attrition rates were 19.1% during treatment (T2), 22.6% at post-treatment (T3), and 30.8% at follow-up (T4). There were four different reasons to withdraw from treatment. Four patients started a different treatment after a few sessions, because of a shift in primary diagnosis or because another treatment was more convenient (e.g. treatment at school). Eight children did not need further treatment because their anxiety problems decreased to a nonclinical level. Twelve children dropped out because their anxiety problems were so severe that they needed inpatient treatment or medication. Finally, 21 children dropped out because they did not want to participate in the study any longer (e.g. they found it too time-consuming). Children who dropped out at different points in time (at T2, T3 or T4) were compared on their pre-treatment scores on the putative mediators, outcome variables, age and gender. There were no significant differences between the groups, indicating no selection bias due to attrition.

Demographics and scores on outcome variables on the first assessment for both the waitlist-group (T0) and the immediate treatment group (T1) are displayed in Table 1 and 2. Bonferroni-corrected difference tests showed that there were no differences on demographic variables and outcome variables between the children in the treatment group and the waitlist group.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Waitlist group (T0, N=55) M (SD)</th>
<th>Treatment group (T1, N=93) M (SD)</th>
<th>Difference test</th>
<th>Cohen's d</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>5.07 (2.19)</td>
<td>5.67 (2.00)</td>
<td>$U = 2970.00$</td>
<td>-0.29</td>
</tr>
<tr>
<td>Parent</td>
<td>5.99 (1.27)</td>
<td>6.31 (1.35)</td>
<td>$U = 2896.00$</td>
<td>-0.24</td>
</tr>
<tr>
<td>Total</td>
<td>6.24 (0.94)</td>
<td>6.55 (1.06)</td>
<td>$U = 2974.00$</td>
<td>-0.31</td>
</tr>
<tr>
<td>RCADS-C/P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>27.05 (16.68)</td>
<td>26.35 (13.17)</td>
<td>$U = 2490.00$</td>
<td>0.04</td>
</tr>
<tr>
<td>Parent</td>
<td>32.86 (12.65)</td>
<td>30.19 (13.31)</td>
<td>$t(146) = 1.20$</td>
<td>0.21</td>
</tr>
</tbody>
</table>

Note: CSR = Clinical Severity Rating ADIS-C/P; RCADS = Revised Child Anxiety and Depression Scale.

*ns difference test is not significant. Cohen's d is reported as effect size.*
Table 3. Reliable change and clinically significant change scores and indices separate for the waitlist and treatment group

<table>
<thead>
<tr>
<th></th>
<th>Waitlist group (T0, N = 55)</th>
<th>Treatment group (T1, N = 93)</th>
<th>Difference test</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RC-Score (M, SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCADS-Child</td>
<td>-0.54 (1.08)</td>
<td>-1.84 (2.04)</td>
<td>t(144.68) = 5.05***</td>
<td>d = 0.75</td>
</tr>
<tr>
<td>RCADS-Parent</td>
<td>-1.13 (0.53)</td>
<td>-1.44 (1.68)</td>
<td>t(119.23) = 1.67</td>
<td>d = 0.23</td>
</tr>
<tr>
<td>CSR Total</td>
<td>-1.37 (3.77)</td>
<td>-10.53 (6.91)</td>
<td>t(144.68) = 5.05***</td>
<td>d = 1.55</td>
</tr>
<tr>
<td></td>
<td>CS-Score (M, SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSR Total</td>
<td>5.96 (5.04)</td>
<td>-6.64 (11.03)</td>
<td>t(138.94) = 9.47***</td>
<td>d = 1.37</td>
</tr>
<tr>
<td></td>
<td>RC-Index (n, %)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCADS-Child Deteriorated</td>
<td>1 (1.8%)</td>
<td>3 (3.2%)</td>
<td>χ2(2) = 23.89***</td>
<td>V = 0.39</td>
</tr>
<tr>
<td>NRC</td>
<td>47 (85.5%)</td>
<td>43 (46.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved</td>
<td>7 (12.7%)</td>
<td>47 (50.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCADS-Parent Deteriorated</td>
<td>0 (0.0%)</td>
<td>3 (3.2%)</td>
<td>χ2(2) = 12.10**</td>
<td>V = 0.29</td>
</tr>
<tr>
<td>NRC</td>
<td>46 (83.6%)</td>
<td>52 (55.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved</td>
<td>9 (16.4%)</td>
<td>38 (40.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSR total Deteriorated</td>
<td>9 (16.4%)</td>
<td>1 (1.1%)</td>
<td>χ2(3) = 61.75***</td>
<td>V = 0.65</td>
</tr>
<tr>
<td>NRC</td>
<td>24 (43.6%)</td>
<td>10 (10.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved</td>
<td>21 (38.2%)</td>
<td>24 (25.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recovered</td>
<td>1 (1.8%)</td>
<td>58 (62.4%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: RC = Reliable Change; CS = Clinical Significant Change; CSR = Clinical Severity Rating ADIS-C/P; RCADS = Revised Child Anxiety and Depression Scale; NRC = No Reliable Change. *** p < .001, ** p < .01, * p < .05. Cohen’s d and Cramer’s V are reported as effect size.

Diagnostic Status and Clinical Significant Change

Children were responders when their combined ADIS-IV C/P CSR score was below four. In the waitlist group, ADIS-IV C/P CSR scores remained in the clinical range for all children but one (1/53 = 1.9%). In the treatment condition significantly more children (42/75 = 56.0%) were free of any diagnosis after twelve sessions of CBT, χ2(1) = 40.76, p < .001. This effect was moderate, Cramer’s V = .56.

Results for reliable change and clinical significant change are reported in Table 3. Children showed more reliable change after treatment in comparison to the waitlist condition as reported on the RCADS-child and ADIS-IV C/P total score. There was no difference between groups on the parent reported RCADS. More children in the treatment condition improved after treatment based on the RCADS-child and RCADS-parent. Based on the ADIS-IV C/P, only one child (1.8%) in the waitlist condition recovered, in comparison to 58 (62.4%) in the treatment condition.
The effectiveness of the Coping Cat protocol in Dutch anxious youth: A Randomized Controlled Trial

Table 4. Pre- and post-intervention means (and SDs), and repeated measures ANOVAs on the outcome variables for the waitlist group (WL) and treatment group (CBT)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-intervention M (SD)</th>
<th>Post-intervention M (SD)</th>
<th>ANOVAs F(1, 146), part.η²</th>
<th>Cohen's d post</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSR child</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBT</td>
<td>5.67 (2.00)</td>
<td>2.10 (2.72)</td>
<td>Time: 66.82***, .31</td>
<td>1.24</td>
</tr>
<tr>
<td>WL</td>
<td>5.07 (2.19)</td>
<td>5.11 (1.85)</td>
<td>Time x cond: 69.64***, .32</td>
<td></td>
</tr>
<tr>
<td>CSR parent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBT</td>
<td>6.31 (1.34)</td>
<td>2.72 (2.85)</td>
<td>Time: 119.11***, .45</td>
<td>1.20</td>
</tr>
<tr>
<td>WL</td>
<td>5.99 (1.27)</td>
<td>5.60 (1.41)</td>
<td>Time x cond: 76.84***, .35</td>
<td></td>
</tr>
<tr>
<td>CSR total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBT</td>
<td>6.55 (1.06)</td>
<td>2.76 (2.90)</td>
<td>Time: 133.33***, .48</td>
<td>1.26</td>
</tr>
<tr>
<td>WL</td>
<td>6.24 (0.94)</td>
<td>5.79 (1.21)</td>
<td>Time x cond: 83.07***, .36</td>
<td></td>
</tr>
<tr>
<td>RCADS-child</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBT</td>
<td>26.35 (16.16)</td>
<td>17.09 (13.03)</td>
<td>Time: 35.94***, .20</td>
<td>0.54</td>
</tr>
<tr>
<td>WL</td>
<td>27.05 (16.68)</td>
<td>24.76 (16.38)</td>
<td>Time x cond: 13.06***, .08</td>
<td></td>
</tr>
<tr>
<td>RCADS-parent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBT</td>
<td>30.19 (13.31)</td>
<td>23.16 (14.01)</td>
<td>Time: 79.98***, .35</td>
<td>0.11</td>
</tr>
<tr>
<td>WL</td>
<td>32.86 (21.65)</td>
<td>24.57 (10.98)</td>
<td>Time x cond: 0.55, .00</td>
<td></td>
</tr>
</tbody>
</table>

Note. CSR = Clinical Severity Rating ADIS-C/P; RCADS = Revised Child Anxiety and Depression Scale. Time: main effect of time; Time x cond: interaction effect of time x condition (waitlist vs. treatment).
* p < .05, ** p < .01, *** p < .001, ns p > .05. Cohen’s d is reported as effect size.

Treatment Outcome
Separate mixed ANOVAs revealed that children in the treatment condition improved more with respect to anxiety severity and level of anxiety symptoms than children in the waitlist condition (see Table 4). For the child reported, parent reported and total ADIS-IV C/P CSR scores, and the child reported RCADS scores, both main effects of time and interaction effects of condition x time were significant. Based on parent reported anxiety symptoms (RCADS-parent) there was no difference between groups: they both improved over time.

Discussion
The present RCT investigated the effects of a twelve-week cognitive behavioral treatment protocol (Coping Cat) compared to an eight-week waitlist in clinically anxious children. The main results can be summarized as: a) CBT was more effective in changing diagnostic status and child- and parent-reported anxiety severity, b) CBT was more effective in decreasing child-reported anxiety symptoms, but not in decreasing parent-reported anxiety symptoms.
As expected, diagnostic status significantly changed after treatment. Post-treatment, 56% of treatment completers were free of any diagnosis. This is highly comparable to earlier studies where the percentage of post-treatment responders ranged between 53% and 74% (Bodden et al., 2008; Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; James et al., 2009; Silverman et al., 2008). Active treatment proved to be more efficacious than an eight-week waitlist. After the waitlist period only one child (1.8%) was free of any diagnosis. This is less than previously reported rates between 28%-35% for waitlist conditions (Cartwright-Hatton et al. 2004; James et al., 2009) and may be due to the present inclusion of severely affected children relative to former studies.

Further, anxiety symptoms and anxiety severity significantly decreased during treatment. On individual level and based on child and parent reported symptoms, respectively 51% and 41% of the children reliably improved after treatment, compared to only 13% and 16% after eight treatment-free weeks. Interestingly, on group level there were no differences between groups on parent reported anxiety symptoms. We do not know how to explain why parents in the waitlist group reported a decrease in anxiety symptoms on a questionnaire, while they reported no decrease in anxiety severity on a semi-structured interview.

A limitation of the current RCT is that not all children were properly randomized due to ethical reasons. Some children were so severely impaired that they did not attend school anymore and we did not consider it ethical to include them in a waitlist condition. We decided to include the youth with school refusal in the analyses as we did not want to have too stringent exclusion criteria and a representative sample of children referred to child- and adolescent psychiatric centers. Moreover, these youngsters were treated with the same protocol and did not receive special attention other than an exclusion of the randomization procedure. Pre-treatment demographic and outcome variables and attrition rates appeared to be comparable between children who did and did not attend school at the time of inclusion. Finally, and most importantly, results for the mixed ANOVAs investigating the effect of condition on outcome variables, were similar when children who were not randomized were excluded from the analyses.

To conclude, the current RCT replicated previous studies investigating treatment efficacy of a protocolized cognitive behavioral treatment for anxiety disordered children. CBT proved to be effective in reducing anxiety severity and anxiety symptoms.
Supplements
The ASICA is an adaptation of the CY-BOCS by E. De Haan, S.M. Hogendoorn, P. J. M. Prins, L. Vervoort, and L. Wolters with permission from W. K. Goodman.

Version March 2008 (translation February 2009)

THE ANXIETY SEVERITY INTERVIEW FOR CHILDREN AND ADOLESCENTS (ASICA)

The ASICA is a clinician-rated, semi-structured interview, designed to measure the severity of anxiety symptoms over the previous week in children and adolescents with an anxiety disorder. It is a modified version of the CY-BOCS for obsessive compulsive disorder in children (Scahill et al., 1997). Anxiety symptoms are divided in three different components: anxious feelings, avoidant behavior and anxious thoughts. Analogue to the CY-BOCS, the severity of each component is rated on five severity items each on a 5-point ordinal scale. The answers have to reflect the average for each day in the previous week.

The ASICA is a semi-structured interview. The clinician has to ask all questions in the indicated order and phrase them as stated in the interview. However, the clinician is free to rephrase questions when necessary and ask extra questions if there are any doubts or the answer is incomplete. Clinicians are also allowed to take their clinical knowledge in consideration. For example, when the clinician knows from a previous session that a child avoids many situations, but the child denies this, the clinician can discuss this with the child.

The final score is based on clinical opinion. In the instructions, the clinician gives a definition of anxious feelings, avoidance and anxious thoughts and gives general examples. For each component, the individual problems of the child are mentioned. For the first assessment, information from the intake and the ADIS-C can be used; for the next assessments information from the therapy is used. In principle, the child is the only informant, however information from the parents is allowed when the child is very young or otherwise incapable of answering the questions and the extra informant is present each assessment.

Extra instructions
- read aloud the questions as literally as possible
- with each question, give examples relevant for the specific child
- ask for examples with each answer, to be sure the child understood the question
- Do NOT read aloud the answers or present them as a multiple choice question. The child should not see the answers. Do not say aloud the resulting score.
- Sometimes with younger children it is necessary to include the parents. This has the preference over not assessing the ASICA. Visualizing the answers (e.g. with a feelings thermometer) is allowed.

- Keep in mind if you question a feeling, avoidance or thought. Sometimes it is difficult to disentangle the three, but try by giving and asking many examples.

**Scoring**

Use the separate score form. Three different subscale scores can be obtained by adding the scores of all 5 items from each component (range 0 - 20). The total score is a sum of the three components (range 0 - 60). Higher scores indicate more anxiety symptoms. A score of 13 or higher indicates clinically significant anxiety problems.

**Assessment**

Text in bold print should be read aloud. First give a definition of anxiety feelings, avoidance and anxious thoughts.

ANXIOUS FEELINGS: This is an anxious or nervous feeling. An example of an anxious feeling is pain in your stomach and sweaty hands when you have present something.

AVOIDANCE: This is when you do not do things anymore because you are afraid. For example, not sleeping over at a friends place because you are afraid to sleep somewhere else but home. Avoidance is also doing things to make sure you do not experience or encounter the situation or thing you are afraid of. For example, when you are afraid of the neighbor’s dog, you walk on the other side of the street so you do not run into the dog. This also helps you not to get scared.

ANXIOUS THOUGHTS are unpleasant ideas, thoughts or images that pop up in you mind regularly. Or these are thoughts about things you are afraid of. This might happen even when you do not want it and these thoughts can be awful. An example of an anxious thought is the idea that something awful will happen to you or your parents. Another example is the thought that you are not able to pass a test, although you learned it by heart.

Do you have any questions about anxious feelings, avoidance of anxious thoughts? (If not, continue)

When repeatedly administering the ASICA to the same child, it is not always necessary to repeat these definitions and examples, as long as it is clear the child understands them.
A. Anxious feelings

"Now I will ask you some questions about your anxious feelings. That is the feeling you have when you are scared, afraid or anxious." [Mention the most important fears and anxious feelings of the child]

1. TIME OCCUPIED BY THE ANXIOUS FEELINGS

"How often do you feel afraid? When we consider an average day, how often are you afraid or anxious in the morning, afternoon or evening?" (Hint: go over the day and consider how often the child is anxious and how long this lasts. Do not ask: is it 1-3 hours, 3-8 hours, etc.)

   0 = None
   1 = Mild: less than 1 hour per day, or now and then
   2 = Moderate: 1-3 hours per day, or regularly
   3 = Severe: 3-8 hours per day, or very often
   4 = Extreme: more than 8 hours per day, or almost continuous

2. INTERFERENCE FROM ANXIOUS FEELINGS.

"How much does this anxious feeling bother you, does it influence your life? Additional: "What would be different if you were not anxious? For example, do you have many quarrels, do you have problems sleeping, do you feel sad or can't you do the things you like anymore?"

(Hint: do NOT score avoidance (e.g. school refusal). Do score quarrels, sad feelings, problems sleeping, and attention problems. When the child does not attend school because it is a holiday period: determine the effect when the child would have attended school.)

   0 = None, no interference
   1 = Mild: little interference, without harming daily functioning
   2 = Moderate: evident but controllable interference with daily functioning (school, social contacts)
   3 = Severe, considerable interference with some domains (school, friends, family)
   4 = Extreme, interfering with all domains
3. DISTRESS FROM ANXIOUS FEELINGS.

“When you are afraid, then how afraid are you?” Additional: “How strong is your fear, how upset do you feel? For example, do you feel uncomfortable, very tense, or do you panic?”

(Hint: Ask for examples: do you have to cry, do you get angry, do you hyperventilate?)

0 = None
1 = Mild: not very upset
2 = Moderate: upset but controllable
3 = Severe: very disrupting
4 = Extreme: almost continuing invalidating agony.

4. RESISTANCE TO ANXIOUS FEELINGS.

How often do you try to resist your anxious feelings or try to get it away? What do you do?

(Hint: do not score avoidance, but do score seeking distraction or trying to relax, etc.)

|Score only the effort of resisting, not the success or failure. How often the child tries to resist anxious feelings, is not necessarily linked to his/her ability to actually control those feelings. This item does not directly measure the severity of the intrusive anxious feelings; it is an indicator of mental health, insofar that it reflects the effort to master anxious feelings without using avoidance. The bigger the resistance is, the less disturbed his/her functioning is. There are 'active' and 'passive' ways of resistance. Children who are treated with behavioral therapy are often encouraged to resist anxious feelings by not fighting them (e.g. "allow yourself to feel your emotions"; passive resistance), or even to evoke their anxious feelings. With this item, consider the use of behavioral techniques as ways of resistance. When the child does not need to resist anxious feelings because they are too insignificant, give a score of 0.|

0 = Always tries to resist anxious feelings, or symptoms are so insignificant resistance is not necessary
1 = Tries to resist anxious feelings most of the time
2 = Sometimes tries to resist anxious feelings
3 = Does not try to resist anxious feelings, but reluctantly
4 = Never tries to resist anxious feelings
5. CONTROL OVER ANXIOUS FEELINGS.

“When you try to resist to your anxious feelings, how often do you succeed?” When there are not many anxious feelings left, you can ask a hypothetical question: “Imagine that your anxious feeling would return sometime, would you be able to get it away?”

(Contrary to item 4, the ability of the child to control its anxious feelings is related to the severity of the anxious feelings).

0 = Always
1 = Often: feelings can be controlled with some effort and concentration
2 = Sometimes it is possible to control feelings
3 = Little control: it is very difficult to control feelings
4 = No control: it is not possible to control feelings
B. Avoidance

"The next questions are about avoidance, or the things you don't do anymore because you are afraid" [Mention avoidant behavior of the child]

1. TIME OCCUPIED BY AVOIDANCE.
   "How often do you avoid something because you are afraid?" Additional: "How often do you do things differently because you are afraid?" or: "When we consider an average day, how often do you avoid situations in the morning, afternoon or evening?" (Hint: go over the day and consider how often the child avoids something and how long this lasts. Do not ask: is it 1-3 hours, 3-8 hours, etc.)

   0 = None
   1 = Mild: less than 1 hour per day, or now and then
   2 = Moderate: 1-3 hours per day, or regularly
   3 = Severe: 3-8 hours per day, or very often
   4 = Extreme: more than 8 hours per day, or almost continuous

2. INTERFERENCE FROM AVOIDANCE
   "How much does this avoidance bother you, does it influence your life (mention actual avoidant behavior)? Additional: "For example, do you have many quarrels, do you have problems sleeping, do you feel sad or can't you do the things you like anymore?"

   Hint: if the child does not experience any interference from the avoidance (e.g. school refusal), because everything is arranged around the avoidance, consider any actual limitations related to the developmental phase. E.g.: when the child does not attend school and says not to be bothered by it, DO score interference, because the child is hindered in his/her development.

   Hint: When the child does not attend school because it is a holiday period: determine the effect when the child would have attended school.

   0 = None, no interference
   1 = Mild: little interference, without harming daily functioning
   2 = Moderate: evident but controllable interference with daily functioning (school, social contacts)
   3 = Severe, considerable interference with some domains (school, friends, family)
   4 = Extreme, interfering with all domains
3. DISTRESS FROM AVOIDANCE

“How would you feel if you would do the things you don’t dare to do?” Additional: “Do you feel relaxed, upset or do you even panic?” (Hint: score how upset the child would be or how lousy it would feel. Ask for examples: crying, hyperventilating, getting angry.)

- 0 = None
- 1 = Mild: not very upset
- 2 = Moderate: upset but controllable
- 3 = Severe: very disrupting
- 4 = Extreme: almost continuing invalidating agony.

4. RESISTANCE TO AVOIDANCE

“How often do you try to resist avoiding situations?” Additional: “How do you try?”

[Score only the effort of resisting, not the success or failure. How often the child tries to resist anxious feelings, is not necessarily linked to his/her ability to actually control those feelings. This item does not directly measure the severity of the intrusive anxious feelings; it is an indicator of mental health, insofar as it reflects the effort to resist avoidance. The bigger the resistance is, the less disturbed his/her functioning is. When fear is minimal, the child might not feel like resisting. Then give a score of 0.]

- 0 = Always tries not to avoid, or symptoms are so insignificant resistance is not necessary.
- 1 = Tries not to avoid most of the time
- 2 = Sometimes tries not to avoid
- 3 = Avoids, without trying not to, but reluctantly
- 4 = Always avoids (no resistance)

5. CONTROL OVER AVOIDANCE

“When you try not to avoid, so doing things you are afraid of, how often do you succeed?”

When there is no avoidance, you can ask a hypothetical question: “Imagine that you feel like avoiding something sometime, would you be able to resist this?”

- 0 = Always
- 1 = Often: it is often possible not to avoid with some effort and concentration
- 2 = Sometimes it is possible not to avoid
- 3 = Little control: it is very difficult not to avoid
- 4 = No control: always avoids (no control)
C. Anxious thoughts

"Now I will ask you some questions about your anxious thoughts. These are unpleasant ideas, thoughts or images that pop up in your mind regularly. (Mention the child’s anxious thoughts)

1. TIME OCCUPIED BY ANXIOUS THOUGHTS

   "How often do you have anxious thoughts, do you have to think about scary things?”
   Additional: “When we consider an average day, how often do you have anxious thoughts in the morning, afternoon or evening?” (Hint: go over the day and consider how often the child has anxious thoughts and how long these last. Do not ask: is it 1-3 hours, 3-8 hours, etc.)

   0 = None
   1 = Mild: less than 1 hour per day, or now and then
   2 = Moderate: 1-3 hours per day, or regularly
   3 = Severe: 3-8 hours per day, or very often
   4 = Extreme: more than 8 hours per day, or almost continuous

2. INTERFERENCE FROM ANXIOUS THOUGHTS

   "How much do these anxious thoughts bother you, do they influence your life? Additional: "For example, do you have many quarrels, do you have problems sleeping or paying attention at school, do you feel sad or can't you do the things you like anymore?" or: "How much are you caught up by it?"

   (Hint: do NOT score avoidance (e.g. school refusal). Do score quarrels, sad feelings, problems sleeping, or attention problems. When the child does not attend school because it is a holiday period: determine the effect when the child would have attended school.)

   0 = None, no interference
   1 = Mild: little interference, without harming daily functioning.
   2 = Moderate: evident but controllable interference with daily functioning (school, social contacts).
   3 = Severe, considerable interference with some domains (school, friends, family)
   4 = Extreme, interfering with all domains.
3. DISTRESS FROM ANXIOUS THOUGHTS

“How upset do you feel by these thoughts, how scary are they?” “For example, do you feel uncomfortable, very tense, or do you panic?” (Hint: Ask for examples: do you have to cry, do you get angry, or do you hyperventilate?)

0 = None  
1 = Mild: not very upset  
2 = Moderate: upset but controllable  
3 = Severe: very disrupting  
4 = Extreme: almost continuing invalidating agony.

4. RESISTANCE TO ANXIOUS THOUGHTS.

“How often do you try to get these anxious thoughts out of your mind? How do you try?” (Hint: do not score avoidance, but do score seeking distraction or trying to relax, etc.)

[Score only the effort of resisting, not the success or failure. How often the child tries to resist anxious thoughts, is not necessarily linked to his/her ability to actually control those thoughts. This item does not directly measure the severity of the intrusive anxious thoughts; it is an indicator of mental health, insofar that it reflects the effort to master anxious thoughts without using avoidance. The bigger the resistance is, the less disturbed his/her functioning is. There are 'active' and 'passive' ways of resistance. Children who are treated with behavioral therapy are often encouraged to resist anxious thoughts by not fighting them (e.g. "allow your thoughts to flow"; passive resistance), or even to evoke their anxious thoughts. With this item, consider the use of behavioral techniques as ways of resistance. When the child does not need to resist anxious thoughts because they are too insignificant, give a score of 0.]

0 = Always tries to resist anxious thoughts, or symptoms are so insignificant resistance is not necessary  
1 = Tries to resist anxious thoughts most of the time  
2 = Sometimes tries to resist anxious thoughts  
3 = Does not try to resist anxious thoughts, but reluctantly  
4 = Never tries to resist anxious thoughts
5. CONTROL OVER ANXIOUS THOUGHTS.
“When you try to get your anxious thoughts out of your mind, how often do you succeed?”
When there are not many anxious thoughts left, you can ask a hypothetical question: “Imagine that your anxious thoughts would return sometime, would you be able to get them out of your mind?”

0 = Always
1 = Often: thoughts can be controlled with some effort and concentration
2 = Sometimes it is possible to control thoughts
3 = Little control: it is very difficult to control thoughts
4 = No control: it is not possible to control thoughts
CHILDREN’S AUTOMATIC THOUGHTS SCALE –
NEGATIVE / POSITIVE (CATS-N/P)

Name :  
Sex : Male / Female  
Date of Birth :  
Date :

Instructions: Listed below are some thoughts that children and adolescents have said pop into their heads. Please read each thought carefully and decide how often, if at all, each thought popped into your head over the past week. Circle your answer in the following way:
0 = not at all, 1 = sometimes, 2 = fairly often, 3 = often, 4 = all the time.

Say to yourself: “Over the past week I thought…”

1. I enjoy life  
2. Kids will think I’m stupid  
3. I know that everything I do will work out well  
4. I have the right to take revenge on people if they deserve it  
5. I can’t do anything right  
6. I’m going to have an accident  
7. Other kids are stupid  
8. I’m worried that I’m going to get teased  
9. I’m going crazy  
10. Kids are going to laugh at me  
11. I don’t give up  
12. I’m going to die  
13. Most people are against me  
14. I am worthless  
15. My mum or dad are going to get hurt  
16. Nothing ever works out for me anymore  
17. I’m going to look silly  
18. I won’t let anyone get away with picking on me  
19. Other people understand me  
20. I’m scared of losing control  
21. Only good things will happen to me  
22. It’s my fault that things have gone wrong  
23. People are thinking bad things about me
Say to yourself: “Over the past week I thought…”

- If someone hurts me, I have the right to hurt them back
- I’m going to get hurt
- I’m afraid of what other kids will think of me
- Some people deserve what they get
- I feel good about myself
- I’ve made such a mess of my life
- I look like an idiot
- My future looks bright
- I’m afraid I will make a fool of myself
- People always try to get me into trouble
- I feel great
- There is something very wrong with me
- Some people are bad
- I hate myself
- Something will happen to someone I care about
- Bad people deserve to get punished

The CATS-N/P (Hogendoorn, Wolters, Vervoort, Prins, Boer, Kooij, & De Haan [2008], COTR 34 [5], 467-478) is an adaptation of the Children’s Automatic Thoughts Scale (Schniering & Rapee [2002], BRAT 40, 1091-1109)
Dankwoord
(Acknowledgements in Dutch)
Toen ik 13 jaar geleden zat te zwoegen op mijn SPSS tentamens had ik niet kunnen denken dat ik ooit nog het dankwoord van mijn proefschrift zou schrijven. Onderzoek doen leek me vreselijk ingewikkeld en ik snapte al helemaal niets van statistiek. Maar toen deed ik een afstudeeronderzoek in het AMC en kwam de wetenschap voor mij tot leven. Het bleek stiekem toch eigenlijk best wel leuk. Van het een kwam het ander en ‘ineens’ was ik al bij het AMC/de UvA. Daar begon ik behoorlijk optimistisch. Want zo’n onderzoek, heb je daar nou echt 4 jaar voor nodig? Kon dat niet wat sneller? Ik zou er in ieder geval echt niet langer dan 4 jaar over doen, kwestie van plannen toch? De praktijk bleek weerbarstiger. Meetinstrumenten moesten nog ontwikkeld of aangepast worden; het tijdschema voor de inclusie bleek wat al te optimistisch; analysemethoden bleken niet zo eenvoudig; en leuke en minder leuke privé zaken vroegen om aandacht. Toch ligt dit proefschrift er nu en dat is de soms hobbelige weg waard geweest.

Het doen van onderzoek is soms eenzaam monnikenwerk. Maar vaker gaat het om samenwerken. Er zijn een heleboel mensen die ik heel graag wil bedanken omdat ze hebben begeleid, meegedacht, meegeploeterd, geïnspireerd en gesteund. Een aantal zal ik hier bij naam noemen, maar ook degenen die ik niet bij naam noem en die wel hebben geholpen of tot steun zijn geweest, wil ik bedanken.

Allereerst wil ik mijn (co)promotoren bedanken, professor doctor Else de Haan, professor doctor Pier Prins en professor doctor Frits Boer. Jullie zijn alle drie zeer betrokken geweest, wat onder andere bleek uit jullie supersnelle reacties op stukken die ik ter beoordeling stuurde, maar ook uit jullie interesse in persoonlijke kwesties en jullie geduld. Lieve Else, ik wil je bedanken voor alle steun en inspiratie de afgelopen jaren. Je bent scherp, je bent kritisch, origineel, je leerde me niet zomaar mee te gaan met de heersende ideeën. Je leerde me ook dat de combinatie onderzoek/praktijk een heel leuke én belangrijke is. We deelden leuke, maar ook minder leuke dingen. En ook bij de minder leuke dingen was je tot steun, zelfs tijdens je eigen tegenslagen. Je bent echt een vrouw met power op alle vlakken en dat bewonder ik. Pier, ook jou wil ik heel hartelijk bedanken voor je intensieve en zeer prettige samenwerking. Met je enthousiasme en kritische blik stimuleerde je me altijd om nog even een stapje verder te gaan en niet te snel genoeg te nemen met een stuk dat ‘af’ leek. Ik ben nog steeds onder de indruk van je geheugen voor zowel de auteurs, het jaartal, het journal en het issue van belangrijke artikelen. Frits, met je open en warme houding zorgde je ervoor dat ik me heel snel thuis voelde op de afdeling, maar ook het (zelf)vertrouwen kreeg om me het onderzoek eigen te maken. Je bent voor mij echt het voorbeeld van een psychiater met hart voor het vak en hart voor zijn patiënten. Bedankt voor je steun, je goede commentaren en taal-technische tips.

Dit onderzoek is opgezet en uitgevoerd in zeer nauwe samenwerking met een aantal mensen. Vanaf het begin is het een multicenter studie geweest waarbij Maaike Nauta en Catharina Hartman vanuit Accare, de Rijksuniversiteit Groningen en het Universitair Medisch Centrum Groningen betrokken zijn geweest bij de initiatie, uitwerking en uitvoering. Maaike en Catharina, ik wil jullie heel hartelijk bedanken voor de intensieve en zeer prettige samenwerking. Jullie waren
altijd bereid om mee te denken en jullie kundig oordeel te geven. Daarnaast spraken jullie op moeilijke momenten altijd steun en vertrouwen uit en dat heb ik erg gewaardeerd. Natuurlijk moet ik ook Harma Moorlag bedanken. Jij hebt gezorgd voor het verzamelen van het grootste deel van de data. Al die vragenlijsten, al die computertaken, al het nabellen over (follow-up) afspraken. En dan mailde of belde ik weer met vragen over missing data, etc…. Heel erg bedankt voor je enorme inzet, zonder jou was het niet gelukt. Ook dr. Catrien Reichart en prof. dr. R. Minderaa wil ik hartelijk danken voor hun bijdrage.

Het is uiteindelijk geen co-promotie geworden, maar in 2005 ben ik samen met Leentje Vervoort aan dit project begonnen. Leentje, de samenwerking was in het begin intensief en we hebben vele uren besteed aan het uitwerken van details en uitzoeken en ontwikkelen van (computer)taken. Gaandeweg gingen we steeds meer onze eigen weg, maar je bleef altijd betrokken bij de stukken die verschenen. Bedankt voor de samenwerking en je zeer precieze en kritische beoordelingen.

Zonder mijn twee heel speciale collega’s en kamergenootjes, Lidewij Wolters en Shelley van der Veek, was het de afgelopen jaren vast een stuk moeilijker geweest. Lieve meiden, wat hebben we een hoop gedeeld samen, zowel wat onderzoek betreft, maar ook privé. We hebben gelachen (soms tot wanhoop van onze andere collega’s haha), gejuicht, gehuild, gebrainstormd, elkaar uit de put getrokken. Wat heerlijk om met twee van die slimme meiden op een kamer te zitten die ik om raad kon vragen, maar waar ik ook mijn verhaal bij kwijt kon. Lidewij, onze onderzoeken waren nauw verweven en vanaf het begin hebben we samen onze eerste stappen gezet in de onderzoeks wereld, dat zal ik nooit vergeten. Shelley, jou leerde ik wat later kennen, maar met je vrolijke persoonlijkheid was je al gauw onmisbaar. Ik kan me geen andere paranimfen voorstellen en ben heel blij dat jullie me tijdens mijn verdediging willen steunen. Ook de andere collega’s van onze afdeling O&O(&O)(&O) wil ik graag bedanken. De ‘Suzannes’, Susan en Suzan, bedankt voor jullie gezelligheid en alle ondersteuning bij praktische zaken. Ik heb ook genoten van jullie egelbief! Mirte Bakker, al even geen collega meer, maar bedankt voor je hulp de eerste tijd. Julia, Marthe, Eva, Els, Caroline, Mariëlle, Chaïm, Jasper, Katja, Katie, Bregtje, Maj, Irma, Inger en alle andere (ex)-collega’s die op de ‘gang’ werkten of nog hebben gewerkt: bedankt voor de samenwerking en succes met jullie eigen werk en studies!

Zonder alle therapeuten, kinderen en ouders, zowel van de Basculé als Accare als Plein 20, die bereid waren mee te werken aan dit onderzoek, was er helemaal geen onderzoek en geen proefschrift geweest. Naast de kinderen met een angststoornis hebben er ook vele kinderen en ouders meegedaan uit de ‘algemene’ populatie. Jullie allemaal heel erg bedankt voor jullie inzet en tijd. Voor de therapeuten was het soms moeilijk om zich in het keurslijf van een studieprotocol te persen, fijn dat jullie dat toch zoveel mogelijk hebben gedaan. Daarnaast is het ook leuk dat jullie altijd weer interesse toonden in de resultaten van het onderzoek. Het verzamelen van die data had niet gekund zonder de enorme inzet van de volgende studenten: Anneloes, Emelie, Tim, Michiel, Annika, Nicolien, Malou en Nathalie. Dank jullie wel!
Gedurende het onderzoek hebben verschillende mensen op uiteenlopende manieren bijgedragen. Harry Garst, jou wil ik hartelijk danken voor je hulp bij de laatste, en taaieste fase van het analyseren van de longitudinale data. Bert Molenkamp, Jaap Oosterlaan en Bart Serrien wil ik bedanken voor de hulp bij het ontwikkelen van de verschillende computertaken. Carl Weems, thank you for your help with the translation of the ACQ-C and your interest in my work throughout the years. Bregie Houtzager, Aleid van Wassenaer, Heleen Stam en Annemarie Kolk wil ik bedanken omdat ze er al die jaren terug voor hebben gezorgd dat ik de wetenschap wel leuk ging vinden. Wat vind ik het erg dat ik Annemarie nooit meer kan laten weten hoe het is afgelopen.

De leden van de promotiecommissie, prof. dr. R.B Minderaa, prof. dr. P.M. Westenberg, dr. J. Huijding en dr. R.J.L. Lindauer wil ik hartelijk danken voor het lezen en beoordelen van het manuscript. Ramón, bedankt voor de samenwerking de laatste jaren en de ruimte die je me hebt gegeven. Ik waardeer het dat je lid wilde zijn van mijn promotiecommissie. Het AMC, de UvA, de Bascule, de RUG, Accare en het UMCG bedank ik voor het (financieel) mogelijk maken van deze studie en deze promotie.

Ondersteuning heb ik niet alleen gehad van directe (onderzoeks)collega’s, maar ook van vele anderen. De 'Angstige Aio’s' wil ik bedanken voor de inspirerende, leerzame en gezellige bijeenkomsten. In het bijzonder wil ik Marija Maric bedanken voor het meedenken over de mediatie analyses, Denise Bodden voor het meedenken over de aanpassingen van de CATS en Floor Sauter voor haar hulp bij het vertalen van de items van de CATS-N/P. Elske Salemink en Marija Maric wil ik daarnaast nog bedanken voor de leuke brainstormsessies over nieuw onderzoek en het meeschrijven aan een subsidievoorstel. Helaas is het niet gelukt, maar het zou leuk zijn om in de toekomst nog eens samen te werken. Alle collega’s van de polikliniek voor autisme spectrum stoornissen van de Bascule wil ik bedanken voor hun interesse. Ik vind het erg leuk dat ik bij ASS blijf werken!

En dan, al mijn lieve vrienden, wat fijn dat ik eindelijk kan zeggen dat het klaar is. Bedankt voor jullie interesse de afgelopen jaren. Vanaf 2013 heb ik hopelijk écht weer meer tijd. Dus Maia, Heleen, Denise, Sylvia, Sally, Claudia, Lies, Angela, Lisa, Marije, Dennis, Kim, kom maar op met de eet-dates, sauna-dates en alle andere afspraken. Ik heb zin om jullie en de groeiende schare ukkies vaker te zien! Ook Henk en Miriam, Veerle, Mirte en Erwin, mijn schoonfamilie en lieve vrienden van mijn ouders wil ik bedanken voor hun interesse de afgelopen jaren. Henk, eind dit jaar zijn er twee doctors in de familie, leuk dat we het konden delen!

Ten slotte wil ik de vier meest belangrijke mensen in mijn leven bedanken. Voor al hun steun, al hun geduld. Lieve Wim en José, lieve papa en mama, wat hebben we samen veel lief, maar ook veel te veel leed gedeeld. Ik ben trots op hoe jullie je staande hebben gehouden en hoe jullie ondanks alles toch steeds weer energie vonden om mij te steunen, op alle mogelijke manieren. Jullie durfden het de laatste tijd bijna niet meer te vragen, maar het is nu echt af! Ik
hou van jullie, laten we samen fijn verder genieten van kleine Sophieke en het, vaak ook goede, leven. Martijn kijkt vast van een afstand mee, hopelijk met zijn bekende big smile.

Lieve Gerdo, ook jij hebt dit hele project vanaf het begin meegemaakt. Wat hebben we de afgelopen jaren veel beleefd samen. Een groot deel daarvan liep mijn promotie onderzoek als een rode draad mee. Alles heb ik met je gedeeld: het plezier, de eerste meting, de eerste publicatie, zenuwen voor een congres; maar ook de frustraties en de stress en heel veel ik-heb-het-echt-helemaal-gehads. En ook met jou heb ik al het lief en leed van de afgelopen jaren gedeeld. En altijd was je er om rustig te luisteren, moed in te spreken of werk uit handen te nemen zodat ik tijd had voor mijn onderzoek of andere belangrijke zaken. Ik weet niet hoe ik alles zonder jou had moeten doen. Bedankt dat je er voor me bent. Nog veel belangrijker dan welk onderzoek of wat dan ook is natuurlijk onze Sophie. Sophie, je bent nog heel klein en staat nog aan het begin van alles. Maar wat maak je mij en papa vreselijk gelukkig. Ik hou van jullie allebei en heb zin in heel veel fijne dingen met jullie samen. Ik ben klaar!
Curriculum Vitae
Sanne Hogendoorn was born in Beesd, The Netherlands, on June 13th 1980. She graduated in 1998 from high-school at the Gymnasium Camphusianum in Gorinchem. After graduation she travelled and worked in Australia and New-Zealand for nine months. From 1999 to 2004 she studied Psychology at the University of Amsterdam, specializing in clinical psychology with an emphasis on children and adolescents. In 2003/2004 she worked on her graduation research at the Division of Neonatology and the Pediatric Psychosocial Department of the Emma Kinderziekenhuis at the Academic Medical Center in Amsterdam. This research titled "Preterm labor suppressors: Psychosocial long term effects on children. A follow-up of children exposed in utero to nifedipine or ritodrine for the management of preterm labor", was completed in 2004. She conducted her clinical training in 2004 at the Department of Medical Psychology at the Slotervaart Ziekenhuis in Amsterdam. At the same time, she worked on her master-thesis titled "The effects of war on children". In 2005, after graduating cum laude, Sanne started her PhD research which formed the basis of this dissertation, at the Department of Child and Adolescent Psychiatry of the Academic Medical Center in Amsterdam. Together with PhD students Leentje Vervoort (now PhD) and Lidewij Wolters, she participated in a large multi-center study which examined both (the assessment of) mediators of treatment effect for anxiety disorders and obsessive compulsive disorder. Sanne's research focused on mediators of anxiety treatment outcome. The study was conducted in collaboration with de Bascule in Amsterdam, Accare in Groningen, the Department of Developmental Psychology of the University of Amsterdam, the Department of Clinical psychology of the University of Groningen and the Department of Psychiatry of the University Medical Centre in Groningen. The study was supervised by professor Frits Boer, professor Pier Prins, and professor Else de Haan; and was conducted in collaboration with doctor Maaike Nauta and doctor Catharina Hartman. During her PhD, Sanne participated in the education program of the Dutch-Flemish post-graduate research school "Experimental Psychopathology", and the post-graduate school of the Academic Medical Center, supervised research projects of master and bachelor students and presented at (international) congresses. Between October 2010 and October 2012 she worked as a researcher at the Academic Medical Center. Since 2007 Sanne works as a psychologist at the outpatient clinic for Autistic Spectrum Disorders of the Bascule in Amsterdam.
Publications


Looking for Mediators

Cognition, Perceived Control and Coping in the Treatment of Anxiety-Disordered Children

Sanne M. Hogendoorn

Uitnodiging

Graag wil ik u uitnodigen voor het bijwonen van de openbare verdediging van mijn proefschrift:

Looking for Mediators: Cognition, Perceived Control and Coping in the Treatment of Anxiety-Disordered Children

Vrijdag 21 december 2012 om 10.00
Agnietenkapel
Oudezijds Voorburgwal 231
Amsterdam

Na afloop bent u van harte welkom op de receptie ter plaatse

Paranimfen:
Lidewij Wolters
l.h.wolters@amc.uva.nl

Shelley van der Veek
s.m.vanderveek@amc.uva.nl

Sanne Hogendoorn
Van Noordtkade 28-b, 1013 BZ Amsterdam
s.hogendoorn@debascule.com
ADDENDUM


In Hoofdstuk 5 is op pagina 81 Tabel 6 weggevallen. Deze staat hieronder weergegeven.

Table 6.

*Intercorrelations of the CATS-N/P Scales and Measures of Anxiety and Emotional Disturbance*

<table>
<thead>
<tr>
<th>CATS-N/P</th>
<th>Total negative</th>
<th>Total internal negative</th>
<th>Physical threat</th>
<th>Social threat</th>
<th>Failure</th>
<th>Hostility</th>
<th>Positive thoughts</th>
</tr>
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<td>.68</td>
<td>.53</td>
<td>.60</td>
<td>.65</td>
<td>.23</td>
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<td>.22</td>
<td>.23</td>
<td>.24</td>
<td>.09*</td>
<td>-.21</td>
</tr>
</tbody>
</table>

* Not significant. All other correlations are significant $p < .01$